COORDINATED WATER MANAGEMENT UNDER THE PRIOR APPROPRIATION DOCTRINE IN NEW MEXICO THE RIO GRANDE CASE - THE PECOS RIVER CASE

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THE RIO GRANDE CASE

The Rio Grande has its headwaters in the southern part of Colorado and flows north to south across the central part of New Mexico. Upon leaving New Mexico, the river forms the international boundary between the Republic of Mexico and the State of Texas. The Rio Grande drains approximately 40 percent of the area of the State of New Mexico.

In the late nineteenth century water shortages on the Rio Grande developed in the southern part of the state, in Texas and in the Republic of Mexico. Mexico subsequently filed a claim for damages against the United States alleging that the shortages in Mexico were due to uncontrolled diversions from the Rio Grande in the states of Colorado and New Mexico. The United States, through the International Boundary and Water Commission, thereupon instituted an investigation of the conditions which resulted in the "Rio Grande Embargo" of 1896 and the Mexican Treaty of 1906. The "embargo" was an order by the U.S. Secretary of the Interior which prevented further large-scale development of Rio Grande water for irrigation in Colorado and New Mexico by suspending action on applications for water-project rights-of-way across public lands. Under the

terms of the Mexican Treaty, and in return for relinquishment of all claims for damages, the United States guaranteed to Mexico annual delivery of 60,000 acre-feet of water in the Rio Grande at the head of the Mexican Canal near Ciudad Juarez, with the provision that the nations would share water shortages in times of drought.

Both to insure fulfillment of the terms of the Mexican Treaty and to develop an interstate reclamation project in the Elephant Butte-Fort Quitman reach of the river, the United States in 1907 modified the Rio Grande "embargo" to permit construction of Elephant Butte Dam by the U.S. Reclamation Service. The dam was completed in 1916, along with other works of the Rio Grande Irrigation Project of New Mexico and Texas.

With the international water problem apparently settled by the Mexican Treaty, competition for use of Rio Grande water by the states of Colorado, New Mexico and Texas increased. The U.S. Constitution forbids alliances and treaties between states, but does permit agreements or "compacts" to be consummated with the consent of Congress. These interstate compacts are our most profound law and can supersede state laws and even state constitutions. Compacts are generally agreed upon first by representatives of the states involved; then are presented to the state legislatures for ratification which is then approved by the governor of each participating state; finally the

agreement is ratified by legislation in the U.S. Congress and becomes law when the legislation is signed by the President.

A Rio Grande Compact between the states of Colorado, New Mexico and Texas had its beginnings in 1923 when the legislatures of Colorado and New Mexico enacted statutes authorizing appointment of representatives to an interstate water commission. Texas followed suit, the U.S. Congress consented to the formation of such a commission and the President designated a representative to safeguard the rights of the United States. A temporary compact was entered into in 1929 which remained in effect until October 1, 1937. A second and final compact was executed by the commissioners in Santa Fe, New Mexico on March 18, 1938. The compact was ratified by Congress and legislation enacting it into law was signed by the President on May 13, 1939, some sixteen years from the date of initiating actions by Colorado and New Mexico.

Since the surface-water supply of the Rio Grande had long since been fully appropriated, the fundamental objective of the compact was the maintenance of the status quo with respect to the amount of consumptive use (depletion) of water within each state. The annual delivery obligations of the upstream states (Colorado and New Mexico) are based on the flow at certain gaging stations which furnish an index of the annual water supply of the river. New Mexico's obligations to deliver water at Elephant Butte Reservoir, pursuant to Article IV of the Rio

Grande Compact, is based on the flow at Otowi gage on the main stem of the river in north-central New Mexico, over 200 miles upstream of Elephant Butte. The delivery is measured as the amount released from Elephant Butte Reservoir plus any increase in the amount in storage or minus any decrease in the amount in storage; that is, reservoir evaporation or other losses are not a part of the delivery. The compact also limits the use of storage facilities in the entire watershed above Elephant Butte dam.

Geologic and hydrologic investigations have long since established that there is intimate hydraulic communication between the Rio Grande and adjacent groundwater reservoirs or aquifers. The Rio Grande flows through New Mexico along a structural and erosional trough which is filled with soft sedimentary rocks and resistant lava interbeds that were deposited from Miocene time to about middle Pleistocene time. These rocks are referred to collectively as the Santa Fe group and form the principal aquifer adjacent to the main stem of the Rio Grande.

While the Rio Grande Compact at no point mentions groundwater, the delivery schedule of Article IV makes clear that any depletion of the flow of the river or its tributaries between Otowi gage and Elephant Butte Dam as a result of withdrawals from the stream related aquifers requires an

equivalent reduction in the consumptive use of stream flows, which were fully appropriated long before 1938.

Article IV of the Compact also provides that the schedule relating to New Mexico's Elephant Butte delivery obligation to the flow at Otowi gage is subject to appropriate adjustment for any depletion in New Mexico of the natural runoff at Otowi gage after 1929. Thus, the limitation on groundwater uses from stream related aquifers above Otowi gage is also clear despite the lack of any literal reference to ground water in the Compact.

The unrestricted development of the groundwater resource in the Rio Grande system in New Mexico would not only reduce the water supply available for existing prior rights in New Mexico, but would also destroy the state's ability to meet its Rio Grande Compact commitment. Another facet was that a prohibition of the development of the groundwater related to the Rio Grande flows would have made it necessary to forego the greater convenience and economy that can be had by the use of wells to meet municipal and industrial requirements instead of the diversion, treatment and distribution of surface water supplies.

Those provisions of the Rio Grande Compact and the contemplated large development of wells in the Albuquerque area were the primary reasons for the State Engineer's November 29, 1956 declaration of the Rio Grande Underground Water Basin

extending from Elephant Butte Dam to the New Mexico-Colorado state line. Laterally from the Rio Grande, the basin boundaries enclose those lands on which it might be practicable to develop wells of large yields which could significantly affect the flow of the Rio Grande. Since 1956, the basin has been extended to include essentially all of the surface drainage of the Rio Grande above Elephant Butte Dam, not only to protect existing water rights and New Mexico's compact obligation, but to insure the orderly development of the ground water resource and its beneficial use.

Within the boundaries of the Declared Rio Grande Underground Water Basin the State Engineer permits the drilling of wells and withdrawals of ground water on the condition that the effects of those withdrawals on the flow of the Rio Grande at each point in time are offset by the retirement of valid existing right to the use of surface waters of the Rio Grande. Ultimately in the hydrologic situation described, the rate of depletion of water pumped from a well must be fully reflected in diminution of river flows, but, before an equilibrium between the pumping and the stream is reached, a portion - and in some cases a large portion of the withdrawal by the well merely reduces the amount of water in underground storage in the aquifer. That portion of the withdrawal has no effect on existing rights to surface water and the new user is not required to compensate for it. This method of administration permits the greatest development and use of the ground water in

the basin, consistent with protecting existing rights to the use of the surface-water supply.

When a new appropriation of the ground water in the basin is permitted, the effects of the new pumping on the river must be calculated. Quantities that need to be known or estimated in order to perform the calculations are the hydraulic coefficients of the aquifer, transmissivity and storage, location and shapes of aquifer boundaries, distances of the well from the river and aquifer boundaries, and the manner of disposal of water not actually consumed and its amount. With the exception of return flow, the distance from the pumping well to the stream causes the greatest variation of any of the parameters in the effect of pumping on the stream at any time. An example may give some idea of the magnitude of the amount and time that the available supply is increased by the coordinated management. Given the aquifer characteristics in the vicinity of Albuquerque, the effect on river flows of withdrawals from a well located three miles from the river is only about 50% after ten years of pumping. Assuming a return flow of 50%, as is typical of municipal use, no reduction of surface water use would have to be made for 10 years.

Perhaps a better way to evaluate the effects of coordinated management is by consideration of these facts. Before the declaration of the Rio Grande Underground Water Basin in 1956, the City of Albuquerque had established the right to withdraw

about 38,000 acre-feet of water annually from wells drilled into the Rio Grande aquifer, which implies a right to deplete the flow of the river by about 19,000 acre-feet annually. At that time the City was using about 31,000 acre-feet annually. By 1982 the City's withdrawals amounted to about 91,000 acre-feet. The difference between the 1956 right of 38,000 acre-feet and the 1982 withdrawal of 91,000 acre-feet was acquired under permits from the State Engineer conditioned so that when the effects of the withdrawals on the river exceeded the 50% of the withdrawal returned to the river from the municipal sewage treatment plant, the City would release to the river San Juan-Chama Project water for which it has contracted or retire irrigation rights to the flows of the Rio Grande in amounts sufficient to equal that difference.

Current estimates indicate that by 1995 Albuquerque will be withdrawing about 139,000 acre-feet annually, which will cause a total gross depletion of surface flows in the amount of about 92,400 acre-feet annually. The City's net depletion to the river (after consideration of 69,400 acre-feet of direct return flow to the river from it sewage treatment plant) would amount to nearly 23,000 acre-feet. Vested City depletion rights in that year amount to 18,700 acre-feet, indicating the need to release about 4,300 acre-feet of San Juan-Chama water to offset the depletion to the Rio Grande resulting from its pumpage. Release of the full amount of 48,200 acre-feet per year of San Juan-Chama water for which the City has contracted will not be

necessary until about the year 2030. After that date the City would be required to acquire and retire valid existing surface water rights to offset its effects resulting from ground water pumpage.

As was expected, the authority of the State Engineer to impose such conditions on permits to appropriate ground water was challenged. In 1962 the New Mexico Supreme Court affirmed that authority in City of Albuquerque v. Reynolds 71 N.M. 428, 379 P.2d 73. The Supreme Court stated that: "The mere fact that the territorial legislature in the water code dealt only with surface waters and therein gave the territorial engineer certain jurisdiction over these waters does not, as argued by the city, imply a legislative intention that subsequent statutes dealing with underground waters are to be looked upon and treated entirely separate and apart as though dealing with two entirely different subjects. The jurisdiction and duties of the state engineer with reference to streams and underground waters are the same. They each relate to public waters subject to use by prior appropriators. There does not exist one body of substantive law relating to appropriation of stream water and another body of law relating to appropriation of underground water. The legislature has provided somewhat different administrative procedure whereby appropriators' rights may be secured from the two sources but the substantive rights, when obtained, are identical ." (71 N.M. at 437.)

The Supreme Court pursued the question further and said: "We have already referred to the fact that no attack is made here, nor has one been made elsewhere in these proceedings, on the reasonableness of the regulations promulgated by the state engineer. If we assume, as we must, from the findings made by the state engineer and also by the district court that the underground waters in question cannot be taken without impairment to the rights of the river appropriators, even though there are unappropriated underground waters in the basin, then it would seem to follow that some method should be devised, if possible, whereby the available unappropriated water can be put to beneficial use. Because of the interrelationship between the two waters, as discussed in the findings of the state engineer from which we have extracted quotations supra, it would seem that a method has been devised to serve this purpose. Having the statutory power and duty to protect prohibit the taking, by denying the applications in toto if necessary to protect existing rights, the state engineer has reasonably exercised his power by imposing suitable conditions so as to permit such taking as will not result in impairment.... We feel constrained to hold that the state engineer adopted the only known plan to avoid impairment to existing rights and that is his requirement, that surface rights be retired to the extent necessary to protect prior stream appropriators as a condition of the granting of an application to appropriate from the basin, is within the lawful power and authority of the state engineer." (71 N.M. at 439-40.)

It is important to note that under the scheme of administration described it is possible to substantially increase for a period of several decades the total amount of surface and ground water used in the Rio Grande Basin in New Mexico without diminishing the amount available to satisfy prior water rights or for delivery to Texas under the Rio Grande Compact. Ultimately the total usage must return to about the amount being used when the ground water controls were initiated in 1956. The temporary increase in usage will, of course, be derived from water stored in the aquifer.

THE PECOS RIVER CASE

The Pecos River rises in Sangre de Cristo Mountains in north-central New Mexico and flows southward some 900 miles to join the Rio Grande near Lantry, Texas draining some 25,000 square miles in New Mexico and 19,000 square miles in Texas.

A discussion of this subject necessarily requires a knowledge of the history of water development in the Pecos River Basin. The earliest recorded uses from this stream system were surface-water diversions from the river reported by the first Spanish Conquistadores who invaded what is now known as New Mexico in 1541-1543. They found one of the largest and most prosperous Indian communities (pueblos) on the Pecos River, known as Cicuye (See-coo-YAY) or Pecos. According to early accounts, Cicuye was a quadrangular structure consisting of two large communal dwellings four stories high, containing more than a thousand dwellings or apartments and so designed that one could make the complete circuit of the village upon the balconies without setting foot on the ground. Adjacent to the walled city were lush fields of maize (corn), pumpkins and beans, irrigated by means of a system of ditches diverting from the river.

Farther south along the Pecos River, the explorers found smaller, less highly developed, less prosperous villages whose semi-migratory residents dwelt in dugout caves and crude mud huts subsisting in the main upon the flesh of such creatures as they were able to overcome and kill. They too cultivated crops of

maize and beans and squash near springs and upon the flood plains of the rivers - if on moderate scale. Relics of these primitive irrigation systems still endure near Fort Stockton, Texas.

Spanish colonization of what is now the Upper Pecos Valley began about 1594 when Spanish settlers ventured from the Rio Grande Valley at first taking up farms near the declining Cicuye Pueblo and utilizing ditches dug by the Indians centuries earlier. Except in rich mining areas, such as in some parts of Mexico, the Spanish scheme of colonization was founded upon agriculture. And since precipitation was limited throughout most of Spain's North American provinces, agriculture depended upon irrigation. As a result, the community acequia (irrigation ditch) was one of the most important institutions in the early colonies, just as it is in most Spanish-American farming communities in New Mexico today.

Development proceeded slowly and Spanish settlements were contained within the arc of the river between Pecos village and Anton Chico, in the Upper Pecos Valley, largely as a result of nomadic Indian hostility and revolution. By 1835, a permanent colony was established on the Baca grant at Vegas Grandes or Las Vegas. By and large, however Spanish-Mexican colonization of the Pecos Valley had been at a standstill since about 1820, and full development of the area's potential natural wealth awaited the coming of the better-armed, better-tooled and better-organized (if not wealthier) Anglo-American settler.

The opening of the West to settlement was brought about by the so-called Homestead Act of 1862 by the U.S. Congress. This act permitted settlers to acquire farms of 160 acres practically free of charge. However, it was soon recognized that the terms of that act were not suitably adapted to conditions in most areas west of the 100th meridian, for private irrigation systems were beyond the means of most settlers; and if the land were to be used for grazing, or even dry farming, a quarter section was not an economic unit. What followed was the Act of July 26, 1866 (17 Stat. 251), granting rights-of-way for canals and ditches on public lands to holders of valid water rights. Then the first Desert Land Act of 1877, and New Mexico's 1887 enactment of a statute providing that: "any five persons who may desire to form a company for the purpose of constructing and maintaining reservoirs and canals, or ditches and pipelines, for the purpose of irrigation ... and for the colonization and improvement of lands in connection therewith ... shall make and sign articles of incorporation ..."--whereupon they were empowered to raise money through the sale of stock and to conduct surveys for water works, construct the works, divert unappropriated waters and condemn lands and materials that may be necessary for the uses and purposes of the companies.

Progress was still slow and limited because the surface water supply from the river was limited without storage of that supply. The task was one of such magnitude that only the Federal Government could cope with it, as men throughout the West were

beginning to perceive. Several years were to elapse before the requested Federal aid for irrigation would become available. But in the meantime, private capital continued to flow into New Mexico and West Texas and development for irrigation continued in the Pecos Valley. In 1889 and 1890, some 55 separate irrigation companies were incorporated in New Mexico, 25 of which were licensed to do business in the Upper and Middle Pecos Valleys. By the turn of the century, more than 13,000 acres were under irrigation in the vicinity of the present day City of Carlsbad, and the outlook for the future at last seemed bright inspite of natural disasters such as floods.

Meantime in 1891, Nathan Jaffa, a prominent Roswell citizen, accidentally encountered a small artesian flow while drilling a well to replace his shallow household well. This discovery led to the development of 153 flowing wells in and around Roswell by 1900, and more extensive development was made between 1905 and 1916 such that by 1925, more than 1,400 artesian wells were in operation irrigating about 45,000 acres near Roswell.

On June 17, 1902, President Theodore Roosevelt had secured passage of the "Reclamation Act". The Secretary of the Interior was empowered to administer the act and the Secretary created the U.S. Reclamation Service (now Bureau of Reclamation) as a branch of the U.S. Geological Survey. After damages from the 1904 Pecos River floods had been assessed, farmers faced with ruin requested that the Service take over and repair the Carlsbad Project works.

Surveys were initiated in early 1905 such that by 1937, the rehabilitation of the Carlsbad Project included reconstruction of Avalon and McMillan Dams as well as construction of Alamogordo Dam (now Sumner Dam). Irrigated acreage in the Carlsbad Project since rehabilitation has ranged from 6,528 acres in 1907 to 25,278 acres in 1926.

Other New Mexico surface water development includes the Hagerman Canal, initiated in 1879 for 9,000 acres, the Hope Project initiated in the late 1880's for some 3,200 acres, the Fort Sumner Project initiated in 1906 for some 6,500 acres and the Storrie Project initiated in 1906 for some 4,900 acres.

Mainstream development of the Pecos River in Texas began about the middle 1870's, but there was no important activity until about 1888, contemporary with important development in the Middle Valley in New Mexico. In their early years of operation, the main-stem Pecos River projects in the Lower Valley in Texas were subjected to incredible hardships. By 1914, 173,000 acres of irrigable land were included in the ten river projects below Red Bluff, but fewer than 30,000 acres were actually in cultivation, and many of these suffered from shortages of water. In January 1914, having resolved to follow the example of their upriver neighbors in New Mexico and request aid from the Federal government, the ten river projects organized the West Texas Reclamation Association and retained a Reclamation Service engineer to investigate the Texas development and make

recommendations concerning project rehabilitation, including the provisions of storage. The engineer recommended construction of a storage dam at the Red Bluff site in New Mexico to serve all ten of the river projects. The engineer foresaw that "the interstate character of the situation would present problems requiring solution." The Association reorganized and further requested that the Federal government assume the role of arbiter of water rights and supervise the apportionment of Pecos River water not only between users in New Mexico and Texas but among users in Texas itself.

In 1920, the Bureau of Reclamation, representing landowners in the Carlsbad Irrigation District, brought suit in Federal District Court in New Mexico asking that all rights served by the Pecos River above Carlsbad be determined by the court. This suit, entered as United States v. Hope Community Ditch, et al., resulting in one of the first adjudication of water rights in the basin. The results of the action, commonly called the "Hope Decree," were issued in 1933 and defined rights to water use in most areas above Lake McMillan. Subsequently, areas outside those covered by the Hope Decree were also adjudicated until, at present, practically all lands irrigated from surface water in the basin have been defined by court decrees.

The interstate water problem on the Pecos River before New Mexico and Texas had the example set some years earlier by irrigators in the two states in the interstate Reclamation

Service project on the Rio Grande, which was presented earlier in the Rio Grande case. In 1939, Secretary of the Interior Harold L. Ickes requested that the Chairman of the Natural Resources Committee conduct a thorough study of the water problems in the Pecos River Basin. The Secretary pointed out that increasingly acute problems connected with water quality and water use in the basin made a general comprehensive investigation necessary.

Thereafter, the Pecos River Joint Investigation was made and results were published in 1942. In that year, New Mexico and Texas began negotiation of a compact. After several years of negotiation it was not until December 3, 1948, that the compact was signed by the commissioners of the two states. In 1949, the legislatures of the two states ratified the compact and Congress and the President approved the agreement. Since that time, the compact has been binding upon the states.

The intent of the compact was to preserve the status quo of man-made depletions from the Pecos River water as of 1947. The key provision of the compact is found in Article III(a) in a sentence which reads as follows:

> "New Mexico shall not deplete by man's activities the flow of the Pecos River at the New Mexico-Texas state line below an amount which will give to Texas a quantity of water equivalent to that available to Texas under the 1947 condition."

The "1947 condition" is defined by an inflow-outflow equation based on data from the 1919-1946 period.

The Roswell Underground Water Basin was declared by the State Engineer on August 31, 1931, in response to overdevelopment of the artesian basin. The basin encompasses two major aquifers, the deeper of these is called the artesian aquifer and the upper body of water is described as the shallow water aquifer. These two aquifers are separated in most areas by a relatively impervious red shale and gypsum known as the Pecos Red Beds. These red beds constitute the confining layer beneath which the artesian aquifer is found. Above the red beds and spreading over the basin is the valley fill, consisting of topsoil, sand, gravel, shale, clay and boulders which have been washing in and deposited over recent geologic time. The shallow water aquifer is contained in the valley fill and varies in thickness from a thin edge to over 200 feet in portions of the basin. The Pecos River extends through this groundwater complex, running generally from north to south. The river cuts through the shallow water aquifer and in some areas penetrates the red beds and exposes the artesian aquifer. The principal point of discharge of the artesian aquifer is by means of springs.

The artesian aquifer is recharged largely by precipitation upon the outcrop area (San Andres Formation) west of the Pecos River. The shallow water aquifer is recharged by precipitation, by upward leakage from the artesian aquifer and return flow from

artesian wells. The direction of movement of the water through the red beds varies from time to time, depending upon conditions of drought and abundance. Sometimes the artesian aquifer contributes to the shallow aquifer and at other times and places the shallow aquifer may leak water into the artesian aquifer. Perhaps what has been said will suffice to indicate the difficulty of administering these several interconnected groundwater and surface water sources.

Since the earliest uses from the Pecos River system were based upon surface water diversions downstream from the Roswell Basin in the vicinity of Carlsbad, one of the principal criteria applied by the State Engineer in managing the Roswell Basin is the protection of the senior downstream surface water users.

The availability of this remarkable groundwater system to the water users in the vicinity of the Pecos River in the Roswell area has provided an unusual solution to the problems of seasonal shortages which generally exist in a southwestern surface water system. The availability of groundwater to supplement surface water uses has forstalled the priority fights that must frequently be anticipated in a prior appropriation system. In fact, the availability of a groundwater source, interrelated with the stream system has resulted in the drilling of supplemental wells, as opposed to the traditional priority call, as a means for securing the full water supply to which senior appropriators have been entitled.

This "administrative solution" was born of necessity rather than by virtue of foresight. It came about in part because, at the time serious surface water shortages began to develop, vast amounts of junior-priority ground water uses had been initiated.

It is clear under the prior appropriation doctrine that even a relatively senior appropriator may not change his point of diversion if to do so will cause impairment of existing rights, whether those existing rights are senior or junior. (N.M. Stat. Ann. Sections 72-5-23 and 72-12-7 <1978>).

At least a partial solution to the dilemma grew out of what is now described as the "Templeton Doctrine" in New Mexico, a concept arising out of the case of Templeton v. Pecos Valley Artesian Conservancy District. 65 N.M. 59, 332 P.2d. 465 (1958). The New Mexico Supreme Court ruled for the first time that a surface water appropriator whose water supply fails at his surface point of diversion is entitled to follow his water to its source in a related underground aquifer. The Court seemed to have said that the adverse effects resulting from "following the water to its source" do not constitute impairment.

Later decisions of the New Mexico Supreme Court in the cases of Clodfelter v. Reynolds, 68 N.M. 61, 358 P.2d 626 (1961), and Durand v. Reynolds, 75 N.M. 497, 406 P.2d 817 (1965), have reaffirmed and perhaps extended the Templeton decision. In the Clodfelter case, the court held that an application for permit to

change point of diversion of an existing surface water right by sinking a well did not attempt a new appropriation and the applicant therefore had no burden to prove that there was unappropriated waters available. In addition the court found that the evidence before the State Engineer and the District Court below supported finding that the proposed change of point of diversion of surface water by sinking a well would not impair other existing rights to the use of public waters. In the Durand case, the court found that "(A)lthough right to change point of diversion or place of use of water is an inherent property right incident to ownership of water rights, it is a right subject to condition that it cannot impair other existing rights that may be enjoyed only in accordance with statutory procedure. N.M. Stat. Ann. §72-12-7 (1978).

The New Mexico Supreme Court also ruled in Kelly v. Carlsbad Irrigation District, 76 N.M. 466, 415 P.2d 849 (1966), that 1) "(U)nderground waters which, if not intercepted, would reach and become part of natural stream, either on or below surface, is governed and controlled by constitution and statutes relating to appropriation and diversion of surface water", and 2) "When artificial or natural flow of surface water, reached, by percolation, seepage or otherwise, underground reservoir and thereby loses its identity as surface water, such water becomes public and subject to appropriation in accordance with applicable statutes", and 3) "One having water rights in surface flow which has been lost to underground reservoir, seepage or otherwise, can

neither transfer his surface rights nor change his point of diversion into underground reservoir", and finally 4) "Transfer of surface right to the water which had lost its identity as surface water because it had reached underground reservoir would not be a change in point of diversion but a new appropriation in underground reservoir."

Because the Pecos River is a fully appropriated stream system, the shallow water aquifer throughout the basin is in hydraulic communication with the river and the artesian aquifer in the Roswell Basin was a substantial contributor to the Pecos River, the State Engineer has adopted an administrative criteria for the Roswell Underground Water Basin which does not allow any new appropriations of groundwater (except for domestic and stock wells pursuant to §72-12-1 NMSA 1978). Therefore any new uses of water must necessarily result from the change in the exercise of existing water rights. In order to protect prior rights from all sources, both surface and ground, the State Engineer's analysis requires a comparison of the effects resulting from a water right transfer on the sources of water supply. Of course the sources to be analyzed are the Pecos River, the intake area of the artesian aquifer and the shallow water aquifer.

The New Mexico Supreme Court's decisions in Templeton, cited in the Pecos River case and the City of Albuquerque, cited in the Rio Grande case, made it perfectly clear that the coordinated management of surface and groundwater is not only possible but is essential under New Mexico's Constitution.

I hope the presentation of these two cases of coordinated management of water in New Mexico demonstrates the importance of groundwater to the state's economic development. Of course, New Mexico's debt to the pioneers and settlers who moved early on to apply available surface water to beneficial use requires that these prior rights be protected.