

THE IDEA OF AN INEXHAUSTIBLE SUPPLY OF GROUND WATER ON THE TEXAS HIGH PLAINS: THE OBSTACLE OF A MYTH TO WATER CONSERVATION

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An important obstacle to ground water conservation on the Texas High Plains has been the erroneous belief that the regional underground water supply is inexhaustible. The myth had its origins in 19th century theories that ground water beneath the Great Plains originated in the melting snows of the Rocky Mountains. Although early 20th century geologists pointed out that the underground water supply was simply the percolated accumulation of local rainfall, the populace adhered to the myth even after massive pumpage for irrigation had begun to lower the water table. In the late 1940's a High Plains organization, professing a belief in the myth, was largely responsible for defeat of a proposed water conservation law.

Myths have played significant roles in the history of the Great Plains. The idea that the area constituted the Great American Desert repelled population from the region until after the Civil War. Following 1865 a period of generally sufficient rainfall set in, and settlers moving into the Great Plains promoted another myth, the belief that the area was the garden-spot of the nation. That concept, too, was shattered in the wake of a disastrous drought which enveloped the semi-arid plains from about 1886 to 1896 (1). Another myth, which gained prominence in the Texas High Plains sub-division of the Great Plains in the early 20th century, was the belief that pumps could not exhaust the underground water supply of the region. Echoing the concept held by settlers and boosters, in 1904 the editor of *The Earth*, an agricultural magazine published by the Santa Fe Railroad, remarked that the Texas Panhandle "has a water sheet under it that is inexhaustible . . . An inexhaustible water supply from such wells is a thing expected and counted upon in all cases" (2). In this region of few streams, thousands of windmills dotting the level terrain furnished most of the water consumed by livestock and people. These whirling, wooden turbines, many of which were concentrated in groups of 100 or more on town sections, indicated to the regional populace that neither drought nor heavy pumpage could diminish their water supply (3).

Most adherents of the myth believed that

the water originated in the snows of distant mountains. In 1914, a geologist with the U.S. Geological Survey noted that most inhabitants of the plains still believed that the ground water flowed from the Rocky Mountains (4). That same year Zenas E. Black, executive secretary of the Plainview, Texas, Commercial Club stated that the water came from "the 'Underground River.' . . . It starts in the melting snows of the Rockies, sinks below the surface and at the urge of gravity starts southeast" (5).

One variation of the concept was that the water flowed from some distant arctic glacier rather than from the melting snows of the Rockies. This idea originated with a certain "Captain Livermore" who supposedly conducted a topographical survey of West Texas in the 1880's for the U.S. Army. H. C. "Hank" Smith, who had settled on the High Plains in 1877, recalled in his later life that Livermore had related the theory to him. According to Smith, the Captain had concluded that "the only power that could ever exhaust the Plains water supply would be an earthquake that would crack the flint bottom of the underground river and give the water another channel" (6). At least one other later settler continued to embrace this idea long after hearing it from Smith. Don H. Biggers, a local booster who had installed one of the earlier irrigation pumping plants near Lubbock in 1911, recalled that he had noticed a movement of water across the bottom of his shallow well "at the rate of

about a mile an hour." Throwing the scientific method to the winds, Biggers concluded: "Livermore was right. It was not melted snow from distant mountains but glacier water from the Arctic, thousands of miles away. How it gets to the Plains and then spreads out is a matter to be worked out" (7).

The myth that ground water originated from some distant source may have had its beginning in the ideas of some geologists in the late 1880's through their efforts to explain the sources for artesian water (flowing wells). Richard R. Hinton, who conducted the Federal Government's first report on irrigation in 1887, believed that the water underlying the western Great Plains originated as snow on the eastern slope of the Rockies (8). Another geologist who worked on the Federal Government's investigation of artesian and "underflow" water in 1891, which Hinton also directed, noted that there were two theories about the origin of the water. First, the plains were underlaid with a deposit of gravel through which most of the run-off from the Rocky Mountains flowed in an easterly direction. Second, the gravel deposits held water which had percolated down into the earth from rain and snow on the surface of the plains. This geologist admitted that he did not know which of the two was scientifically sound (9). Harry M. Bainer, an agricultural agent for the Santa Fe Railroad, appeared to be reiterating the early Hinton theory when he wrote in 1912: "Geologists, and others . . . claim that this water has its origin in the mountains to the north and west, and that it is an underground stream, flowing southeasterly" (10).

Soon after the turn of the century, however, leading geologists concluded that the ground water of the region was simply the percolated accumulation of local precipitation over a period of thousands of years. Charles N. Gould, professor at the University of Oklahoma who headed an investigation of the Texas Panhandle for the U.S. Geological Survey in 1904-05, noted that the only geological formation of the High Plains which stretched unbroken to the Rocky Mountains was the Permian which

lay well below the water-bearing formation of the region. Moreover, the Valley of the Pecos River in New Mexico cut off the Ogallala formation (the name given to the water-bearing stratum by geologists) from the mountains. Thus, it was physically impossible for water from the mountainous west to reach the underground gravel of the Texas High Plains (11).

A logical implication of the Gould report was that if the region's rich ground water resources were to be conserved, water withdrawal must not exceed the amount of moisture recharged into the formation from local precipitation. So long as inhabitants relied upon the supply only for livestock and human consumption, there was no immediate danger of depleting the supply. But just as technological breakthroughs and economic prosperity have left the undesirable residues of smog and water pollution for the nation to contend with, so the development of more efficient irrigation pumps has played havoc with the High Plains' most valuable natural resource.

In the half-century between 1910 and 1960 the Plains of Texas emerged as one of the most extensively irrigated areas in the United States. Relying almost exclusively upon underground water pumped from the vast Ogallala formation, the region of irrigated land grew from a few acres in 1910 to over 4,600,000 acres in 1964 (12). This massive irrigation pumpage caused the ground water level to decline dramatically within a relatively short period of time. In 1939, the Texas Board of Water Engineers, a State agency empowered to conserve surface water resources, noted a slight but significant drop in the water table (13). The severe drought which covered the region from 1950 to 1956 put an even more severe strain on its water resources as the number of new irrigation wells more than doubled the rate of water withdrawal through the 1950's. Between 1937 and 1959, the decline in the water table throughout the irrigated Texas High Plains averaged 43 feet. In areas of heavier concentration of irrigation wells the decline in ground water level reached a alarming 100 feet (14, p. 5).

Foreseeing possible disaster, the Texa

Board of Water Engineers and other hydraulic engineers called for a ground water conservation law as early as 1934. Specifically, the Board asked the Texas Legislature: "First, to declare the underground water of the State the property of the State; second, to guarantee vested rights to those who already have made beneficial use of underground water; and third, to exercise proper control over future underground water development." The Board concluded: "There is no reason why underground water should not be subject to the same control as surface water." (15) Walter N. White, Senior Hydraulic Engineer for the U.S. Geological Survey, warned plains irrigators in 1938: "Practically everywhere that large supplies of water can be obtained from wells the popular belief has developed that the water is inexhaustible. This belief in many parts of the United States had led to disastrous over-development." Moreover, White observed, "in parts of the High Plains the wells are spaced too closely and the present pumpage probably exceeds the limits of safety" (16). In spite of such warnings, bills dealing with ground water conservation introduced into the Texas Legislature in 1937, 1941, and 1947 were defeated.

One important reason for the defeat of such legislation, especially for the defeat of the 1947 bill, was organized opposition by rural irrigation interests of the High Plains. Irrigation farmers were adverse to such legislation, not only because they feared that a ground water conservation law would limit or even diminish their profits, but also because they still believed in the myth of the "inexhaustible supply." For example, when support for an underground water law began growing in Texas, a group of farmers and local businessmen met at Amherst on November 21, 1946, and organized the Lamb County Water Conservation Association in order to fight against passage of the bill which would come before the legislature the next year. Significantly, the group ignored the U.S. Geological Survey report written by Gould more than forty years before. In its resolutions the organization stated that "it has not been conclusively established whether the source of such underground

water is from surface rainfall or from undercurrents of water flowing through such territory" (17).

County organizations such as the Lamb County Association, sprang up throughout the region and formed a united Plains Water Conservation and Users Association which met at Plainview on December 28, 1946. The group announced its opposition to any type of legislation affecting ground water withdrawal until such time that controls were deemed to be absolutely necessary (18). Subsequently, the association proved to be an important instrument in defeating the ground water conservation bill in the State Legislature in 1947.

Myths about the Great Plains lose their grip on the area only after the populace has endured some traumatic experience. Just as a drought shattered the myth of the region as a garden, massive irrigation pumpage virtually destroyed the myth of the "inexhaustible supply" by the late 1960's. Then the volume of water which could be pumped from wells had decreased so much that farmers were painfully adjusting to more efficient use of their remaining reservoirs of water (14). By that time, farmers and businessmen in the region had formed an organization, called Water, Incorporated, which had as its objective the importation of water through a system of gigantic dams and canals from some distant water resource region such as Northwestern Canada, the Upper Missouri River, the Mississippi River, or the rivers of East Texas (19). If that association is successful (although at this time its future is much in doubt), perhaps eventually the water irrigating the Texas High Plains will indeed come from "some distant source."

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