Texas Water Resources Institute

December 1980
Volume 6
No. 10

Texas Treasure

By Lou Ellen Ruesink, Editor, Texas Water Resources

Long before TV commercials extolled the quality of beer from "the country of 1100 springs," and long before highway billboards proclaimed the wonders of springs as seen from glass bottom boats--Texas springs played a major role in the history of the state.

How amazing springs must have seemed to dusty, thirsty travelers. Spring water answered prayers, saved lives, and restored hope.

Earliest white explorers found well-worn Indian trails leading from one spring to another. They also found many Indian tribes settling near springs, irrigating with spring water, and fighting other tribes for spring water. Later, white men themselves fought Indians over possession of spring sites.

Even today, sites of present or former springs in Texas are good places to find Indian artifacts such as spearheads, arrowheads, and pottery. Rocks around many springs are worn into mortars where Indians and early settlers ground grain, acorns, or mesquite beans.

Texas springs spared many an Indian tribe, explorer, or military expedition from retreat, or from extinction. Later they made it possible for wagon trains and stagecoach lines to journey across Texas. They were described in eloquent terms by early Texans as "water which bursts from the plains," "large fountains," "pure water rushing from rocks," and "water from deep chasms into an immense reservoir."

At least 61 springs powered grist mills, flour mills, saw mills and cotton gins. They even supplied water for steam locomotives when railroads arrived on the scene.

Most importantly, however, they provided dependable, high quality water supplies so that settlers could establish towns. At one time there were some 200 Texas towns dependent

on springs for their water supply. Spring water was first carried by bucket to homes; later many towns piped spring water through a distribution system.

In the late 1800's many medicinal or health spas sprang up around the 25 or more mineral springs. Water from these springs, high in sulfate, chloride, iron, and manganese, was thought to be good for various and sundry maladies. Piedmont Springs was the site of a large hotel and bath house built in Grimes County before the Civil War. Other favorite mineral springs and spas at the turn of the century were Chalybeate Springs in Harrison County and Boiling Springs in Houston County.

Dry Springs

While it is true that springs in Texas determined to a great extent the first two centuries of the state's development, the development of the state has determined the fate of the springs in this century.

There are no longer "large fountains gushing forth from the plains." As a matter of fact, 63 of the 281 major springs in Texas no longer have enough flow to measure. Some of these are totally dry; some release a small amount of water in high rainfall years. Thousands of small springs or seeps have dried up completely, and most large springs have declined in flow in the past 50 years.

Several formerly large springs are now supplemented--or replaced--with water pumped from wells. Big Spring and San Antonio Springs are two springs fed water from city wells for recreation and aesthetic purposes.

Decline of many Texas springs began soon after the first Spanish colonies started clearing East Texas forestland. Heavy grazing of pastures in other parts of the state also diminished the natural recharge of the underground reservoirs. Spring decline was later accelerated by artesian or flowing wells which reduced underground water pressure.

In recent years, flow in nearly all of the state's springs has decreased or disappeared because of the tremendous amount of underground water pumped for irrigation and for municipal and industrial purposes. Spring flow has also diminished because of paving and other development on recharge zones.

Some very large springs have been inundated by reservoir development. Springs beneath reservoirs generally cease to flow because of the weight of the reservoir water. Other springs, however, have increased in flow due to reservoir development. An example is San Felipe Springs located downstream from Amistad Reservoir. These springs which supply municipal water to Del Rio have actually increased in flow since the reservoir's development.

Spring or Springs

Springs are breaks in the impervious layer of an underground reservoir--often a result of a geologic fault. Called "spring" when water surfaces from one discharge point and "springs" when water flows from several discharge points into a common surface water source, they act as spillways to release the excess water in underground reservoirs.

Even though flow has declined in recent years, major springs still supply Texans with about 1,150,000 acre-feet of surface water each year. Adding water from all minor springs, the total amount of groundwater bubbling from underneath the earth to become surface water averages three million acre-feet each year. Nearly all of this spring water flows into the low-rainfall river basins south and west of Austin.

Major springs in Texas are those which maintain an average flow of at least one cubic foot per second. Only two are classified as very large--over 100 cubic feet per second average flow. One hundred and sixty springs in the state are classified as medium to large-- meaning that they average 1 to 100 cubic feet flow per second.

Most of the larger springs in Texas are found in Central and West Texas along the Edwards Plateau area. One-half of all major springs in Texas, in fact, come from two aquifers: the Edwards and the Edwards-Trinity aquifers. San Saba County has the most springs of any Texas county with 19 major springs.

Texas has no true hot springs. This means that Texas springs come from relatively shallow aquifers since temperature of a spring is an indicator of the depth of the underground reservoir. The closest to hot springs in Texas are the Boquillas Warm Springs in the Big Bend National Park. These springs range in temperature from 95 to 105 degrees Fahrenheit and probably come from as deep as 2,000 feet beneath the earth's surface.

Spring Quality

The quality of spring water is generally dependent upon the rock materials making up the aquifer and also the length of time the water is stored in the aquifer. Texas spring water--except for salt springs--has typically been noted for its purity.

Not all spring water in the state, however, would make good beer.

There are 14 major salt springs producing essentially useless water. Water from these springs contains over 3,000 milligrams per liter of dissolved solids and often contaminates downstream flows. Unlike the fresh water springs in Texas most of the salt springs appear to be maintaining their volume of flow. This is probably due to the fact that there is very little use for salt water other than for certain types of oil recovery; therefore, little salt water is pumped from beneath the ground.

Man's activities have impacted the quantity of water much more than the quality in the past. Texas spring water has remained astonishingly stable in quality through the years.

Considering all the farming, clearing, and paving in Texas, relatively little pollution has made its way into underground aquifers. This is due largely to the natural filtering of groundwater. Where recharge water must percolate through sand beds for a considerable distance to reach an underground reservoir, many impurities such as bacteria and insecticides are naturally filtered out.

Groundwater in limestone or gypsum aquifers, however, does not receive the same type of filtration. These reservoirs receive recharge from surface water through open crevices and sink holes with little or no filtering.

The danger of pollution is certainly real in any aquifer, however, and Texans must be extremely cautious to protect their springs.

Spring Protection

Gunnar Brune, who authored a 1975 Texas Water Development Board report on major and historical springs in Texas, explained that little attention has been given to springs in Texas.

"The study of springs," according to Brune, "is a borderline discipline, because springs are the transition from groundwater to surface water. They have been studied to some extent by groundwater specialists and to some extent by surface water specialists. Overall, however, they have been neglected."

Texas water law is also clearly divided between groundwater and surface water, leaving springs somewhere in between.

Groundwater in Texas belongs to the surface landowner. Spring water at its source is considered to be groundwater, therefore belonging to the landowner. Once spring water enters a defined river or stream, it becomes the property of the state. A permit from the Water Rights Commission is then required before it can be used.

Landowners adjacent to a stream are protected by the state-granted right and assurance that a certain amount of water is theirs to use. Spring owners, however, have no such guarantee. Landowners can pump water from underneath their property and can completely dry up someone else's spring.

A case involving spring flow is now in federal district court. The case has to do with assuring a minimum spring flow in San Marcos Springs to protect four endangered species of plant and aquatic life.

Questions before the court include: When low water levels in the Edwards Aquifer reduce spring flow below a minimum set by the U.S. Fish and Wildlife Service, what agency will have the authority to require decreased pumping of Edwards Aquifer water? Who will decrease pumping?. . . the city of Hondo?. . . irrigators near Knippa?. . . industries or military bases in San Antonio?

Pumpage and use of the water stored in the Edwards Aquifer continues to increase. Experts predict that several years of low rainfall could indeed reduce the flow at San Marcos Springs to a level well below the stated minimum.

Under present Texas law, state agencies have the authority to regulate a landowner's pumpage or use of groundwater only if the landowner is intentionally wasting the water pumped. The mere mention of "regulation of groundwater" in the Edwards Aquifer region, by the way, has the same effect as wearing a red shirt into a bull ring.

Modern Texans must realize that springs are one of the most valuable--and one of the most fragile--of all natural resources. Their forefathers diminished or dried spring flow by over-grazing, over-pumping, and over-developing on recharge zones. Springs still flowing should be protected so that they will continue to flow and continue to supply water pure enough for drinking, for recreation--and, yes, for beer production.

Mustang Spring in Martin County was the last water on the California Trail until Willow Springs, in Winkler County 100 miles west. Described in 1879 as excellent stock water, it was surrounded by "good grazing, numerous wild mustangs, and thousands of buffalo and antelope." The spring dried many years ago due to heavy well pumping in the area.

Big Spring in Howard County was a favorite campground for Indians. When Spaniards arrived in 1768, they found Comanche and Pawnee Indians fighting for possession of the spring. Big Spring essentially dried up in 1925, but well water has been piped to the spring since 1967 for recreational purposes.

Spanish explorer Juan de Mendoza described Comanche Springs in 1684 as six large beautiful springs gushing forth to form Comanche Creek. Gold seekers on their way to California stopped at the springs, and in 1859 Camp Stockton used the spring water for its water supply. The springs irrigated 6,200 acres of cropland in 1875. Heavy pumping of the aquifer caused the springs located in Pecos County to decrease and finally to cease flowing in 1961.

The citizens of Old Shinoak Springs in Eastland County built a lake in 1911 to catch the flow from Shinoak Springs, but the springs dried up in 1937.

The XIT Springs in Hartley County were the site of the general headquarters for the three-million-acre XIT Ranch. In the late 1800s the springs irrigated 40 acres of alfalfa and a fruit orchard. Many wells were drilled in the vicinity causing the springs to dry up by 1970.

Dripping Springs in Hays County powered a cotton gin in 1849. For many years the springs provided water for the town of Dripping Springs and for Dripping Springs Academy. The town now has a water well because of the unreliability of the spring flow.

In 1849, after camping at Mary Le Bone Springs near the present site of Arlington, a unit of Texas Rangers set out to locate a site for a U.S. military post to be named Fort Worth.

They found a site with a spring which "gushed clear cold water" and was surrounded by a grove of giant oak and pecan trees. Cold Springs supplied water to the troops at Fort Worth, to the settlers in the town, and to cattle and cowboys traveling the Chisholm Trail until wells were drilled in 1876.

The springs were reported as "faintly bubbling" in 1949; by 1957 they were dry.

Much of the material presented in this issue first appeared in Major and Historical Springs of Texas by Gunnar Brune, Texas Water Development Board, Report 189, 1975. A book by Brune, *Springs in Texas, Volume? - 1981* is scheduled for distribution in April.