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Taming the Brazos

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Not until this century has man had the capability to control a river. Modern technology has made possible the management of an entire river basin for flood control, water conservation or other beneficial uses.

The history of man's impact on the Brazos River is an example of what has occurred in river basins throughout the state and nation.

Instead of trying to control the Brazos River, Indians along its banks simply adjusted their lifestyle to its unpredictable flow. They crossed during low flow seasons, moved villages to higher ground during flood dangers, and built canoes to skim the surface of the shallow river. The river was a respected and honored force in their lives.

Spanish explorers used the river as an access route to the Texas interior and designed boats and routes to take advantage of the ever-changing river. Certainly they would never have dreamed of changing the course or flow of a river they had named "Los Brazos de Dios," or "the arms of God."

With settlers from the United States came the desire to harness the area's resources. Just as these settlers cultivated land and domesticated animals, they wanted to control the river for their own use. They wanted to live and farm on the fertile bottom-lands, build towns near the river, and ship large quantities of goods on the river.

Texans have made significant changes on the Brazos as new technology has become available, but not all of the settler's dreams have come true.

Navigation Efforts

Early shipping interests used the lower river to transport cotton to Galveston and to deliver merchandise to the many settlements along the river. They were not content to use

canoes or flatboats designed for the shallow, often sluggish, river. Instead large stream paddleboats were maneuvered up the Brazos as far as 350 miles from the river mouth. At least 12 steamboats were in operation on the Brazos in the mid-1800's; several made it as far upstream as Port Sullivan, a site near the present town of Hearne.

Although the river carried a tremendous volume of water at times, the flow of the river was so uncertain and erratic that navigation on a regular basis proved to be impossible. Parts of the river were dredged and snags removed, but seasonal rises silted in manmade channels and left behind new snags to catch the unwary navigator. Elaborate plans were initiated to "improve" the river for navigation, but most were never begun.

A canal joining Galveston and the Brazos above a large sandbar at the river mouth was actually dug. A group of Galveston merchants formed the Galveston and Brazos Navigation Company which collected $142,000 and dug the canal in less than 4 years. The canal, opened in 1854, was a financial disaster as well as an engineering nightmare.

The River and Loan Bill was passed by the 1856 Texas Legislature to try to save the already ailing canal. It provided a $50,000 state appropriation and required financial commitments from counties along the river up to Washington to make improvements on the river and canal.

The Civil War brought the work and funding to an abrupt halt. By the time the war was over, railroads had caught the fancy of most businessmen and politicians in the state. However, there were still those determined to make the Brazos navigable. A federal act in 1874 authorized a study by the U.S. Army Corps of Engineers to determine navigation possibilities from Waco to the Gulf. Two different studies conducted by the Corps--one in 1874 and another in 1895--concluded that a navigable Brazos was not economically practical.

For reasons understood only by Washington officialdom, these reports were ignored; and for the next 20 years Congress regularly authorized money for navigation improvement of the Brazos. In 1905 Congress approved a massive appropriation to construct a series of locks and dams below Waco, but a disastrous flood in 1913 wrecked the completed structures and cut new channels around proposed dam sites.

Major Floods

That year the Brazos was reported to be four miles wide near Bryan, and the peak flow of the Little River at Cameron was equivalent to the normal flow of the Mississippi River. This flood was followed by two other major flood years causing tremendous loss of life and property.

After 75 years of dreams and effort, the variable flow and shifting channels of the Brazos were basically unchanged by man.

The same floods that ended the navigation improvement efforts on the Brazos, however, introduced an era of significant development on the Brazos. Three severe floods in 10 years should have been enough to move people out of the Brazos bottomland; instead they appealed to the state legislature for dams to control the river.

Because of the years of devastation and the basin's statewide significance, and because "the time was right," the Brazos River Authority--originally called the Brazos River Conservation and Reclamation District--was established by the Texas Legislature in 1929. This was the first agency in the entire United States established to conserve, control, and develop the water resources of an entire river basin.

Twenty-one men were appointed by the governor to serve as the directors of the Authority and were authorized to develop a master plan for the entire basin. A plan including dams for flood control, hydroelectric power, and conservation storage was developed and the first project built, even though the Authority had no state appropriation and no viable taxing authority.

Possum Kingdom

Although the primary concern of the Brazos River Authority in its early years was control of flood water, the first dam built by the Authority had as its primary purpose the generation of hydroelectric power. Flood control and water supply were secondary benefits derived from the Possum Kingdom Lake near Mineral Wells.

Possum Kingdom was completed in 1941 just in time to supply much-needed power during World War II. The sale of hydroelectric power was an immediate source of revenue for the Authority and allowed it to begin other projects in the basin. In addition to Possum Kingdom, the Authority completed Lake Granbury in 1969 and has under construction Lake Limestone on the Navasota River near Groesbeck.

Another way the Authority meets water demands is by operating canal systems in the industrial region south of Houston. Two hundred miles of canals deliver Brazos River water to petrochemical plants and rice farms in the area.

Multi-Purpose Reservoirs

The federal government, through the Army Corps of Engineers, has assumed primary responsibility for flood control in the basin since 1943. Six major reservoirs have been built and are operated by the Corps: Waco, Belton, Proctor, Stillhouse Hollow, and Somerville are multi-purpose water supply and flood control projects; Whitney supplies hydroelectric power in addition to flood control.

The Brazos River Authority has contracted with the federal government to pay the costs of conservation storage space in these reservoirs for water supply use. According to Brazos River Authority General Manager Walter Wells, "The Authority cooperates closely with the Corps from the earliest planning stages on up through construction and

operation of federal water projects in the Brazos Basin. From the Corps point of view, a lake is built primarily for flood control. From our point of view, it is built primarily to develop the water resource--to conserve the water. Combining the two functions in a coordinated basin-wide system of lakes permits most effective control, conservation, and development of water resources of the entire Brazos Basin.

"Planning and operating these lakes on a system basis offers many benefits. We can use new lakes to meet local needs and to meet system needs any place on farther downstream. We can supply water to the lower basin from any or all of our reservoirs in the system by making releases of water from reservoirs and allowing it to reach the area which needs it at that particular time.

"Although we are not the only entity that engages in conservation and development and utilization of the water resources within the basin, we are the only one that covers the whole Brazos Basin. Many lakes in the basin have been built by cities and towns to meet local needs, but the Authority tries to keep an overall picture of the basin. We keep in close touch--at least on a daily basis--with the Corps of Engineers," explains Wells.

The Brazos River Authority and Corps reservoirs make up an effective and flexible basin-wide system for water supply and flood control. Today the Brazos River development is a model in effectively controlling and conserving water from an entire basin.

Cost of Development

"Taming" the Brazos has been to a large extent successful--perhaps too successful according to Dr. C. C. Mathewson, geologist at Texas A&M University.

Mathewson has studied the impact of reservoir development on the beach areas at the mouth of the Brazos. He has found a relationship between large dams built on the river and coastal erosion near the mouth of the river.

According to him, dams have an effect on the ability of a river to carry sand to the Gulf in two ways: (1) peak flows--flood stages--are not as strong nor as long and (2) reservoirs hold much of the sediment which would otherwise be carried to the Gulf. He estimates that 50 million cubic feet of sand is trapped annually within the reservoirs and other smaller ponds within the basin and feels that this certainly could have an impact on the reservoirs and the coastal zone in the future.

Mathewson points out other changes taking place in the Brazos River due to the regulation of flow. Large sand bars are growing larger and may eventually cause the river to change its course or to flood in areas never before flooded.

Controlling and conserving the river have been expensive endeavors. The total cost of projects built and under construction in the basin exceeds half a billion dollars. Water

resource development costs have mush roomed in recent years, greatly increasing the price of future water development.

Benefits to Basin

Benefits from the river development are many for the basin as well as the entire state.

Flood control and recreation give basin residents invaluable security and pleasure. Available surface water for municipal and industrial uses is assured for one of the fastest growing areas in the nation.

Today one of the principal industrial uses of Brazos River water is cooling water for electric generating plants. A number of large power plants are now using water from Authority lakes, and several more are under construction or design. These include two nuclear-powered plants, one near Lake Granbury and one west of Houston, and two lignite-fueled plants southeast of Waco.

Twentieth-century Texans have indeed tamed the Brazos. Those in the lower basin no longer fear droughts or floods as they once did. The water is theirs to use when needed and, to a large extent, where it is needed.

The developed river is supplying two necessities for Texans today--water and energy. The demand for both is certain to increase with industrial and population growth and to be met by more development on every major river in the state. Only future historians and scientists will be able to evaluate the social and environmental impact of large-scale river development.

Briefs on The Brazos

Sixteen percent of Texas--an area of 42,000 square miles--drains into the Brazos River. The basin or drainage area is more than 600 miles long, ranges from 1 to 120 miles wide, and includes all or part of 69 counties. In its southeastward course across Texas from the New Mexico state line to the Gulf of Mexico, the Brazos drops 4,600 feet in elevation.

The channel pattern of the Brazos River is dominantly that of a meandering river. In fact, the river meanders so that it is twice the length of the basin.

Seven major tributaries flow into the Brazos. The main stem of the river is formed by combining the Double Mountain Fork and Salt Fork in Stonewall County north of Abilene. The Clear Fork, Bosque, Little River, and Yegua Creek enter the Brazos progressively farther downstream along the west bank; the Navasota River is the only major tributary entering the Brazos from the east bank. All but the Clear Fork join the Brazos downstream from Lake Whitney.

The waters of the Brazos are relatively free of manmade pollution; however, the quality of water in the main stem Brazos River is poor because of natural salt contamination. Water of the upper Brazos River is too salty for most domestic, industrial, and irrigation uses, but quality progressively improves in the downstream direction. Downstream from the mouth of the Little River the water is suitable for irrigation of rice (the principal irrigated crop) and other crops as well as for controlled municipal and industrial use.

Many reservoirs on tributaries in the Brazos River Basin store water of good quality, but waters of Possum Kingdom and Whitney Reservoirs on the main stem Brazos River usually are too salty for public supply.

The first bridge across the Brazos was a suspension bridge built at Waco in 1870. It was the longest single-span bridge west of the Mississippi at that time and for many years was the only bridge across the Brazos. Today well over 50 bridges of varying height and construction span the river from its beginnings in northwest Texas to its end near Freeport.