

Balmorhea Project

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Balmorhea Project

The Trans-Pecos region of western Texas is an often inhospitable place of creosote, cactus and hardscrabble earth. Tall mesas of the country eventually yield to sloping lands leading up to the Davis Mountains, a volcanic fortress of high desert mountains above 8,000 feet. Once, numerous natural springs and watering holes existed here, lying between mesquite, acacia, tarbush, and tobosa grass. The springs quenched the thirst of Native Americans, Spanish expeditions, and countless 20th century travelers.

Since 1870, a series of springs, fed by tributary streams running to the Pecos River, have served as the basis for irrigation in the Madera Valley. The springs supplied the needs of 19th century soldiers, and more recently played an important role as part of Franklin Roosevelt's program to increase food production for World War II. Reclamation's Balmorhea Project was designed to improve the production and efficiency of the valley's old irrigation system.

Project Location

The Balmorhea Project provides supplemental irrigation to some 10,600 acres extending four miles above and eleven miles below the town of Balmorhea, Texas, along Toyah Creek. The lands lie almost exclusively within Reeves County.¹ Balmorhea is located in the Madera Valley of deep west Texas, 175 miles southeast of El Paso, 75 miles south of the Texas-New Mexico border. The Main Canal of the project snakes seven miles from west to east, connecting along the way the settlements of Toyahvale, Balmorhea, Brogada, and Saragosa. Two transportation arteries cross the project, U.S. Highway 290, and the Pecos Valley Southern Railroad. U.S. Highway 290 became U.S. Interstate 10 in the 1970's, prompting local irrigators to relocate a small portion of the canal system, where it intersected the highway.

The Madera is a long, narrow valley of lower cretaceous limestones overlain with

1. U.S. Department of the Interior, Water and Power Resources Service. *Project Data*. Denver: U.S. Government Printing Office, 1981, 25; U.S. Department of the Interior, Bureau of Reclamation. Record Group 115. "Annual Project History, Authorized Portion of Balmorhea Project, Texas," 1948, (see accompanying maps). (Annual Project Histories cited hereafter as "Project History," followed by year and page number).

gravels. It serves as the principal intake area for a large underground reservoir which surfaces as artesian springs including San Solomon and Giffin, at Toyahvale, four miles southwest of Balmorhea, and Phantom Lake Spring, three miles west of Toyahvale. Underground seep springs supplement the water supply of San Solomon and other artesian flows - at Saragosa², West Sandia, and East Sandia Springs. Saragosa Spring lies along the Main Canal two miles northeast of Toyahvale. East and West Sandia Springs lie less than a mile east of Balmorhea.³

San Solomon Spring has long been a popular oasis in the Chihuahuan Desert. From 1935 to 1938, the spring was the site of a Civilian Conservation Corps (CCC) camp. The Corps dredged the site and built a rock and mortar retainer to collect the spring flow in a natural swimming pool, 25 feet deep. The spring is now part of Balmorhea State Park, created at the end of construction in 1938. The park is very popular with scuba divers and vacationers, who want to escape the desert heat. Some 131,000 people visited the park in 1992. The CCC also built canal works from the park as part of the old irrigation system before Reclamation's arrival.

Project lands straddle Toyah Creek, which winds northeasterly through the project. The Toyah is formed by the junction of the Madera, Big Aguja, and Little Aguja Creeks six miles west of Balmorhea. These small tributary headwaters form at an 8400 foot elevation in the Davis Mountains before joining the Toyah. The normally dry creek flows northeast 24 miles before forming the highly saline Toyah Lake, a few miles south of the Pecos River.

Originally designed and built by private interests beginning in the late 19th century, the project was reconstructed by Reclamation, starting in 1946. Important Reclamation features of the project include Phantom Lake Canal; the Inlet Feeder Canal; and the Madera Diversion Dam, built by private interests and repaired by Reclamation.⁴

Historic Setting

2. United States Department of the Interior, Bureau of Reclamation. "Balmorhea Project, Texas, Project Planning Report NO. 62-A," November, 1943, 2.

3. U.S. Department of the Interior, Bureau of Reclamation. "Project Planning Report NO. 62-A," November 1943, 2.

4. *Project Data*, 25.

The earliest suggestion of Native American presence in the Trans-Pecos came from Cabeza de Vaca, in 1535. He mentioned a tattooed people coming to his aid with gifts of skin blankets near the confluence of the Conchos and Rio Grande Rivers. These sedentary Jumanos may have farmed in the Trans-Pecos between 1200 and 1400 A.D. A nomadic group of the Jumanos ranged north from the adobe and thatch structures of their more "Pueblo" cousins near the Rio Grande. De Vaca called these Indians "the cow nation" because of their use of buffalo products obtained from herds north and east of the Davis and Chisos Mountains.⁵

In November, 1582, Antonio Espejo journeyed along the Rio Grande and into the area east of Fort Davis and Balmorhea. Espejo noted that some of the native fields were irrigated using diversion ditches, while other farmers relied solely on the weather.⁶ One hundred years later, in December of 1683, Juan Dominguez de Mendoza led a detachment of soldiers east from El Paso. This party encountered several Jumano rancherias as they traveled down the Rio Grande, then north into the Trans-Pecos from present day Presidio, Texas.⁷

The Mescalero Apaches filtered into the Trans-Pecos in the 17th and 18th centuries, living in rancherias from spring until harvest, and hunting buffalo in fall and winter. As the Comanche forced the Apache tribes from the bison rich High Plains to the north, the Apache increasingly took refuge in the canyons and dry washes of the Trans-Pecos.⁸

In the 19th century, the Trans-Pecos, including the springs of the present Balmorhea Project, was a major crossroads for trade, military expeditions, and mail delivery. In 1838, in an effort to encourage trade, American merchant D. H. Connelly and some wealthy Mexicans sponsored an expedition of 100 men to find an acceptable route across the Texas frontier to the Red River. By 1848, teamsters shipped goods from San Antonio to El Paso by way of San Solomon Spring at Balmorhea, and Comanche Springs, 30 miles to the east of

5. W. W. Newcomb. *The Indians of Texas: From Prehistoric to Modern Times*. Austin: University of Texas Press, 1961, 226.

6. Newcomb, 229.

7. Herbert Eugene Bolton, ed. *Spanish Exploration of the Southwest, 1542-1706*. Charles Scribner's Sons, 1908. Reproduced, New York: Barnes and Noble, 1946, 1976.

8. Newcomb, 108, 109, 161.

project lands.⁹ In 1849, Captain Randolph B. Marcy and a Comanche guide established an "Emigrant Trail". Thousands followed this trail west from Arkansas, southwest across Texas and the Trans-Pecos frontier, and on to California.

In 1857, James Leach, working for the Interior Department, lay out a wagon road following much of Marcy's route. Sponsored by Southern congressmen, the improved route was intended to provide a pro-slavery thoroughfare to the west.¹⁰ On August 1, 1859, the Post Office Department ordered the Butterfield Overland Mail service to follow a more southerly route than the one across the Guadalupe Mountains. The new route included the forts Stockton, Davis, and Quitman, from east to west. The forts formed part of a whole line of forts stretching across the Texas frontier to protect settlements and travelers against Indian depredation.¹¹ In 1865, Charles Goodnight and Oliver Loving established the Goodnight-Loving cattle trail through the country. By 1874, some 110,000 head of cattle had passed through the Trans-Pecos on their way to Colorado, Wyoming, and Montana ranches.¹²

The Madera Valley was first settled and irrigated about 1870, following the settlement of Fort Davis, south of Balmorhea, in 1853. Irrigation activities increased in order to provide feed for cattle herds in the 1880's. Irrigation expanded until 1909, when the demand outstripped the available water supply.

In that year, Toyah Valley Irrigation Company organized to consolidate several small irrigation systems operating in the area. The Reeves County Irrigation District organized itself in 1914 and 1915, and purchased Toyah Valley Irrigation. Some 10,640 acres fell under the new district's authority but only 7,520 acres actually came under irrigation.¹³

The District changed its name to the Reeves County Water Improvement District Number One in 1917. The District built the Madera Diversion Dam across Madera Creek,

9. Walter Prescott Webb, et. al., eds., *The Handbook of Texas*. Austin: Texas State Historical Association, 1952, 337,338.

10. J. W. Williams. *Old Texas Trails*. Burnet, Texas: Eakin Press, 1979, 356-358.

11. T. R. Fehrenbach. *Comanches: Destruction of a People*. New York: Alfred A. Knopf, 1983, 401,402.

12. Pecos County Historical Commission. *Pecos County History*, vol. 1, Canyon, Texas: Staked Plains Press, 1984, 76.

13. "Project Planning Report NO. 62-A," November, 1943, 3.

and the Madera Diversion Canal east to San Solomon Springs. The District was now able to capture Madera Creek flood flows, and divert the waters to San Solomon, where the Main Canal began. About the same time, local interests constructed the Lower Parks Dam and Renz Dike, both earthfill structures. The resulting Lower Parks Reservoir collected water from an area of some 16 square miles.¹⁴ When Reclamation began studying the Balmorhea area in 1939, the reservoir's storage capacity was 5,200 acre-feet, down from 6,155 acre-feet in 1917, because of siltation from Toyah Creek flood flows. By 1948, following Reclamation improvements to other parts of the irrigation system, the capacity of Lower Parks was further reduced to 4,800 acre-feet.¹⁵

Investigations for increasing the irrigation capacity and efficiency of the district began in 1939, following Congressional requests for local assistance. A report discussing three alternatives for rehabilitating the district irrigation system was completed but not issued in 1941, due to United States involvement in World War II.¹⁶

The first alternative called for development of an adequate water supply to irrigate 10,000 acres. Reclamation planned to acquire rights to privately owned Phantom Lake Spring, enlarge Lower Parks Reservoir to a capacity of 20,000 acre-feet, and enlarge, relocate, and line the existing canal network. The second alternative was less ambitious, calling for the irrigation of 8,700 acres by acquiring the rights to Phantom Lake Spring, and enlarging the reservoir to a 14,000 acre-foot capacity. The third alternative would provide water to 7,500 acres by enlarging Lower Parks Reservoir to 14,000 acre-feet, and lining 10.5 miles of canal.

The irrigators of the District rejected all three of the plans as too costly under an arranged 40-year repayment schedule with Reclamation. Consequently, Reclamation made further studies, resulting in a redrafted report in November, 1943. Like its predecessors, the plan called for enlarging Lower Parks Reservoir, this time to 18,000 acre-feet, and acquiring

14. *Project Data*, 25.

15. U.S. Department of the Interior, Bureau of Reclamation. Record group 115, Engineering Reports, "Summary Report," 1953, 4.

16. U.S. Department of the Interior, Bureau of Reclamation. "Project History, 1948, Authorized Portion of Balmorhea Project, Texas," 1948, 3.

the rights to Phantom Lake Spring's water supply. The report also recommended lining some 21 miles of canal and extending the lateral system.¹⁷

Project Authorization

In 1943, food supplies became critical to the war effort, and the Balmorhea Project, among others, was revived to provide increased production. On April 15, 1944, President Franklin Roosevelt approved a curtailed version of the proposed project, one which could be built in a short time without using critical materials. The project was authorized as part of the War Food Administration program under provisions of the amended Water Conservation and Utilization Act of 1939.¹⁸

Construction History

Reconstruction of the Balmorhea Project began in August 1946, and was completed in 1947. Water delivery and operation of Reclamation's new features began June 12, 1947.¹⁹ Reclamation's first order of business was to obtain additional water for the canal system. In 1945, Reclamation purchased water rights at Phantom Lake Spring for \$60,000 from the Kingston family, who owned extensive acreage in the western part of the project. The major provision in the agreement between Reclamation and the landowners called for the delivery to the Kingston lands of about seven second-feet of the spring's flow during the irrigation season, and an additional amount throughout the year, for domestic and other purposes, presumably stock watering. Altogether, some 3,337 acre-feet per year reverted to the former owners of the spring.²⁰

Original plans for construction of the Balmorhea Project called for labor supplied by the Works Progress Administration (WPA). WPA crews employed for 21 months would spend four of those months building a work camp for an estimated 350 men. The cost estimate of the original project before its reduction by Congress, was \$942,000. This amount

17. "Summary Report,:" 1953, 2.

18. *Ibid.*, 2; "Project History," 1948, 3.

19. "Project History," 1948, 3.

20. "Project History," 1948, 3; "Project History," vol. 8, 1965-1976 contains the contract text between Reclamation and the Kingston family, styled "LIMITING AGREEMENT AND CONTRACT FOR THE PURCHASE AND SALE OF CERTAIN WATER RIGHTS, LAND AND RIGHTS OF WAY"

included \$32,000 for the work camp.²¹ Other more ambitious proposals for the project would have cost \$4,000,000. Because project construction did not start until 1946, plans to use WPA labor were scrapped. Instead, H. B. Zachry Construction Company used its employees to renovate the project. Construction began in August of 1946 and was completed by June of 1947. Total cost of the project amounted to \$440,000. The Water District contracted to pay back \$255,600 over 40 years, with the balance of \$184,400 being non-reimbursable.²²

The proposed labor required for the project included a number of skilled workers, to be paid commensurate with their position. The project's construction engineer was scheduled to receive \$4,600 a year, followed in order of salary by various assistant engineers, surveyors, and draftsmen. Dragline operators were to receive \$1.25 an hour, followed by tractor operators at \$.70, drivers at \$.65, carpenters from \$.70 to \$1.25, welders at \$1.25, blacksmiths and powdermen at \$1.00 an hour.²³

Zachry Construction began building two concrete lined canals. One would convey water from the newly acquired spring at the far western edge of the project, and the other would deliver water from the Main Canal east of San Solomon Spring, to Lower Parks Reservoir. The building of the two canals and restructuring of Madera Diversion Dam entailed hauling aggregate from as far away as the Brogada Hills, just outside the community of Brogada. The concrete and riprap on the project required the use of crushed, washed rock.²⁴ After the rock was crushed and washed, truck drivers carried the aggregate west from Brogada, presumably down Highway 290 which paralleled the Main Canal through project lands.

Reclamation soil and water analyses taken back in 1939 revealed high quantities of sulfate in project lands. Project and Denver officials at the time presumed that the samples were not indicative of salt content throughout the project. In 1945, subsequent observation

21. J. R. Iakisch. "Reimbursable Estimate Computations", U.S. Dept. of the Interior, Bureau of Reclamation. Record group 115. "Project Engineering Reports, 1910-1955," 1942, 12.

22. Project Engineering Reports, Summary Report, 1953, 3.

23. Iakisch, 12-6.

24. *Ibid.*, 39, and in introduction by A. N. Thompson.

of concrete damage to District structures led to the collection of further soil and water samples. Samples collected indicated high salinity, far exceeding the 150 parts per million of sulfate dangerous to ordinary concrete. Consequently, contractors used modified, or sulfate-resistant cement at Balmorhea.

Improvements at Madera Dam included placing rubble mortar masonry near the right abutment, and installing new headwork gates. Reclamation also removed old concrete paving and replaced it, as well as the stilling pool below the headworks. Reclamation graded the channel above and below the dam, and built two dikes. Even with these improvements, the dam, a concrete weir structure 13 feet high and 950 feet long, retained its original design virtually intact.²⁵

At Madera Dam, waters from Phantom Lake and Madera Creek joined forces in the Madera Diversion Canal as it Traveled east below Toyahvale to San Solomon Spring. The District's Main Canal started its northeasterly trek at this point, with the collected waters of Phantom Lake, Madera Creek, and San Solomon Spring. The canal skirted the northern edge of Balmorhea, continuing due east through project lands.

Reclamation, hoping to collect any excess spring flow and runoff during winter months, built the Inlet Feeder Canal. This structure ran 2.8 miles from the Main Canal just east of San Solomon Spring, to the Lower Parks Reservoir, about a mile southeast of Balmorhea. A previously constructed Outlet Canal released collected waters from the reservoir's easternmost edge. The Outlet Canal extended northeast to rejoin the Main Canal near Brogada and East Sandia Spring.²⁶

In effect, Reclamation's additions to the project created a southern loop, starting at the project's west end, proceeding to the Madera Dam, continuing to Lower Parks Reservoir, and finally rejoining the Main Canal. With construction of the Inlet Feeder Canal, water could be stored in Lower Parks Reservoir during the winter and released during summer months to supplement irrigation supplies.

25. *Project Data*, 1981, 25.

26. "Project History," 1948, (see accompanying map).

Post Construction History

In addition to the major construction and renovations on the project, Reclamation conducted investigations which led to further rehabilitation of Balmorhea's distribution system in 1947 and 1948. The Interior Department Appropriation Act of 1947 included General Investigation funds for examining existing projects, and making recommendations to enhance their performance.

Investigators found that Balmorhea badly needed some 40 measuring devices at turnouts on the Main Canal to accurately distribute water to ditches throughout the project. Reclamation and the Water District worked together to install 40 concrete Cippoletti weirs across project lands. The District furnished the labor and some materials, while Reclamation supplied supervision and leftover construction materials. Work began in the fall of 1947, and ended in the fall of 1948. As a result of Reclamation construction and subsequent improvements, the district received 7,570 acre-feet of "new" water from Phantom Lake Spring in 1948.²⁷ As soon as the first water was released into project canals, Reclamation, at the request of the water district, appointed a superintendent to supervise the transition from old irrigation practices to new. The project's often wasteful and inequitable distribution of water was based on the prior appropriation principle of "first come, first served". During a dry year under the old system, farmers at the far east end of the project might be shorted water they desperately needed. Reclamation put an end to the practice by scheduling water deliveries in a modified rotation system.²⁸

No major construction took place at Balmorhea after 1948, but efforts continued throughout the project's history to improve existing facilities. Improvements centered around three objectives: lining existing canals and laterals, building roads to maintain the system, and destroying vegetation which threatened the operation of the system.

From 1951 through 1953, more than three miles of laterals damaged by storms were rebuilt and lined with concrete. Reeves and Son Contractors made repairs in 1951.

27. "Project History," 1948, 4,6.

28. *Ibid.*, 6.

Reclamation turned the reins of operation and maintenance over to the District after 1951, and the District in 1953 and after, performed their own repairs on the project. In 1955, localized flooding washed out 350 feet of concrete lining in the Inlet Feeder Canal. Further damage occurred when a 30 foot section of the Phantom Lake Canal siphon across Toyah Creek was exposed.²⁹

Following the flood, the District sought financial help under provisions of the Rehabilitation and Betterment Act of 1949. Unfortunately, the act did not apply to projects under the Water Conservation and Utilities Act. The District enlisted private funds to make repairs, which required the purchase of special equipment. The District purchased a D-6 Caterpillar and Carryall Scraper for excavation, and a Fullerform lining machine to lay concrete along the floors of damaged laterals.³⁰

Nearly all repairs to the canal and lateral system were finished by the end of 1955, and they were extensive. In all, some 1300 feet of canals and laterals were lined. The District placed a grill over the entrance to the Madera siphon at the east end of Phantom Lake Canal. The grill acted as a trashrack and safety feature. The Water District also installed a six foot Parshall flume in the Main Canal. It was located 200 feet below the diversion gates leading into the Inlet Feeder Canal. Other improvements included replacing metal gates in the Phantom Lake Canal with new ones made of redwood, building four bridges, several cattle guards, and adding Cipoletti weirs to the west end of the project.³¹

Late in 1956, the Water District's Board of Directors met with Reclamation officials from Region 5 to discuss the possibility of rehabilitating the rest of the project. The idea hearkened back to the ambitious proposals made during New Deal days. The District wanted to pay for the work by securing monies under the Small Projects Act. Apparently the request was turned down because the District continued to line several miles of farm ditch with concrete, charging water users for the service. Also in 1956, the District reinforced Renz Dike at Lower Parks Reservoir and relocated and enlarged about a mile of the Madera

29. "Project History," 1952 and 1953, 1; 1954, 1

30. "Project History," 1955, 3,4.

31. *Ibid.*, 4.

Canal.³²

Enlargement of Madera Canal continued in 1957, as did the continuation of canal and lateral lining, replacement of checks and turnouts, and installation of Parshall flumes at various locations. In 1956 and 1957, the Texas State Highway Department and the District worked cooperatively to move sections of lateral and canal which interfered with road work and relocation of Highway 290.³³

Routine maintenance and lining continued in 1958, 1959, and 1960, as the District established a \$2 per acre maintenance fee for the program. Crews spent the winter months between irrigation seasons lining the system. By 1960, the District had lined 46,000 feet of the District canals and laterals, and 48,000 feet along private farm ditches. Improved efficiency because of the lining program resulted in lower operating costs on the project. The cost of operation per irrigated acre in 1959 was \$12.67. One year later, it was \$11.00.³⁴

In 1962, hailstorms and flood damage destroyed several sections of concrete ten to 100 feet long on the Main Canal. Besides repairing these sections, the District replaced bridges, and widened Renz Dike. Crews placed riprap at the outfall of the Inlet Feeder Canal into Lower Parks Reservoir, and relocated stretches of the Main Canal. The old canal diagonally severed property tracts at many places on the project. The newly lined canal now neatly followed section lines laid out by survey.³⁵

By 1964, the District had lined 45 miles of the canal and lateral network, representing 90% of the total. Laterals generally featured one or two foot bottoms with a depth of 3 ½ feet.³⁶ By 1974, District crews had lined all but four miles of the project with concrete.³⁷ Periodic flash flooding on the project led to recurrent repairs from 1965 to 1976.

In January and February, 1965, the District placed 7,650 feet of concrete on the reservoir's Outlet Canal. Six months later, crews returned to replace six areas of concrete washed away in storms. In June and October, 1966, the District repaired ditch and canal

32. "Project History," 1956, 3.

33. "Project History," 1957, 3.

34. "Project History," 1959 and 1960, 3.

35. "Project History," 1961 and 1962, 5.

36. "Project History," 1964, 2.

37. "Project History," 1965-1976, 1.

linings and rebuilt the Saragosa Dam. The structure was a small diversion dam on Toyah Creek near the town of Saragosa. In November and December, 1967, workers built up the front of Renz Dike and repaired 1500 feet of the Madera Canal. The District conducted similar concrete repairs in 1968, 1974, 1975, and 1976.³⁸

The routine maintenance of replacing weirs, headgates, and bridges continued during the 60's and 70's, and in February, 1966, the District embarked on a new project. To enhance the recreational value of the project, the District started building two restroom facilities and three sheds for fisherman at Lower Parks Reservoir. One year later, workers started building a fish hatchery with five 190'x 75' ponds. The District finished the project in March. In April of 1969, picnic tables and campsites were repaired at Lower Parks Reservoir, and in November and December, 28 cooking grills were built at the site. In keeping with improvements at the reservoir, District crews in 1975 made repairs to the boat dock located there.³⁹

Besides the lining of canals and laterals, and routine maintenance of project facilities, the District fought the constant battle of destroying unwanted weeds and vegetation. Project officials recognized the problem as early as 1949. In that year, lateral banks were covered with wild plum, Johnson grass and cane. An infestation of salt cedar (tamarisk) threatened several hundred acres of land along the delta and margins of Lower Parks Reservoir. At a loss of four acre-feet of water per acre due to transpiration, the salt cedars were wasting up to 800 acre-feet of potential irrigation water each year.⁴⁰

Over the years, Reclamation and the District worked closely to eliminate pest plants on the project. Under the Weed Control Demonstration and Revegetation Program, Reclamation provided a variety of chemicals, methods, and machinery to eradicate weeds. The District hired seasonal crews to spray, burn, and manually dispose of salt cedar, Johnson grass, and Russian thistle, and other varieties of plant life. In 1957, the District tried planting Bermuda grass along farm ditches to compete with the weeds. In the same year, shop

38. *Ibid.*, 5,6.

39. *Ibid.*, 6,7.

40. "Project History," 1949-1951, 1.

workers devised a special fork to deal with water plants. Crews attached the fork to a front-loader and removed three miles of weeds submerged in the Main Canal above Balmorhea.⁴¹

In order to properly maintain the project's canals, laterals, ditches, and dams, the District started building several roads paralleling the distribution routes. The program began in the early 1950's and continued into the 1970's.

In the late 1960's and early 1970's, a controversy arose over sulphur drilling on the slope of the nearby Davis Mountains. The Duval Corporation reportedly used some 8,000,000 gallons of well water per day in its drilling operations in Reeves and Culberson Counties. At stake were the waters of Phantom Lake Spring. Alarmed by such withdrawals of water, the District feared the loss of waters from Phantom Lake Spring. In 1969, the District consulted Reclamation about the possibility of establishing an underground water conservancy district.

Reclamation had no jurisdiction in regulating drilling in the state of Texas, but encouraged the District to form an underground water district if possible. Such a move could force the spacing of water wells over such a district, and present a united front against parties involved in drilling water wells in the area. Reclamation agreed to provide any available engineering data from previous studies to aid the District.

Subsequent hearings and meetings between Reclamation, the Duval Corporation, area ranchers, the Texas Water Development Board and District officials resulted in recommendations for boundaries delineating an underground water district. The Water District, for reasons not readily apparent, decided to shelve the matter, and did not pursue options in Austin, the state capital.⁴²

Uses of Project Water

The Balmorhea Project irrigates 10,608 acres on 59 farms. Principal crops include cotton, alfalfa, pasture, oats, and barley. At various times in history, the farmers also raised hegira, a grain sorghum, maize, or Indian corn, and cantaloupes. Although intended

41. "Project History," 1956, 3; "Project History," 1957, 3.

42. "Project Histories," vol.8, 1965-1976, 9.

primarily as a storage facility for irrigation waters, the 648 acre Lower Parks Reservoir provides recreation as well. Camping sites are available, as are day-use picnic areas. Fishing and boating are also provided for, although reservoir levels are usually low except during winter and early spring. Additional recreation is provided by Balmorhea State Park at San Solomon Spring.

Settlement

Settlement of the Balmorhea Project was closely tied to the availability of water and crop production. The area where the project is located is sparsely populated. Probably more cattle live in Reeves County than do people. Almost 93% of the \$66,000,000 generated from the county's farm income derives from livestock and poultry. In 1990, Reeves County had a total population of 15,852 spread over 4,233 square miles, or 2.3 persons per square mile. Total irrigated acreage in the county is 13,000 acres, so the bulk of irrigated acreage falls within project lands. In 1990, Reeves County had a total of 174 farms with 59 of those on project lands.⁴³

Crop values on the project have fluctuated from a low of \$48.59 per irrigated acre in 1946, to \$227.47 in 1957. Population of project towns peaked in 1952, five years after Reclamation's construction activities on the project. At that time, 800 persons lived in Balmorhea, 500 in Saragosa, 100 in Toyahvale, and some 200 to 300 in Brogada. By 1955, populations of project towns had fallen to 700, and by 1962, population of project farms was 360. A gradual rise in population occurred beginning in 1969, when project population rose to 365. Numbers continued to rise in the 1970's. In 1976, the population of project lands stood at 500.⁴⁴

Conclusion

The Balmorhea Project provided necessary improvements to a small irrigation system in the middle of the desert. At face value, the project does not look like much. But, for the few people who lived on the project, the increased volume of water storage, and

43. Courtenay M. Slater, and George E. Hall, eds. *1992 County and City Extra: Annual Metro, City and County Data Book*. Lanham, Maryland: Bernan Press, 624,625,631,633.

44. "Project Histories," 1948-1976. Information was compiled from project crop reports for these years.

improvements in efficiency meant the difference between success and failure.

About the Author

William Joe Simonds was born and raised in Colorado and has a clear understanding of the importance of water in the American West and its influence on the development of that region. He attended Colorado State University where he received a BA in History in 1992 and a Masters in Public History in 1995. He lives with his wife and two children in Fort Collins, Colorado.

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