A History of Water Development in Emery County, Utah

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Emery County is a dramatically varied region in east-central Utah, ranging in elevation from under 4,000 feet in the depths of Labyrinth Canyon on the Green River to well above 10,000 feet on the higher ridges of the Wasatch Plateau to the west. The central part of the county is dominated by the San Rafael Swell, a deeply eroded anticlinal uplift characterized by imposing buttes, rugged canyons, and great mural cliffs. Between the Wasatch Plateau and the San Rafael Swell lies Castle Valley, home to most of the county's agricultural and industrial development and population. The county's other developed area is in and around the community of Green River on the eastern border.

Emery County is an arid region with an annual average of less than ten inches of precipitation. However, there is significant local variation. The highest levels of the Wasatch Plateau receive more than forty inches of precipitation in an average year, most of it in the form of snow during the winter months. The prevailing westerly winds deposit the snow in massive drifts just below the skyline ridge. These snowbanks feed the four major creeks that drain into Castle Valley. There is sufficient moisture on the higher benches of Castle Valley and the San Rafael Swell to support native bunchgrasses and pinion-juniper woodlands. In the lower parts of the county the natural vegetation is desert growth including shadscale, greasewood, prickly pear, and a low saltbush locally known as "Castle Valley clover." No cultivated crops can be grown without irrigation. The development of Emery County has depended on the appropriation and management of the streams.

Pioneer Water Development

The first official recognition of Castle Valley's development potential occurred in 1873 when a government surveyor named Augustus D. Ferron was sent into the region to survey the irrigable lands, making them available for occupation under the homestead laws. The first extensive use of the region's economic resources dates from 1874 when herds of cattle, horses, and sheep began to be moved into what is now Emery County from the overcrowded ranges of western Utah. Most of the stockraisers were interested only in the grazing resources, but two of them, Leander Lemmon and James McHadden, plowed a plot of ground near the mouth of Huntington Canyon in 1875 or 1876 and diverted water from Huntington Creek to irrigate it. This farm, which was still in the possession of the Lemmon family 125 years later, is the oldest cultivated land in Emery County. (The oldest, that is, in terms of Anglo-American history. Native peoples of the Fremont Culture grew irrigated crops in Castle Valley as early as circa 700 A.D. The settlers of Ferron reportedly found the remains of prehistoric irrigation ditches near Ferron Creek.) Another stockman, Justus Wellington Seely, Jr., filed a homestead claim on land near Cottonwood Creek in the spring of 1877, the first homestead filing in Emery County. This farm, located between Orangeville and Castle Dale, is still owned by Seely's descendants.

The settlement of Emery County is traditionally dated to August 22, 1877, when President Brigham Young of the LDS church sent a letter to Sanpete Stake President Canute Peterson calling for "at least fifty families" to colonize Castle Valley during the fall of that year. The first groups to answer that call arrived on Huntington, Cottonwood, and Ferron creeks in October and November. The ecclesiastical leader of the colonists was Orange Seely, a stockman from Mount Pleasant who had first visited Castle Valley with a company of militia during the Black Hawk War in 1865 and who had returned to the valley with a herd of livestock in 1875. The new colonies grew steadily, and Emery County was established by the 1880 territorial legislature. In that same year the Huntington, Castle Dale, Orangeville, and Ferron townsites were platted.

Castle Valley was a challenging region to develop. Unlike the earlier-settled areas of Utah, there was practically no usable ground water-no springs or wells for household use. The settlers were forced to depend entirely on the creeks. The first irrigation works were small ditches that brought water to land near the streams. These were

typically the work of a single family or two or three families who held adjacent homesteads. More ambitious projects were undertaken beginning in 1878 as cooperative ventures to develop larger tracts. The Blue Cut Canal diverted water from Cottonwood Creek a short distance above Orangeville and used it to irrigate several hundred acres lying west and south of Castle Dale. The Clipper Canal was diverted about a mile farther upstream and carried water to fields west of Orangeville. The Avery Ditch diverted water from Huntington Creek just to the north of the Huntington townsite and irrigated land east of the town. The North Ditch carried water to the bottomlands on the left bank of Huntington Creek and was later extended into the Cedar Creek valley and eventually as far as Buffalo Bench. The Molen and Peterson ditches delivered water from Ferron Creek to the wide bottoms near Molen. These pioneer canals were constructed by pick-and-shovel labor and horse-drawn plows and scrapers. The diversion dams were simple structures of logs and rocks, frequently washed away by floods. There was also a tendency for the canal banks to wash out in the early years before they were stabilized by grass and other stream-side growth.

The more easily watered creek bottoms were substantially occupied by 1880. Later settlers took up homesteads on the benchlands and organized joint-stock companies to construct high-line canals diverted from the creeks near the canyon mouths. These canals typically extended several miles into the valley and fed lateral branches that delivered water to individual farms. The Huntington Canal, constructed in stages between 1879 and 1884, brought water to the Huntington townsite and opened up the flats to the west and south, extending east to Lawrence. The Mammoth Canal, begun about 1884, supplied the Castle Dale townsite and the benchlands to the north. At their completion the Huntington and Mammoth canals made it possible to develop a continuous strip of irrigated land between Huntington and Castle Dale. The Great Western Canal, begun in 1884, opened up additional land west of Orangeville and carried water as far south as Rock Canyon Flat. In order to divert water at the desired elevation, the builders of the Great Western constructed an aqueduct attached to a vertical ledge at the canyon mouth. The King Ditch (1879) and Upper South Canal (1881-82) brought the southern portion of the Ferron Creek valley under cultivation. The Ferron North Ditch, begun in 1879, carried water to the Ferron townsite and at its completion extended north to Rock Canyon, making possible the development of the Clawson area.

Two especially ambitious irrigation projects were initiated in 1885. A group of settlers staked homestead claims around what would become Cleveland and began work on a long canal to carry water to their land from Huntington Creek. The new settlement was four miles from the nearest water supply and more than eleven miles from the diversion point of the canal. No earlier Utah settlement had been established at such a distance from its water source. The construction of the Cleveland Canal provides a good example of the cooperative spirit that has characterized water development in Emery County. The canal in its original form was twenty-five miles long and cost $30,000 to build, a substantial sum at that period. Some stockholders labored on the canal to earn their water rights while others worked in the Scofield coal mines to obtain money for equipment and supplies. With subsequent extensions, the Cleveland Canal is now the largest irrigation system in Emery County.

In the case of the Emery Canal, the challenge was not so much distance as it was rugged terrain. Casper Christensen developed the first irrigated farm on Muddy Creek in 1881, followed by several other colonists in the next three years. During the same years other families located in the valley of Quitchupah Creek, six miles to the south. The quantity of irrigable land in the Muddy Creek valley was quite limited, and the streamflow of Quitchupah Creek was insufficient for more than a small acreage. The attention of the colonists soon focused on the wide bench between the two creek valleys. To bring water from Muddy Creek onto the bench required tunneling through a large hill. Like their Cleveland compatriots, the Emery settlers accomplished the project with a cooperative spirit, ingenuity, and tenacity. Living in a subsistence economy with no capital to speak of, no access to trained engineers, nothing but the most rudimentary tools, they labored on the tunnel for more than two years, doing most of the work during the winters. They calculated the proper fall with a homemade water level and sighted over lighted candles to keep the tunnel correctly aligned. To expedite the work they sank a shaft in the center of the hill so that they could excavate from four ends at the same time.. When the various segments met, they were almost perfectly aligned.

If the workmanship was well adapted to the purpose, the same could not be said of the materials. The Blue Gate shale formation softened upon exposure to air and water and sloughed off into the tunnel, blocking the flow of water. Efforts to shore up the tunnel with timber proved unsuccessful, and the canal company finally had to spend an additional year converting the lower half of the tunnel to a open cut. In this modified form the Emery tunnel continued in service for seventy-five years.

Over the many years since their construction, these pioneer irrigation works have not only supplied essential water to farms and towns but have also shaped then Emery County landscape. The winding courses of the canals are marked by streamside trees and shrubs, serving as strong visual boundaries between the desert and the cultivated land.

Water Shortages and Disputes

Within a few years of settlement the demand for irrigation water in Castle Valley had outrun the dependable supply. Well over half of the annual natural streamflow of the creeks occurs during a few weeks in late spring when the mountain snow is melting. There was normally sufficient water for all users during this period, but as the creeks dwindled in the summer farmers struggled to obtain enough water to bring their crops to maturity. The shortages were intensified by inefficiencies in irrigation practices, which also led to the degradation of some land. As the network of canals and laterals extended more widely, more and more water was lost through seepage and evaporation before it reached the fields. Some of the seepage entered the shale strata in hillside cuts and flowed underground, bringing dissolved alkali salts to the surface some distance away. The ditch-and-furrow irrigation system used in the fields led to the over-watering of some areas. Excessive moisture in the poorly-drained Mancos shale soils further aggravated the alkali problem. By 1904, less than three decades after the beginning of irrigation in Castle Valley, almost one-third of the agricultural land had been rendered unfit for cultivation because of salt contamination.

Utah water law was established on the principle of "first in time, first in right," meaning that the operators of the oldest farms were entitled to meet their full needs before the later users could exercise a claim to the streamflow. While this principle was clear enough in theory, in practice it was complicated by several factors. The newer canals diverted their water higher on the creeks than the older ones, putting them in a physical position to take water that belonged by legal right to senior downstream users. The downstream supply was then partially made up by runoff from the upstream users, which degraded the quality of the water. By this process, the pioneer Avery Ditch eventually became so contaminated that the water users transferred their rights into the higher Huntington Canal. In fact, some of the original agricultural lands were among the first to be degraded by alkaline soil and water, which meant that the owners either had to transfer their water rights to new canals and new lands or lose their value altogether.

Social and personal factors also complicated water distributed policy. The operators of the later-developed lands were in many cases close relatives-sons or brothers-of those who held the original homesteads. In any event they were all members of the same communities, involved together in church and civic activities. It was difficult in such circumstances for a senior water user to assert a right to his full supply while his neighbors' fields were burning up with drought.

In 1901 the water users on Cottonwood Creek turned to the courts to resolve some competing claims. The resulting Johnson Decree defined a normal "duty," or necessary water supply, as one cubic foot per second for each sixty acres, and established three classes of water rights. First-class rights were awarded to those lands occupied before 1884. Second-class rights were assigned to lands developed after 1884, and additional third-class rights were given to water users on the Great Western Canal in recognition of the high expense of construction. In effect, second- and third-class rights provided water only during the spring runoff when the supply exceeded the claims of the holders of first-class rights. If strictly implemented, this decree would have driven most of the farmers on the high-line Great Western and Mammoth canals out of business. However, the spirit of community cooperation prevailed, with the holders of senior rights voluntarily sharing some of their water during periods of scarcity.

Water rights disputes and litigation also took place during the early years of the twentieth century between Huntington and Cleveland users, between the senior users on Ferron Creek and the developers of newer lands around Clawson, and between water users at Emery and those at Rochester (Moore). Eventually, a single consolidated irrigation company was established for each major creek, enabling stockholders to buy and sell or to transfer water rights from one part of the system to another. However, the original canals typically retained a measure of autonomy with their own elected directors who administered some policies independent of the consolidated company.

In addition to the larger-scale conflicts over water rights, there were often disputes between neighbors using the same ditch. In a few incidents, these disputes led to violence. To prevent or alleviate conflict, some distinctive arid-region institutions became part of the accepted way of life in Emery County. Measuring weirs were installed in canals, laterals, and individual farm ditches to regulate the distribution of water. Where an individual water user's share of the stream was too small for efficient use, a system of watering by turn was employed, allowing each user on a lateral ditch to have the entire flow for a certain number of hours each week. Headgates and water turns were regulated by the water master, an official unknown to most of the world but vitally important in the arid west.

Water Storage

The settlers of Emery County realized from an early period that they could farm more effectively if they could

hold back some of the spring snowmelt for use later in the summer. The upper watersheds on the Wasatch Plateau offered a number of natural reservoir sites, some of them situated on glacial moraine deposits where relatively modest additional earthworks could impound water. Ferron Reservoir was situated on one such site and was storing some water by 1890. The Cleveland settlers began work on a reservoir in 1889, soon after their canal was put into service. The Huntington Reservoir was constructed a few years later, after the Huntington water users saw the benefits their Cleveland neighbors gained from having some storage. The developers of the Rochester (Moore) area built the Julius Flat and Spinner's Meadow reservoirs in 1907 to augment their water supply from Muddy Creek. Other small impoundments were made on the upper tributaries of Cottonwood Creek.

These pioneer reservoirs were constructed with the same hand-and-team labor that had been employed in building the canals. Typically, work crews of men and boys would travel to the site in August, after the summer's heavy farm work was completed, and remain through September or until they were driven out by the first snow. They scraped and hauled rocks and earth to form an embankment in which an outflow conduit was buried. A rock-lined spillway was provided on solid ground near the end of the embankment for overflow water. A reservoir tender either closed the outflow gate in the fall or snowshoed in to close it in the early spring. In their initial stages these reservoirs stored only a few hundred acre feet. Additional work over several years gradually raised the dams higher and increased the reservoirs' storage capacities.

As a general rule the early reservoirs were constructed without the advice of professional engineers. Loose soil might be scraped away from the dam site before construction began, but there was no attempt to excavate to bedrock or take other special precautions to provide a solid foundation. A bank of earth was simply heaped up, compacted as well as was feasible with horse-drawn equipment, and perhaps later faced with a stone riprap to prevent wave erosion. The Rolfson Reservoir, built during the 1930s, and the Miller Flat Reservoir, in the 1950s, were constructed with heavy equipment and under the supervision of professional engineers. The original dams of the main early reservoirs have since been replaced by larger and better engineered earthworks. Ironically, the only catastrophic dam failure that has occurred on the Wasatch Plateau involved the one early dam that was professionally designed and constructed. This was the Mammoth Reservoir disaster on the headwaters of the Price River in 1917, caused by inoperative outlet works that allowed water to spill over the top of a masonry dam and undermine its foundations.

Two ambitious efforts to develop off-stream reservoirs in the valley proved unsuccessful. The Desert Lake reservoir was completed in 1892 and rebuilt following a washout in 1897. The developers intended to store spring runoff water and use it to irrigate several thousand acres in a hollow east of Cleveland. However, salt-impregnated runoff from higher farms drained into the lake and made its waters unsuitable for irrigation. Efforts were made beginning in 1904 to bring water to the wide expanse of Buckhorn Flat. A reservoir was constructed at the head of the flat to capture storm runoff from Cedar Mountain, but this proved to be insufficient. Prohibitive cost estimates thwarted plans to built a conduit through the ridge that separated Buckhorn from the south branch of the Cleveland Canal.

None of the reservoirs built by local irrigation companies could store more than three or four thousand acre feet, and most were much smaller. The Huntington watershed had by far the greatest amount of storage, and the combined effect of the four reservoirs was to substantially augment the mid-summer water supply. Branches of the Cleveland Canal were extended out onto the Washboard Flat in the first decade of the twentieth century, opening up considerable additional acreage and making possible the establishment of the town of Elmo. During the same period an extension of the North Ditch brought water to Buffalo Bench east of Lawrence. By this time, approximately half of all of the cultivated acreage in western Emery County was served by Huntington Creek, even though its annual streamflow was less than one-third of the total.

The Joe's Valley Project

The major tributaries of Cottonwood Creek converge in Lower Joe's Valley. This creek, the largest in western Emery County, then flows through a narrow gap in a fault scarp and runs down Straight Canyon into Castle Valley. It was obvious to the Emery County settlers from the earliest period that if that gap could be dammed it would create a larger reservoir than all of the other impoundments in the county combined. Serious proposals to construct a reservoir in Joe's Valley began at the time of the Cottonwood Creek water rights litigation in 1901 and were renewed periodically for the next half-century.

The Joe's Valley project was simply beyond the capacity of the local irrigation companies. It involved damming a major creek rather than the small tributaries that were controlled by other impoundments. This meant construction on an altogether different scale from the other local reservoir projects. It was not a reservoir that could be built by teams and scrapers. To be economically feasible, the project required the support of Huntington and Cleveland water users. While the farmers on Cottonwood Creek would benefit from a more dependable wa-

ter supply, there was not sufficient land under their canals to make use of all the water that could be stored in Joe's Valley. The Huntington and Cleveland users needed more water but preferred to invest in storage projects on the Huntington watershed instead of committing their resources to a larger and more uncertain project that would not be under their complete control. (Longstanding local rivalries and animosities, especially those between Huntington and Castle Dale, also played a role.) Ferron water users also needed a better supply, but a higher elevation and the barrier of Rock Canyon Wash made it impractical to divert water from Cottonwood Creek to the Ferron system. A further complicating factor in the Joe's Valley project was the Sanpete County water interests, who from an early period had diverted some of the precious summit ridge snowbank water to their side of the mountains. There was concern that if a large reservoir were constructed the Sanpete users might claim a larger portion of the upper watersheds as being surplus to Emery County needs.

Notwithstanding these obstacles, there were repeated efforts over several decades to bring the Joe's Valley project to fruition. A local irrigation convention in 1902 petitioned the federal government to develop the project under the provisions of the Newlands Act. However, government agencies did not begin to assume an active role in Emery County water development until the aftermath of the devastating drought of the early nineteen thirties. The depression-era Federal Emergency Reconstruction Administration assisted with the building of the Rolfson Reservoir on the Huntington watershed in 1935. In 1937 the state water development planning board endorsed the Joe's Valley project and did some test drilling at the dam site. Two years later, Sanpete County interests joined with Emery County in urging that the reservoir be constructed with federal relief funds in order to make possible larger trans-basin diversions into Sanpete Valley as well as a more adequate water supply for Emery County.

With this regional support and a Bureau of Reclamation study that identified Joe's Valley as being among the most economical storage projects in Utah, the project reached the top of the state's priority list in 1941. In order to move forward, however, the project required the support of the Huntington-Cleveland Irrigation Company, which would have received 13,000 acre feet annually from the proposed reservoir. Local rivalries and suspicions again came into play. The Huntington-Cleveland directors expressed concerns about the cost of a high-line canal to deliver the water to their system and about a proposed trans-basin diversion of several hundred acre feet from the upper Huntington watershed into Gooseberry Creek. They preferred to construct a reservoir at Miller Flat, which the Bureau of Reclamation declared was not cost-effective. In the end, however, these local disputes probably made little difference. The outbreak of the Second World War brought an end to depression-era public works projects as the country's financial and human resources were diverted to national defense.

Water Development at Green River

The first settlers came to Green River (originally known as Blake) in the late eighteen-seventies, at about the same time as the colonization of Castle Valley. However, the Green River pioneers were independent ranchers and not part of an organized colonization movement. They ran their livestock on the nearby desert and the Tavaputs Plateau and diverted water from the river by means of brush dams and water wheels to irrigate small plots on the banks. The Farrer family were the most prominent property owners and business entrepreneurs during Green River's early years. Another significant figure was John F. "Melon" Brown, who first discovered that the climate and soil conditions were well adapted for growing melons. The town of Green River grew around the railroad hotel erected by the Rio Grande Western Railway in the early eighteen-eighties. The railroad established a divisional headquarters at Green River, and the community grew rapidly for a few years only to shrink again when the divisional operations were moved to Helper in 1892.

The challenges faced by Green River irrigators were very different from those in Castle Valley. There was an ample water supply in the river. The problem was getting the water onto the land. The flows varied widely through the course of a typical year, from heavy spring floods that tore out diversion structures and washed away riverside fields to late-summer low water that was inaccessible to the irrigation ditches. Furthermore, there was insufficient fall between the mouth of Grey Canyon and the head of Labyrinth Canyon to allow for a gravity canal that could reach more than a few hundred acres.

A new era in land and water development at Green River began in 1904 when land speculators bought up most of the property of the early settlers and began to promote the area as an ideal site for growing peaches and other fruit. The Green River Land and Townsite Company platted a new townsite and sold farms and residential property chiefly to people from Iowa and other Midwestern states. To bring water to the new town and agricultural land the company built a large dam across the river designed both to divert water into a gravity canal and to provide power to pump water into another, larger canal forty-two feet above the river level. Hundreds of new residents came to Green River and more than fifty thousand fruit trees were planted. But the spring floods of 1907 destroyed the dam within a few weeks of its completion. Thousands of peaches perished from lack of water and thousands more were killed by the cold, dry winters. When the surviving orchards bore their first

full crop, in 1915, they found the market saturated and prices too low even to recover the shipping costs. Scores of residents became discouraged and left the area, but others were determined to make a success. An Iowan named George E. Thurman accepted the challenge of rebuilding the diversion dam. Thurman realized that it was neither possible nor necessary to hold back the waters of the Green River. All that was needed was to raise the water to the level of the diversion structures, which had to have strong enough gates to protect the canals from floods. The graceful, crescent-shaped Green River diversion dam is an enduring monument to the efforts of Thurman and his associates.

The remaining farmers at Green River gave up on trying to grow peaches and planted their land instead to melons and alfalfa, both of which have done well in the long, hot summers. The idle land under the Forty-two Foot Canal was acquired in 1917 by Sam Wilson, who developed what was probably the largest farming operation in Emery County. During the peak years in the 1930s, Green River melon growers shipped more than 250 railroad carloads of fruit to eastern and mid-western markets.

Emery County at Mid-Century

The practical limits of agriculture in western Emery County had been reached or exceeded by the early years of the twentieth century. The newer lands brought into cultivation at Washboard Flat, Buffalo, Rock Canyon Flat, and Moore were largely supplied by water transferred from alkali-degraded older farms. At the same time, however, the extension of canals and laterals for longer distances increased water losses through seepage and evaporation. The typically small subsistence farms of the pioneer era were gradually consolidated into larger economic units. Strong prices for farm products in the period from 1910 to 1919 and again from 1940 to 1950 raised the hopes of farmers and stockraisers, but the combination of drought and low prices during the nineteen-twenties and -thirties and again in the nineteen-fifties and -sixties drove many farmers from the land and reduced other operations to what were essentially hobby farms. Only a few agricultural operations were capable of supporting a family without being supplemented by non-farm employment.

In common with many other rural areas, Emery County exported virtually its entire natural growth, maintaining a relatively steady population between seven and eight thousand from 1900 to 1950. Then with the decline of the coal industry, the county's other economic mainstay, during the nineteen-fifties and -sixties, the rate of out-migration increased, resulting in a substantial decline in population and an ageing citizenry. The communities of Ferron and Emery were especially hard-hit, losing almost half of their residents during this period while the median age increased to the mid-thirties. Major water development projects initiated during this troubled period did much to arrest the economic decline and prepare the way for a period of renewed growth.

The Emery County Project

The long-deferred hope for a large reservoir in Joe's Valley began to move toward realization in 1956 when the Emery County Project was included as a participating unit in the massive Upper Colorado Reclamation Project, to be developed by the Bureau of Reclamation. As a key step toward development of the project the Emery County Water Conservancy District was formally organized in 1961 with prominent citizens as officers and directors, including O. Eugene Johansen of Castle Dale as president, Mark Humphrey of Orangeville as secretary, and directors Ralph Lundy of Cleveland, Rosel Jensen of Huntington, Russell Justesen of Orangeville, Clyde Conover and Ellis Wild of Ferron, and Rex Bunderson of Emery. This was the first water agency in the county's history to transcend the boundaries of individual watersheds. This area-wide support was further affirmed in 1962 when ninety-six percent of the district's voters approved the repayment contract.

Ground was broken for the Joe's Valley dam on June 20, 1963, in a ceremony attended by state and national dignitaries and hundreds of Emery County residents. The dam, an earthfill structure almost 200 feet high with a crest length of 740 feet, completed in 1965, created a reservoir with a storage capacity of more than 62,000 acre feet. In addition to the Joe's Valley Reservoir, the Emery County Project included the off-stream Huntington North Reservoir, the Swasey Diversion Dam, the Cottonwood-Huntington Canal, and some drainage projects. Besides providing a greatly improved water supply to Cottonwood and Huntington-Cleveland irrigators, the project provided badly needed construction jobs for local residents and an enduring legacy of recreational resources. The Joe's Valley Reservoir is a beautiful body of water that attracts many boating and fishing enthusiasts each year. The Huntington North Reservoir (better known as Huntington Lake) provides easily accessible water recreation to county residents.

The Ferron Watershed Project

The Emery County Project provided no direct benefits to Ferron Creek irrigators, whose canal diversion points were too high to be supplied from Cottonwood Creek. The possibility of constructing a reservoir near the site of the old flour mill at the mouth of Ferron Canyon had been discussed for many years, and an unsuccessful attempt had been made during the nineteen-thirties to have it built by the Civilian Conservation Corps. New efforts were initiated beginning in 1962 to improve the Ferron Creek water supply through existing programs of the U. S. Department of Agriculture. Ground was broken for the Mill Site Dam on June 16, 1969, and the completed project was dedicated two years later. The dam is 112 feet high with a crest length of more than 4,000 feet. Storage capacity in the reservoir is about 19,000 acre feet. The cost of the $3,380,000 project was divided among the Soil Conservation Service, the Ferron Reservoir and Canal Company, Ferron City, and the Utah Department of Wildlife. The Utah Water and Power Board provided a long-term loan of $750,000. The Mill Site Reservoir can effectively control the entire flow of Ferron Creek, except during seasons of high runoff. It has also made an important addition to the county's recreation facilities, offering boating, fishing, and golf.

The Energy Boom

The development of water storage facilities combined with Emery County's abundant coal resources to make the county an inviting site for steam-electric generating operations during the "energy crisis" of the nineteen-seventies, when fears of the imminent depletion of world petroleum supplies made coal suddenly fashionable again. Utah Power and Light Company constructed the 860,000 kilowatt Huntington Plant in two stages between 1971 and 1977 and the 1.2 million kilowatt Hunter Plant in three stages between 1974 and 1983. These two plants were the largest steam-electric generating facilities built in Utah up to that time. Utah Power also constructed Electric Lake, a reservoir with a storage capacity of 32,000 acre feet, in the right fork of Huntington Canyon.

The work force required to construct and operate the power plants as well as some of the largest underground coal mines in the western United States abruptly reversed a twenty-year depopulation trend in Emery County. The county's population grew by more than 150 percent, from 5,137 residents in 1970 to a peak of 13,100 in 1983. In addition, many workers commuted to Emery County jobs from homes in adjacent counties. This rapid growth put a tremendous strain on the county's physical infrastructure and capacity to provide services, a strain that was relieved by the establishment of the Castle Valley Special Service District in 1976. The special service district made it possible to tax industrial facilities in unincorporated areas of the county in order to fund water, sewer, and road projects in the hard-pressed cities and towns.

The most important impact of the energy boom on water development in Emery County was the transfer of more than one-third of the region's water from agricultural to industrial and municipal uses. Utah Power acquired large blocs of water stock in the Huntington-Cleveland and Cottonwood Creek irrigation companies and entered into a long-term lease with Ferron Creek waterusers for water from Mill Site Reservoir. This major shift in water use meant that some agricultural land was retired from cultivation and some addition land had a reduced water supply. Fortunately, however, with the enlarged storage facilities and some improvements in water distribution and irrigation practices, the effects on agriculture was less severe than it would have been if such a transfer had taken place at an earlier period. In addition to the industrial impact, water was also diverted from agricultural to municipal uses by the growing towns, the grassroots North Emery culinary water project, and the Castle Valley Special Service District. Among the most important water developments sponsored by the special service district was the provision of pressurized secondary water systems in the towns. This eased the demands on the culinary water supply, reduced the amount of water lost through seepage and evaporation, and eliminated the roadside ditches that had required annual cleaning.

Challenges of the Twenty-first Century

The challenges of providing a sufficient, sustainable water supply for economic development and a comfortable lifestyle are just as great as they have ever been in the history of Emery County. The management of scarce supplies during drought periods requires a delicate balancing act among competing interests-farmers, industries, cities and towns-and a variety of different agencies including the irrigation companies, the water conservancy district, and local governments. Unforeseen events can have a major impact on the water supply, including the effects of underground mining on the hydrological system. This became dramatically apparent in 2002 when a large inflow of water in the Skyline Mine occurred at the same time as a large water loss from Electric Lake. Local water issues are increasingly caught up in the national political debate over the control and use of public lands. Even international politics can have an impact as evidenced in the pressure to reduce salt contamination in the Colorado River Basin to protect the water quality of downstream users in Mexico.

The water available for development and beneficial use in Emery County is finite and scarce. The existing water storage facilities are probably close to the practical limit. Even if additional reservoir storage were economically feasible, it would face some difficult political obstacles. The best prospect for improving the water supply lies in reducing waste and improving the efficiency of delivery and application. Several initiatives aimed at doing just that are currently under way in the county. With financial and technical assistance from the Bureau of Reclamation and other government agencies, pressurized delivery systems and sprinkler irrigation are now in place throughout the Ferron Creek valley. Similar facilities are being installed in other areas, progressively replacing open canals and laterals and inefficient flood irrigation with irrigation technology that reduces water losses through evaporation and seepage and also reduces the runoff that has historically contaminated downstream water and land.