

What is Utah's Water Legacy?

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Our water legacy is measured in terms of the spirit and determination of our predecessors who first dammed the streams, dug the ditches and canals and later built the large water projects that provide us the water we have today.

To appreciate our Utah water legacy, it's necessary to understand the history of our water development. Who were the leaders, shakers and movers in developing the water that today is our legacy? What events in the past shaped our lives today? In preparing for this assignment, I have tried to trace the major water development milestones through the leaders who made them possible. There are a number of historic milestones that can be associated with certain individuals and time periods.

I've chosen the early pioneers as a group and seven individuals to describe these milestones.

The Mormon Pioneers

Early Descriptions of the Salt Lake Valley

It's interesting to note the different observations of those first pioneers as they viewed the Salt Lake Valley upon their arrival.

"Streams from the mountains and streams were abundant, the water excellent and generally with gravel bottoms." Orson Pratt

"The most fertile valley spread out before us for about twenty-five miles in length and sixteen in width, clothed with a heavy garment of vegetation." Wilford Woodruff

"The ground seems literally alive with large crickets crawling around." William Clayton

"Aside from its scenic splendor...there was little to invite and much to repel in the prospect to their view. On all sides a seemingly interminable waste of sagebrush bespangled with sunflowers, the paradise of the lizard, the cricket and the rattlesnake."

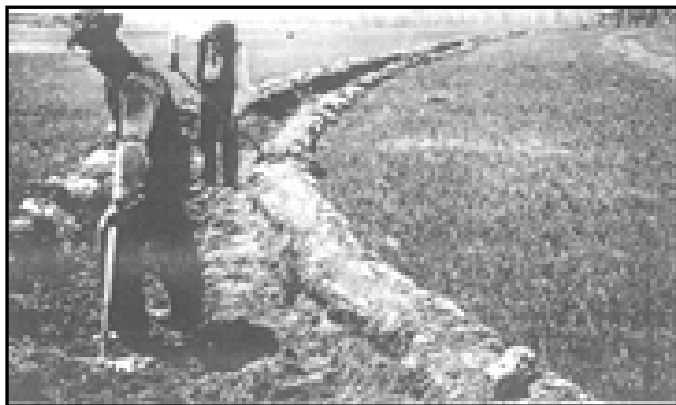
Orson F. Whitney

The Establishment of Irrigation

The struggle that the early Mormon Pioneers endured, simply to survive in this arid portion of the United States, certainly has played a key role in the way we view and cherish water, compared to other parts of the country where there is an abundance of water.

On July 23, 1847 the advance party of pioneers arrived in the Salt Lake valley. Preparing the soil for planting crops and diverting City Creek were their first order of business. The advance party of pioneers built a dam across City Creek at 2:00 P.M. in order to convey water from the stream to the land being plowed.¹ Thus began the practice of irrigation and our water legacy. This single event has had an enormous influence, of historic proportions, on Utah's legacy, and in fact on the entire west.

The following year, individuals and groups spread out over the state to settle near or on waterways. For example, water was diverted from the local Salt Lake canyon streams beginning in 1848; in the spring of 1848 about 30 families settled on the Provo River; recorded diversions on the Weber River began as early as 1851. The first diversion of the Logan River was in 1860 and was sufficient to irrigate 800 acres of wheat. In 1854 missionaries under the leadership of Jacob Hamblin were sent to southern Utah and in the fall of that year placed a dam across the Santa Clara Creek.



The Mormon Pioneers were totally dependent on the crops they could grow in this new

land. It was a matter of survival!

All of the settlers came from areas that had plentiful water and rainfall, and it was necessary to learn a new way of farming in this arid region of the country. If it were not for irrigation, they would have failed in their attempt to settle the Salt Lake valley where the annual precipitation is less than 16 inches, with very little during the summer growing season.

Their efforts established water laws and agricultural practices that others would copy. The Mormon experience would be later emulated by the federal government's reclamation program.

During the first 50 years an estimated 1000 miles of ditches were dug with an estimated 500,000 acres of land under irrigation in the state (1% of the land).²

The Fruits of Irrigation

The following notation was made in Captain Stansbury's journal:

"A city has been laid out upon a magnificent scale. By ordinance of the city, each lot is to be placed 20 feet back from the front line of the lot, the intervening space being designed for shrubbery and trees. The site for the city is most beautiful...by an ingenious mode of irrigation is made to traverse each side of every garden spot, spreading life...and beauty over what was heretofore barren waste." Captain Stansbury, 1850

Brigham Young

The Colonizer

Unquestionably the greatest individual influence on the State's legacy was Brigham Young. Charismatic leader of the Mormons, he was both head of State and church. Under his leadership the practice of irrigation was an essential part of his plan to settle the Great Basin. Known as the "Colonizer" or "America's Moses," he envisioned colonizing vast areas of the west to form an ecclesiastical commonwealth covering about 210,000 square miles including the current states of

Utah, portions of Wyoming, Colorado, Arizona, Nevada, Idaho, Oregon and California with sea ports at what are now San Diego and Los Angeles.

Brigham Young, with the limited water found in the Great Basin, established the policy of appropriation in opposition to the common-law doctrine of riparian rights found in the east and cooperatively dug ditch systems. The Mormons are credited with creating modern irrigation in America. Under Brigham Young's leadership over 365 communities throughout the Great Basin were settled by applying his water policies and practices. The following quote best describes the influence of Brigham Young and the church:



"We find the Mormon settlers in a valley of the Great Salt Lake pioneers in deed-- settlers in a new county without established government and requiring a new system of engineering and agriculture. Without the necessity of conforming to existing rules...the church...prevented conflicts over...land and water which would have otherwise arise."³

Jesse Fox

Early Water Pioneer

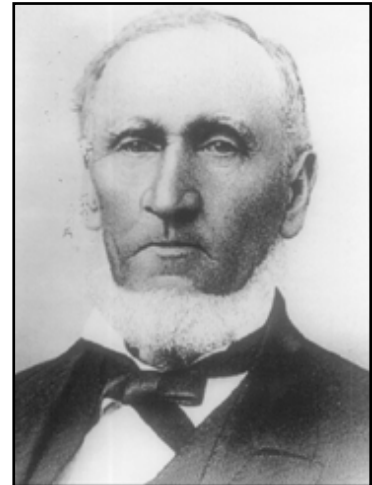
Jesse Fox left his mark on early water development in Utah. His engineering endeavors during the pioneer period would develop water to irrigate thousands of acres of land in Salt Lake County.

He was born on his father's farm near Adams Centre, New York on March 31, 1819. He joined the Mormon Church and moved to Nauvoo in 1844, joining the pioneer migration in 1849 to Utah. Learning surveying as an assistant to the County Surveyor, he was employed by the church in 1850 to survey city lots and farm allotments. Later he would survey for a railroad to Red Butte Canyon to bring foundation stone to construct the Temple. In 1852, the railroad idea was abandoned. Jesse Fox became County Surveyor on August 2, 1852 followed by being appointed

Territorial Surveyor, which he vacated in 1876.

He was chief engineer over the construction of the five major canals diverting water out of Utah Lake and the Jordan River within the Salt Lake valley.⁴

When Salt Lake City decided on August 17, 1879 to find a new source of water from Utah Lake and the Jordan River, Jesse Fox was asked to survey the alignment and to estimate the cost to construct the canal. The proposed 28-mile canal was estimated to cost \$280,000. A bond election was held to finance the canal in 1880. During the debate over the bond, the engineering ability of Jesse Fox became an issue. Opponents of the bond attacked him for his involvement in the failed canal from Little Cottonwood Canyon that was intended to carry the granite slabs to the temple. Some members of the City Council opposed the canal, believing that if the canal was constructed, water would never flow through segments about 5 miles southeast of the city. Ultimately, a bond election was held and approved on April 5, 1880, with five to one in favor. With the bond approved, the City Council hired Jesse Fox to construct the canal.



The canal was completed and water flowed from the diversion at the Jordan Narrows to the confluence of City Creek at Eagle Gate on July 12, 1882. Despite his critics, he must have been pleased to read the words of the Salt Lake Herald, "... We commend Mr. Jesse W. Fox Engineer, his skill, having the manhood to acknowledge his business...and the Herald regards this as one of the greatest days in the history of Salt Lake City." Later the canal would be used to exchange Utah Lake water for the high quality Wasatch Canyon waters. These exchanges would provide the city enough water to grow for the next 50 years.

Other work to his credit included the early survey work on the present Weber/Provo Canal through the Kamas Bench that would later become a key feature of the Provo River Project.

He also surveyed the early waterworks system in City Creek Canyon in 1872, establishing the diversion, settling tanks and 4 miles of cast iron pipe serving the city's downtown business district.

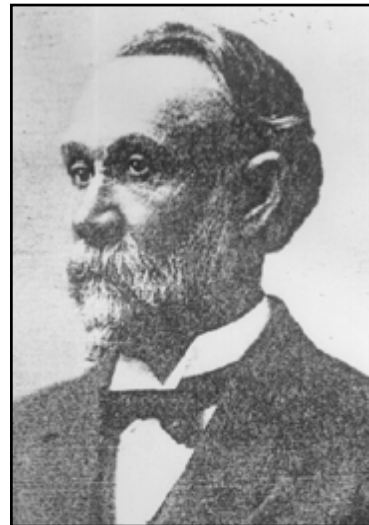
Jesse Fox left his mark on early water development in Utah. His engineering skills changed the history of the Salt Lake valley.

A. F. Doremus

State Engineer

Abraham Fairbanks Doremus held the positions of City Engineer and State Engineer and was known for his civil engineering skills in water and railroad construction.

Born in Salt Lake City on May 24, 1849 his career began in the pioneer era and extended into the twentieth century. His father, Henry I. Doremus, was a prominent educator and through his tutelage, young Doremus secured an education that led him into civil engineering that would later help shape Utah's water legacy.⁵



As City Engineer from 1890 to 1894 he explored early water exchanges and expanded Salt Lake City's water system.

He was the first State Engineer, holding the position from 1901 to 1905. The position acted as a consultant to the state from 1896 to 1903; but, beginning in 1903 it gained statutory authority.

As State Engineer he was involved with the Strawberry project, which would later become part of the Central Utah Project. He also worked in support of the Water Reclamation Act of 1902.

He continued to serve the state when in 1921 he became first vice chairman of the Utah Water Storage Commission.

After he was State Engineer, he became a consulting engineer for the State and helped form a large number of irrigation districts until his death in 1933.

During his career he was involved in a wide-range of engineering projects, both large and small, but his pioneer heritage inspired him to build projects for the farmer, as stated in his obituary:

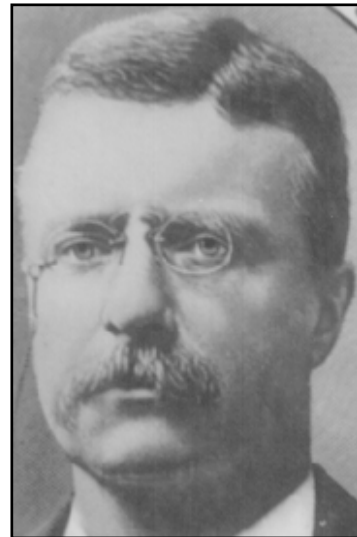
"Mr. Doremus' counsel has been received with the greatest of respect; and through it all, his sympathy was on the side of the small farmer who had pioneered in irrigation, rather than in favor of projects that were impressive on account of their size and spectacular engineering features."⁶

Theodore Roosevelt

Water Reclamation in the West

In 1901 President Teddy Roosevelt in his first message to Congress, allied his Administration with proposals for federally constructed engineering works for water storage.

He endorsed a bill sponsored by Congressman Francis G. Newlands of Nevada that in due course passed and became the 1902 Reclamation Act. The Act established a federal program for the purpose of developing water supplies for irrigation in the arid and semi-arid areas of 17 western states and territories. The reclamation service was established in 1902, given Bureau status in 1907 and in 1923 it was named the Bureau of Reclamation (USBR).



Many credit John Westley Powell, famed scientist and explorer, as the champion of reclamation. He strongly advocated a comprehensive scientific approach to western development. He also had a distrust of government developing water and land and felt that a social order of citizens could best manage the western resources. Powell's early recommendations were largely unheeded, however Congress supported a resource inventory. In 1888, Powell was head of the USGS and was authorized to survey streams and damsites in the west.⁷

Later others would further the efforts of reclamation in the west. Most notably was William E. Smyth, a Nebraska journalist who attracted public attention through a series of articles in the *Omaha Bee*. In the late 1890's George W. Maxfield, a California lawyer organized the National Irrigation Association that had great public and congressional support for reclamation.⁸

However, it was President Roosevelt who ultimately won passage of the Act. Mid-west and eastern legislators who were fearful that the reclamation projects in the west would create competition for their own farmers opposed the bill. Roosevelt was familiar with the arid west and its need for water, and with his strong support, the bill passed.

The USBR has had a significant impact on the State's water legacy. Beginning with the Strawberry Project to the Central Utah Project, the USBR has developed 240,000 acre feet of M&I water serving nearly a million people; 430,000 acre feet of irrigation water irrigating 330,000 areas of farm land. The USBR has spent \$2.3 billion in constructing 14 projects, 22 dams, counting the CUP as three units.

E.O. Larson

Bureau of Reclamation Engineer

A native of Utah he was born in Santiquin and educated at Utah State Agriculture College.

Beginning in 1923 through the next three decades E.O. Larson played a significant role in developing water in Utah as an employee of the USBR; and beginning in 1943 when he was made director of District 4.

In his early years he was involved in the successful completion of the Hyrum, Ogden, Moon Lake, Sanpete, Provo River and Weber River Basin Projects. He helped form the Metropolitan Water District of Salt Lake City, which led to the successful completion of Provo River Project.



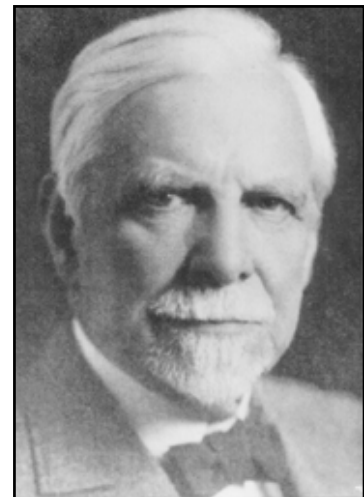
Later in his career, he worked for the passage of the 1956 Colorado River Upper Basin Storage and Participating Projects Act.

He was recognized for his knowledge of the Colorado River basin. According to Robert S. Halliday, *Salt Lake Tribune* writer, "Mr. Larson undoubtedly knew more about the Colorado River drainage system and its potential than any other one man. The outcome is history, and Mr. Larson merits a lion's share of credit for the final approval of the mammoth project."⁹ The Central Utah Project, Initial Phase, was authorized for construction as a participating project under the Act.

William Ross Wallace

State Water Boards

A businessman (mercantile, mining, ranching and oil refining), he was born in Salt Lake City on December 10, 1865 and died in 1953. He was a leader in State of Utah water development. Mr. Wallace was first appointed to the Utah State Conservation Storage Commission from 1923 to 1929, and re-appointed in 1932. He went well beyond just attending board meetings, by lending his own financial support to further water development. "Legislative appropriations to the Water Storage Commission had been for investigation only and included no construction money. Mr. Wallace, on occasions, financed the state's share of investigative work on his personal note, with hope that the Legislature would later reimburse him, which it usually did."¹⁰



He was also appointed a commissioner of the Colorado River Commission for Utah in 1924. He would later be an original member of the Utah Water and Power Board formed in 1947 when he would have been in his eighties. "He and Thomas J. Jensen, lobbied tirelessly from 1945 to 1947 with Utah lawmakers for the new Board."¹¹ The Utah Water and Power Board is now the State Water Resources Board.

He was also involved in the formation of the Metropolitan Water District of Salt Lake City in 1935 and the successful construction of the Provo River Project that includes Deer Creek

Reservoir in Provo Canyon. This project would provide a firm water supply to Utah and Salt Lake Counties for the next 50 years until the Central Utah Project began delivering its water supply to the growing Wasatch Front. At one time, there was talk of naming the project after him.

He also formed the Utah Water Users Association in 1944.

The State of Utah water has help develop 860,000-acre feet of new water by constructing about 1000 projects, (109 dams) with about \$200 million in state appropriations and \$413 million in revolving loans.¹²

George Dewey Clyde

Governor of the State of Utah

Governor of the State of Utah from 1956 to 1964.

Born in Mapleton, Utah he graduated from Utah State Agricultural College and received a master's degree in civil engineering from the University of California, Berkeley. He was the dean of engineering at Utah State from 1945 to 1953. As a water expert, he became director of the Utah Water and Power Board in 1953 and helped initiate the Flaming Gorge and Glen Canyon dams.

He was with the U.S. Soil Conservation Service from 1945 to 1953.

He was a strong supporter of the Upper Colorado River Storage Project and the quest to fully control and utilize the waters of the Colorado. While governor he continued to represent the state as a member of the Upper Colorado River Commission.

In 1953 in an effort to gain the approval for the Upper Colorado River Storage Project, it was decided that Mr. Clyde was needed as head of the Utah Water and Power Board.



"However...he had been appointed Chief Engineer of the Soil Conservation Service and was about to move to Washington D.C., when he was selected to direct a major assault on the state's water problems. I (Mr. Redd, Board member) chased him all over the country and found him in Michigan, to offer him the full-time directorship...at \$12,000 a year."¹³

Work then began with the Eisenhower administration and congress. He found a strong ally in Senator Watkins. "Mr. Clyde was aided greatly in obtaining confidence of the White House by a friendship which developed between U.S. Senator Arthur V. Watkins, R-Utah and President Eisenhower."¹⁴ With his water expertise and Senator Watkins having the President's ear, Mr. Clyde and E. O. Larson, mentioned earlier, gained congressional approval of the Upper Colorado Storage Project on March 1, 1956. It was signed into law on April 11, 1956.

That fall President Eisenhower triggered an explosion at both Flaming Gorge and Glen Canyon dam sites, setting the projects in motion.

Mr. Clyde was elected Governor in 1956 and after retiring from office in 1965; he worked as a consulting engineer until his death in 1972.¹⁵

Conclusion- What is Our Water Legacy?

There is no doubt in my mind that our water legacy is our rich history, the great leaders (including many not mentioned here) and the water developed from the pioneers to the present. Marc Reisner, contemporary author, and no friend of water reclamation, best described the origins of our water legacy: "Without realizing it, they were laying the foundation of the most ambitious desert civilization the world has seen. The Mormons attacked the desert full-bore, flooded it, subverted its dreadful indifference--moralized it--until they made a Mesopotamia in America."¹⁶

Furthermore, the pioneer experience played a significant role in water development during the 20th century. Again according to Marc Reisner, "In 1902, the United States Government launched its own irrigation program, based on Mormon experience, guided by Mormon laws, run largely by Mormons."¹⁷

And finally, generations of Utahns, through the State of Utah and its water development

programs have added to the legacy.

We need to remember and appreciate those in the past that built our water legacy as we look forward to the twenty-first century. And hopefully we will preserve and build on the legacy, so that future generations will be as grateful as we are today for the most valuable and essential of resources -- water!

In conclusion, I believe that our greatest challenges in furthering our water legacy during the coming century are meeting growth demands while maintaining the infrastructure built over the past 150 years (particularly the municipal systems) and, equally as important, protecting the quality of our water.

As a state experiencing enormous growth, it will be difficult to meet the financial needs of building new infrastructure and still maintaining the old. The replacement costs of old facilities are immense compared to their original costs. For example Mt. Dell dam cost \$440,000 when first built, but today it cost five times that amount to just meet new dam safety requirements. Replacement costs will be tremendous.

Likewise the effects of growth could have an adverse impact on water quality if not kept in check. The Wasatch Cache/Uinta Forest is the most used forest in the United States with 10.5 million recreation visitor days, with most of this visitation in the Wasatch Front Canyons.

There is no reason to believe that this growth (and associated development) will not continue into the future.

Across the country, national parks and recreation areas are experiencing degradation and pollution from human overuse. It will take extraordinary efforts in Utah to protect the environment and our watersheds in order to preserve water quality with growing population and recreational demands.

If we fail to take responsibility and meet the obligations of our stewardship for the infrastructure and quality of our water, our water legacy may be at risk -- for future generations.

¹ LDS Journal of History

² Elwood Mead, Report of Irrigation Investigation in Utah, 1903

³ Ibid

⁴ F.Y. Fox, The Life Of Jesse W. Fox, Sr., p.41

⁵ Salt Lake Tribune, 1909, Sketches of the Inter-Mountain States 1847 - 1909

⁶ Salt Lake Tribune, May 11, 1933, p.20

⁷ Michael C. Robinson, Water For The West - The Bureau of Reclamation 1902 - 1977, p.12

⁸ Ibid

⁹ Salt Lake Tribune, April 8, 1956, Robert S. Halliday, Meet E.O. Larson -- Mr. Reclamation

¹⁰ Deseret News, Charles S. Barker, Staff Writer, Twenty Years of Achievement 1947 - 1967

¹¹ Ibid

¹² Larry Anderson, State Division of Water Resources, 1996

¹³ Deseret News, Clarence S. Barker, Staff Reporter, Twenty Years of Achievement 1947 - 1967

¹⁴ Ibid

¹⁵ Miriam B. Murphy, www.media.utah.edu - Microsoft Internet Explorer

¹⁶ Marc Reisner, Cadillac Desert, p.2

¹⁷ Ibid