Hyrum Project

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The Hyrum Project

When the first settlers entered the Cache Valley in the 1850s, they continued a tradition that was common in most settlements in the Utah Territory: irrigated agriculture. But at the same time, they became part of another tradition of western settlement, the tradition that, while early season run-off provided more than enough water for irrigation, lack of late season rains meant that many crops never reached maturity. The key to overcoming this situation was the construction of reservoirs to store spring run-offs for use in the late summer. A difficult proposition for water users who had little money for such endeavors.

Project Location

The Hyrum Project is located in Cache County in northern Utah, about eight miles southwest of the city of Logan. Hyrum Dam is located on the Little Bear River which runs through a valley known as Cache Valley near Hyrum, Utah. The river drains an area of about 220 square miles above the dam site. Project lands are located above the reservoir to the northeast, and along the west side of the river which runs northwest of the dam.[1]

Historic Setting

To pioneers traveling west in search of mineral wealth or green pastures, the bleak and barren landscape of Utah seemed to have little to offer, and most continued on to California or the Northwest. It was for this very reason that a small group of settlers choose to locate their community at the foot of the Wasatch Mountains. The Mormons came to Utah because they believed no one else would want it and that they could practice their unique religion without fear of the persecution that had driven them from their home on the banks of the Missouri River.

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1. United States Department of the Interior, Water and Power Resources Service, *Project Data,* (Denver: U. S. Government Printing Office, 1981), 550; D. J. Paul, "Construction of Hyrum Dam," *The Reclamation Era,* January 1936, 14-7.

Evidence of early human activities in Utah clearly dates back more than 10,000 years. When the first Anglos entered the region around 1540, they found it inhabited by bands of Shoshone, Paiute, and Ute peoples, primarily hunter/gatherer groups surviving on small game and plants.[2]

Tradition holds that the first Anglos to enter the region were a party sent by Francisco Coronado and led by García L. de Cárdenas in search of the legendary "seven cities of Cibola." In 1776, two Franciscan priests, Francisco Silvestre Vélez de Escalante and Francisco Domínquez, explored southern and central Utah. The fur trade of the early 1800s brought more explorers into the region, including Etienne Provost, Jedediah Smith, Peter Skeen Ogden, and Jim Bridger, who claimed to be the first white man to reach the Great Salt Lake in 1824.

The first Mormons, led by Brigham Young, entered Utah in July 1847, settling in the Great Salt Lake Valley near the foot of the Wasatch Mountains. Upon settlement, the Mormons began plowing fields and constructing irrigation works. By providing food and aid to the Native Americans in the valley, the colonists were able to avoid many of the conflicts experienced by other Anglo settlers in the west. Only year after the first Mormon settlers arrived in Utah, the territory was ceded to the United States by Mexico in the Treaty of Guadalupe-Hidalgo. The following spring, the Mormons organized the State of Deseret, a territory that included all of Utah and Nevada, and parts of Colorado, Wyoming, Idaho, California, Idaho, Arizona, Oregon, and New Mexico. Congress ignored their state and formed the Utah Territory in 1850, naming it for the Ute Indians of the region. Brigham Young was named the territory's first governor.

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2. Warren L. D'Azevedo, ed., *Handbook of North American Indians*, Vol. 11, *Great Basin*, (Washington: Smithsonian Institution, 1986), 21; "Utah," *Compton's Interactive Encyclopedia* (CD-ROM), Compton's NewMedia, Inc., 1995.

Mormon settlement expanded north and south out of the Great Salt Lake Valley. In 1850, the population of Utah was about 11,000. By 1880, this number had reached over 130,000, all under direction of the Mormon Church. Following formation of the Utah Territory, the Mormons petitioned Congress for admission to the Union, but their request was denied. Five more times the Mormons asked for admission as a state, and each time, Congress rejected the petition - primarily due to the Mormon practice of allowing plural marriage.

The practice of plural marriage had been a source of conflict between the United States Government and the Mormon Church for decades. In 1857, the Mormons were declared to be in open rebellion against the United States, and Young was removed as governor. Federal Troops were sent to Utah to enforce federal law and support the new governor. In 1862, Congress enacted laws to prohibit plural marriage and disincorporate the church, although this had little effect. Eventually, church leaders softened and began to change some church practices and customs. In 1890, the practice of polygamy was banned by the church, and in 1896, Utah was admitted to the union.[3]

Settlement of the Cache Valley began in 1856 with the construction of Maughan's Fort near the site of Wellsville. Settlement of the valley was rapid, and several communities developed, constructing irrigation works which diverted water directly from streams and rivers to irrigate thousands of acres of land in the valley. As with many other western settlements, seasonal fluctuations in precipitation made raising irrigated crops something of a gamble, particularly in years of below normal precipitation. The lack of storage reservoirs to trap the spring run-off for use during the late summer and early fall prevented further irrigation development and threatened existing developments. Creation of the Reclamation Service in

3. "Utah," *Compton's Interactive Encyclopedia*.

1902 gave hope to the farmers of the Cache Valley of aid in developing a reliable supply of water for irrigation.[4]

Project Authorization

Immediately following passage of the Reclamation Act of 1902, Reclamation began investigating the possibility of developing supplemental water supplies for irrigation in the Cache Valley. Following these initial studies, interest lagged until 1922, when the Department of Agriculture released a study of the land and water resources in the Cache Valley. This report renewed interest in irrigation development in the valley. In 1923, representatives of valley water users approached the Utah Water Storage Commission for assistance in developing a water resource development plan for the valley. Investigations continued off and on for the next decade before the Bureau of Reclamation released the report that would become the basis for project construction.[5]

The Hyrum Project was initiated under provisions of the National Industrial Recovery Act of 1933, and funds for construction were provided by the Public Works Administration in August 1933. The project received Presidential approval in November 1935, under provisions of two laws, the Act of June 25, 1910, which required Presidential approval for all new projects, and the Fact Finders Act of December 5, 1924, which required that all new projects be found feasible prior to authorization.[6]

Construction History

The project plan called for the construction of Hyrum Dam and Reservoir on Little Bear River to store run-off floods for irrigation use. Water released from the reservoir would flow

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4. *Project data*, 547-9.
5. *Ibid*.
6. *Ibid*, 549; D. J. Paul, "Construction of Hyrum Dam."

from the outlet well through a 300 -foot long concrete flume to a structure for diversion into several different conveyance structures: the Hyrum-Mendon Canal, the Hyrum Feeder Canal, a waste way, and the pump plant penstock. From the dividing structure, the Hyrum-Mendon Canal would cross the valley in a 1000 foot long siphon then continue generally northwest for about 14 miles. The Hyrum Feeder Canal would cross the spillway in a concrete flume and run northward for about 1.3 miles, emptying into the lateral system of the Hyrum Irrigation Company.

Water diverted into the pump plant penstock would drive the turbine connected to a pump to raise water to the Wellsville Canal. Just upstream from the pump, the penstock would split into two pipes, one to drive the turbine and one to supply the pump. The pump would discharge the water into a steel pipe which would carry it across the valley to the canal. The canal would be about 5.4 miles long and run generally westward. Water discharged from the turbine would be released into the existing Wellsville-Eastfield Canal to satisfy pre-existing water rights cut-off by construction of the dam. The wasteway would discharge into the Wellsville-Eastfield Canal to provide water when the pump plant is shut down.[7]

Bids for construction of the dam and appurtenant works were opened on December 13, 1933. The low bid of $337,221 was received from J. A. Terteling & Sons. The contract was awarded in January 1934, with a scheduled completion date of August 8, 1935.[8]

After several delays caused by difficulties acquiring the needed rights-of-ways, work at the site began on March 23, with clearing the dam site. This was followed a few days later by stripping of the foundation and the beginning of spillway excavations. Excavations for the

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7. *Project Data*, 547, 550; Denver. National Archives and Records Administration, Rocky Mountain Region. Record Group 115. Records of the Bureau of Reclamation. "Annual Project Histories - Hyrum Project," Vol. I, 1933-5; 1935: 42-7; United States Department of the Interior, Bureau of Reclamation, *Schedule, Specifications, and Drawing, Pumping Plant, Structures, and Canal Lining, Hyrum-Mendon, Wellsville, and Hyrum Feeder Canal, Hyrum Project, Utah*. Specifications No. 606 [1934], 12-3.
8. Everett T. Giles, "Construction of Hyrum Project, Utah," *The Reclamation Era*, February 1935, 36

diversion tunnel through the right abutment began on March 31. When the dam site was cleared, a cut-off trench was excavated to bedrock, and a concrete cut-off wall was constructed. The trench had a minimum bottom width of 25 feet, and paralleled the dam axis about 130 feet upstream, extending up both abutments. The cut-off wall rises 10 feet above the floor of the trench, and the areas under the wall were sealed by grout injected through pipes in the base of the cut-off wall.

Work moved forward at a steady rate. Preparation for construction of the earth dike began in early July, with placement of earth in the dike beginning the end of the month. Concrete operations also began in early July with placements in the Wellsville-Eastfield Canal siphon which passes beneath the spillway. Placements in the concrete cut-off wall began in early August, and lining of the diversion tunnel, which was holed through in late-May, began August 23. The first placement of embankment materials in the main dam began on August 25. The Little Bear River was diverted through the diversion tunnel on October 8.

Embankment operations continued until early-December, when operations were halted due to cold weather. At that time, the embankment was almost 90% complete, although only about half the contract time had elapsed. Embankment materials were placed in 8 -inch layers and compacted by several passes of a sheepsfoot roller. When necessary, moisture was added to the fill to achieve the desired results. The completed embankment was covered with layers of rock on both the upstream and downstream faces.

The outlet works were constructed in the diversion tunnel. The gate chamber, which is hollowed out of rock, contains two high-pressure slide gates. Installation of the gates began April 1, 1935. To clear the tunnel of water, a temporary gate was installed at the entrance to the tunnel. While the gates were being installed, the river began to rise at a rapid rate, and on April

23, it was necessary to open the temporary gate to lower the water level in the reservoir to avoid damage to the unfinished embankment. Delays caused by the high water, followed by the beginning of irrigation season which necessitated continued releases to meet irrigators needs, prevented completion of the outlet works until early-August. The contract for construction of Hyrum dam was accepted as complete on August 10, 1935.[9]

Hyrum Dam is a rolled earthfill structure, 116 feet high and 540 feet long. In addition to the dam, there is an earth dike located about 800 feet northeast of the dam. The dike is about 15 feet high and 900 feet long. The spillway is located about 400 feet north of the dam. It is an open-cut, concrete lined chute controlled by three, 16 foot by 12 foot radial gates. The outlet works consist of a concrete lined tunnel, gate chamber with two sets of 33 inch square high-pressure slide gates, and two, 43 inch diameter outlet pipes leading to the outlet well which discharges into the distribution system. Hyrum Reservoir has a maximum capacity of 18,800 acre-feet (af) and a surface area of 475 acres.[10]

Bids for earthwork on the distribution system were opened on October 11, 1934. As with the dam, the low bidder was J. A. Terteling & Sons. The contract for construction of the pumping plant, canal structures, and canal lining was awarded to Knowlton & Rupert on February 6, 1935. The pump and turbine were supplied by the Worthington Pump and Manufacturing Corporation. In addition, construction of some canal structures was carried out by Emergency Conservation Work (E.C.W.)[11] crews and by government force account.[12]

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9. *Ibid*.; D. J. Paul, "Construction of Hyrum Dam."; "Annual Project Histories - Hyrum Project," Vol. I, 1933-5; 1934: I-II, 23, 34; 1935: IV-V.

10. *Project Data*, 550; United States Department of the Interior, Bureau of Reclamation, *Statistical Compilation of Engineering Features on Bureau of Reclamation Projects*, (U.S. Government Printing Office, 1992), 40.

11. The Emergency Conservation Work program was a predecessor of the Civilian Conservation Corps.

12. "Annual Project Histories - Hyrum Project," Vol. I, 1934, 6; 1935: iv: United States Department of the Interior, *Annual Report of the Secretary of the Interior For the Fiscal Year Ended June 30, 1935*, (Washington: U.S.

(continued...)

Crews for Terteling & Sons began work on the earthwork contract in early-November 1934, completing work under the contract in mid-June 1935. Knowlton & Rupert began construction under their contract in late February 1935. Concrete placement in the pump plant began in late-March, and all work under the contract was completed by the end of August. Government work crews began work on canal structures in early May, with E.C.W. crews beginning work in September. The distribution system was finished in the spring of 1936.[13]

The Hyrum Feeder Canal is 1.3 miles long, unlined, and has an initial capacity of 9 cubic-feet-per-second (cfs). The Hyrum-Mendon Canal is 14 miles long and is both lined and unlined. It has an initial capacity of 89 cfs. The Wellsville Canal is 5.4 miles long and has an initial capacity of 15 cfs. It is unlined. The Wellsville Pumping Plant as a single, 550-horsepower pumping unit with a pumping capacity of 16 cfs pumping against a dynamic head of 81-feet. Flows into the canals, penstock, and wasteway are controlled by slide gates.[14]

Post Construction History

The project was turned over to the South Cache Water Users Association for operation and maintenance (M&I) on May 1, 1936. After several years of operation, it became apparent that the pumping system did not work as expected. Although the pump operated as designed, the water available to drive the turbine did not allow for optimum operation. A report issued in 1940 recommended connecting a pipe directly from the outlet works to the turbine, thus increasing the head available to drive the turbine from about 48 feet to the full level of the reservoir. As the

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12. (...continued)
Government Printing Office, 1935), 67 (hereafter cited as *Annual Report* followed by year and page), *Annual Report*, 1936, 60-1; Denver. National Archives and Records Administration, Rocky Mountain Region. Record Group 115. Records of the Bureau of Reclamation. N. T. Olson,"A Brief Report on Revision of Pumping Plant, Hyrum Project, Utah."(December 1940), 4.

13. "Annual Project Histories - Hyrum Project," 1934, 6,44; 1935, iv-v, 49; *Annual Report*, 1936, 73.

14. United States Department of the Interior, Bureau of Reclamation, *Summarized Data on Federal Reclamation Projects* , (February 1939), 174; *Schedule, Specifications, and Drawing, Pumping Plant, Structures, and Canal Lining, Hyrum-Mendon, Wellsville, and Hyrum Feeder Canal, Hyrum Project, Utah*, 12.

turbine was designed to operate under heads as high as 81 feet, this solution did not require modifications to the turbine. Modifications were completed in 1943.[15]

A rehabilitation program begun in 1976 repaired or replaced deteriorated structures on the canal system, including replacement of several steel flumes on the Hyrum-Mendon Canal with reinforced concrete siphons, and replacement of the steel pump discharge line with a buried, reinforced concrete pipe. The program was completed in 1977.[16]

Since it entered service more than fifty years ago, the Hyrum Project has operated without significant problems. Over time, many structures have been repaired, replaced, or modified in order to ensure continued trouble free operation. The South Cache Water Users Association has an on-going maintenance program that keeps the project in working order.

Settlement of Project Lands

Because the lands within the project boundaries were in private ownership prior to construction of the project, no lands were available for withdrawal for future settlement. Just over 880 acres of land were acquired by Reclamation in association with project construction. In addition, Reclamation holds about 30 acres of easements on private lands within the project area. In 1992, 987 farm customers on 36 part-time and 188 full-time farms, and 2,027 non-farm customers benefitted from project water deliveries [17]

Project Benefits and Uses of Project Water

The primary benefit of the Hyrum Project is supplemental irrigation service to 6,800 acres of land within the project area. In 1992, the most recent reporting year, 6,363 acres of project land received water. The primary crops grown on the project are forage crops, which

15. "Project Histories - Hyrum Project," Vol IV, 1950-9, 10; Olson,"A Brief Report on Revision of Pumping Plant, Hyrum Project, Utah", 10.
16. "Project Histories - Hyrum Project," Vol XII, 1977, 5.
17. United States Department of the Interior, Bureau of Reclamation, *1992 Summary Statistics, Land, Water and Related Data*, (US Government Printing Office, [1995]), 61, 64, 126.

total just under 4,400 acres. In addition, slightly less than 2,000 acres are planted in cereal crops. The total value of crops crown and harvested in 1992 was $1,274,439.

Recreation is another benefit of the project. Hyrum Reservoir is a major recreation area, attracting up to 100,000 visitors per year. Boating, waterskiing, camping, and hunting are some of the activities enjoyed at the reservoir. Recreation activities at Hyrum Reservoir are administered by the Utah Division of Parks and Recreation. There are no hydropower developments on the project and Hyrum Reservoir provides only minimal flood control benefits.[18]

Conclusion

As with many other projects located throughout the West, Reclamation had the solution to a problem that has plagued farmers for over a century: how to ensure a reliable supply of water for irrigation in a region of widely variable precipitation. With construction of Hyrum Dam and other features of the Hyrum Project, Reclamation helped the farmers of the Cache Valley continue their tradition of productive, irrigated farming. A tradition that began almost 150 years ago.

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.

18. *Ibid*., 110, 115, 232.

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