Burnt River Project

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The Burnt River Project

Along many of the smaller streams and rivers in the West, there is usually sufficient water to irrigate some land if spring runoff is stored for use in the late summer when flows in the rivers and streams dwindle to almost nothing. But if only the natural flow of the river is available, many lands go without during the late season. This was the case along the Burnt River in east-central Oregon.

Project Location

The Burnt River Project is located in Baker County in east-central Oregon and provides supplemental irrigation water for about 15,000 acres. Unity Dam and Reservoir are located on the Burnt River about 40 miles southwest of Baker, Oregon. Lands served by the project are scattered along the river downstream from Unity Reservoir near the towns of Hereford, Bridgeport, Durkee, Weatherby, Dixie, Lime, and Huntington. In addition, some lands upstream from the reservoir are included in the project because storage in Unity Reservoir allows for increased upstream diversions without interference with downstream priorities.[1]

Historic Setting

For several centuries before the first Europeans entered the region, the area that would become eastern Oregon was frequented by numerous native groups including the Paiute, Umatilla, Nez Perce, and Shoshone. The first non-Native people to enter the area were trappers and explorers who began moving through the region in the late 1700s and early 1800s. The first mention of the Burnt River was a reference by explorer Peter Ogden Skene in 1825. Many who trekked through the Oregon Territory followed the Burnt River, a route that became an important

1. Department of the Interior, Water and Power Resources Service, *Project Data*, (Denver: U.S. Government Printing Office, 1981), 95-6.

part of the Oregon Trail. Beginning in the early 1840s, thousands of people passed through the valley on their way to the Willamette Valley in western Oregon. Many noted the beauty of the valley and its apparent fertile soils, but few settled in the area.[2]

The first significant settlement in the area of the Burnt River came in the 1860s, following the discovery of gold in eastern Oregon. The first people to move into the area were prospectors, but soon the fertile valley began to attract farmers and ranchers. The earliest water rights along the Burnt River date to 1862 and numerous ditches and canals were constructed to bring water to the region's mines, ranches, and farms. The most notable canal to be constructed during that period was the Eldorado Ditch. Built to divert water from the Burnt River and transport it to mining operations more than 100 miles away, construction began in 1863 and took 15 years. The canal was abandoned for several years around the turn of the century with agricultural use of the canal beginning around 1911. Numerous legal battles over water rights along the Burnt River led to an adjudication in 1925 that made continued operation of the canal impractical, forcing its abandonment.[3]

The earliest attempts at irrigation in the Burnt River Valley consisted of ditches and canals that diverted water directly from the river without benefit of storage. For a time this method proved successful as the river usually flowed with sufficient volume to support diversions. But as the valley developed and diversions increased, the flows often dwindled during July and August, leaving junior water rights holders without water to mature their crops. This was the situation when the Bureau of Reclamation and the State of Oregon teamed up in the

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2. Baker County Historical Society, *History of Baker County Oregon 1986*, ([Baker, Oregon]: Baker County Historical Society, 1986, 5, 7-8, 13-6, 38.
3. *Ibid*., 38, 49; Gordon Stewart, *Baker County Sketch Book*, ([Baker, Oregon]:[Baker County Chamber of Commerce, 1956]), 13.

1930s to find a solution to the shortages along the Burnt River.[4]

Project Authorization

The Burnt River Project was found to be feasible by the Secretary of the Interior on September 25, 1935. The finding of feasibility was based on a 1934 report submitted by Reclamation engineers E. B. Debler and L. J. Foster. The project was approved by the President and funds totaling $500,000 were appropriated under the Emergency Relief Act of August 13, 1935. This appropriation was later increased to $600,000. A repayment contract between the Burnt River Irrigation District and the Bureau of Reclamation was signed on December 24, 1935.[5]

Construction History

Reclamation first began investigations along the Burnt River in 1928. Those investigations consisted of preliminary studies conducted in conjunction with a proposed transmountain diversion to the Brogan Project.[6] More extensive investigations were conducted in 1933 and 1934 under a cooperative agreement between Reclamation and the State of Oregon. These investigations resulted in the 1934 report that was the basis for project approval.[7]

Exploratory drilling began in September 1935 at the site identified as most favorable in the 1934 report, but poor conditions on the north abutment forced abandonment of the site. Investigations of alternative sites began immediately both upstream and downstream from the original site. While site investigations continued, Reclamation solicited bids for construction of Unity Dam. Bids were opened in late November 1935. The low bid of $273,989 was submitted

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4. *Project Data*, 95; Denver, National Archives and Records Administration, Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115. "Project Histories - Burnt River Project," Vol. I, 1936-7 (hereafter cited as "Project History" followed by volume number, year and page), 10.
5. *Project Data*, 95; "Project Histories," Vol. I, 1936-7, 12-3, 15.
6. The Brogan Project was later incorporated into the Vale Project as the Bully Creek Extension.
7. "Project Histories - Burnt River Project," Vol. I, 1936-7, 12.

by J. A. Terteling & Sons, of Boise, Idaho. The contract was awarded to the low bidder on December 13, but notice to proceed was delayed pending completion of site investigations. Several sites were identified as being acceptable, but the best site was rejected after it was determined that the cost of construction would exceed the benefits. A second site, about 2,000 feet upstream from the original site, was determined to be acceptable, and an order for change increasing the total contract price by $7,206 was issued. The revised contract was awarded to J. A. Terteling & Sons on June 15, 1936. Acceptance of the notice to proceed was issued by the contractor on July 30, and construction began on August 19.[8]

Several other contracts relating to construction of Unity Dam were let. The contract to furnish and deliver concrete aggregate to the construction site was awarded to Chester T. Lacky of Ontario, Oregon, who submitted the low bid of $16,587.50. Two contracts were issued for spillway and outlet gates. The contract for two, 24-foot by 16-foot radial spillway gates was awarded to the Valley Iron Works of Yakima, Washington. Commercial Iron Works of Portland, Oregon, received the contract for two, two-foot, nine-inch by two-foot, nine-inch high pressure outlet gates and assemblies. The contract for relocation of State Highway No. 7 and construction of a bridge across the river was awarded to the George B. Henly Construction Company of Ontario, Oregon. Work under the highway relocation contract was carried out between June and October 1937.[9]

A temporary camp to house government employees was constructed near the site of the dam. The camp, constructed by government forces during the spring of 1936, consisted of several cottages, a dormitory, an office building, two garages, a pump house, and a water storage

8. *Ibid*., 13-4; Denver, National Archives and Records Administration, Rocky Mountain Region, Records of the Bureau of Reclamation, Record Group 115. Engineering and Research Center Project Reports 1910-55, Box 119, Agency 273, Folder "Burnt River Project 1947 Final Report, Unity Dam", 33.
9. "Unity Dam Construction, Burnt River Project," *The Reclamation Era*, (April 1938), 60-4; "Notes for Contractors," *The Reclamation Era*, (January 1936), 20.

tank. In addition, a materials control laboratory was constructed downstream from the construction site.[10]

The primary contractor began operations in mid-August 1936. The first work to be carried out was stripping loose materials from the cut-off trench and coffer dam area. This was followed by excavations for the intake portal of the diversion tunnel. Stripping and excavation of the spillway and stilling basin areas began in early September. Excavated materials that were suitable for use in the dam embankment were stockpiled and rejected materials were used in the temporary coffer dam. Drilling of the diversion tunnel began in mid-September, advancing from the upstream end and progressing at a rate of about 4½ feet per 7 hour shift. Excavation of the tunnel was completed on October 21. Construction activities for the season were suspended due to bad weather on December 13.

Activities under the aggregate supply contract began in later September with the erection of a screening and washing plant at a gravel deposit about 4,000 feet northwest of the construction site. The plant began operations on December 1, and by December 22 when work was suspended for the season, 840 tons of gravel and 270 tons of sand had been delivered and stockpiled at the construction site.[11]

Work at the dam resumed on March 13, 1937, with a small crew clearing and trimming the diversion tunnel in preparation for lining. Concrete operations began about two weeks later. Concrete placement was carried out from both ends of the tunnel. As concrete was being placed at one end, forms at the other end were being moved and prepared. In this way, the contractor was able to complete one full section each day. The tunnel was completed and the river diverted on May 21. A temporary flume carried water past the stilling basin and into the old river

10. "Project History," Vol. I, 1936, 19-21.
11. *Ibid*., 27.

channel. Following completion of the dam, the diversion tunnel would form part of the outlet works.[12]

Work in the spillway area also resumed in March with drilling and blasting in the stilling basin. At the same time, the walls and floor of the spillway gate section were cleaned and trimmed in preparation for concrete placement. Excavation for the gate structure and placement of reinforcing steel and concrete forms was completed by the end of May. Concrete placement in the spillway structure was delayed as most of the workforce and equipment was engaged in excavation of the cutoff trench and construction of the cutoff wall.[13]

Excavations for the cut-off trench began on June 1, and were completed by the end of the month. Suitable material excavated from the trench was placed in the embankment. Following excavation of the trench, the cut-off wall footing was cut into bedrock to a depth of three feet. Placement of the cut-off wall followed excavation of the footing and was completed by the end of July. The cut-off wall extends across the bottom of the trench and up both abutments and provides a water-tight seal between the dam and foundation.[14]

With completion of concrete placement in the cutoff wall, the concreting equipment was free to resume work on the spillway and by the end of July, the gate structure was virtually complete and work was advancing on the spillway chute and stilling basin. The last concrete in the spillway structure was placed in November, and the two radial spillway gates were installed shortly after. Work on the outlet system, which had been idle since late May, resumed in September when a crew completed excavation, grouting, and lining of the shaft leading to the gate chamber. Progress on the tunnel plug, which houses the embedded portions of the control

12. "Project History," Vol. I, 1937, 15-6.
13. *Ibid*., 16-7.
14. *Ibid*., 15-6, 18-9.

gates, and the control house which is located atop the right abutment, moved forward steadily and were completed by early December. One of the gate hangers for the high pressure slide gates was defective and was returned to the manufacturer for repairs. It was installed by government employees in early January.[15]

Embankment placing operations began in mid-August with placement of impervious materials in the cutoff trench. Progress in the trench was slow due to the confined nature of the trench which limited the amount of equipment that could work there. Placement of materials in the trench was completed by the end of the month, and the contractor was able to put all equipment to work completing the remainder of the embankment. Work on the embankment was carried out in three shifts per day and advanced quickly. Rip rap placement began in October and followed closely behind embankment operations. The embankment was completed to full height on November 6, taking only 87 days to complete. Placement of rip rap was completed by the end of November. Final details and cleanup of the construction site was completed by late December, and on January 4, 1938, the dam was accepted as complete by the Bureau of Reclamation, ending the contract with J. A. Terteling & Sons 177 days ahead of the scheduled completion date.[16]

Reservoir clearing operations were carried out by the Civilian Conservation Corps (CCC) from CCC Camp No. 42. Quarters for the CCC forces were constructed by the government in the spring of 1937. A force of 35 men reported to the camp in mid-June, and immediately began operations, working two shifts per day throughout the summer. By the end of the construction season, CCC forces had cleared 190 of the 227 acres to be cleared. The remaining area was

15. *Ibid*., 16; "Burnt River Project 1947 Final Report, Unity Dam," 31.
16. "Project History," Vol. I, 1937, 7,19-20; "Burnt River Project 1947 Final Report, Unity Dam," 37.

cleared by CCC forces in early 1938.[17]

Unity Dam is a zoned earthfill dam 82 feet high and 694 feet long. The embankment contains 254,000 cubic yards (cy) of material and is 560 feet wide from upstream toe to downstream toe. The spillway is a concrete lined open channel on the right abutment and is controlled by two, 24-foot by 16-foot radial gates. The spillway as a maximum capacity of 10,000 cubic feet per second (cfs). The outlet works consist of a concrete lined tunnel through the right abutment controlled by two, 2¾-foot-square high-pressure slide gates. The control house is located atop the right abutment above the gate chamber. The capacity of the outlet works is 620 cfs. The outlet works and spillway share a common stilling basin. Unity Reservoir has a maximum capacity of 25,800 acre-feet (af) and a surface area of 926 acres.[18]

Post Construction History

Forces of the CCC completed reservoir clearing in the spring of 1938. In addition, CCC forces constructed the parapet and curb walls along the crest of the dam and installed the auxiliary hoists for the spillway gates. Following completion of the dam and appurtenant works, operation and maintenance of the facilities was turned over to the Burnt River Irrigation District.[19]

Since its completion in 1937, Unity Dam and Reservoir have been operated and maintained by the Burnt River Irrigation District. Since the project was designed to take advantage of the existing distribution system, Reclamation was not required to construct additional facilities. The success of the project can been seen in the fact that, with few exceptions, water users within the project area have been supplied with sufficient water to bring

17. "Project History," Vol. I, 1937, 14-5.
18. *Project Data*, 97.
19. "Unity Dam Construction, Burnt River Project"; "Project History," Vol. I, 1937, 14-5.

their crops to full maturity each season. The success of the project is also due in part to the efficient operation of the project by the irrigation district, which made the final payment under the contract to repay the costs of construction of Unity Dam in 1979.

Settlement of Project Lands

The region around the Burnt River Project was already extensively settled prior to construction of Unity Dam, so no lands were withdrawn for future settlement. In 1992, 64 full-time and 25 part-time farms totaling 15,200 acres received supplemental irrigation water. The total population served was just over 1,750 people.[20]

Project Benefits and Uses of Project Water

The primary benefit realized from the Burnt River Project is the supply of supplemental water for irrigation of just over 15,000 acres of lands along the Burnt River. In 1992, 15,070 acres received project water. The primary crops grown on projects lands are forage crops, covering about 13,670 acres. In addition, there are about 1,385 acres dedicated to cereal crops such as corn, and barley. The total value of crops harvested on project lands in 1992 was just under $2,700,000.[21]

Along with the irrigation benefits, Unity Reservoir provides area residents with limited recreation benefits. Camping, fishing, and boating are popular pastimes at the reservoir. Recreational activities at Unity Dam and Reservoir are administered by the Oregon State Parks Department. No flood control benefits are realized from the operation of the dam and reservoir.[22]

Conclusion

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20. Department of Interior, Bureau of Reclamation, *1992 Summary Statistics, Water, Lands and Related Data*, (Denver: U.S. Government Printing Office, 1995), 60, 63.
21. *Ibid*., 83, 150.
22. *Ibid*., 109, 115.

The construction and operation of the Burnt River Project assured farmers and ranchers along the Burnt River and its tributaries an adequate supply of water to bring their fields and pastures to their full potential. By storing the spring runoff in Unity Reservoir, upstream water users are able to continue diversions from the river during the later parts of the irrigation season without interfering with the rights of downstream users.

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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