Helena Valley Unit: Pick-Sloan Missouri Basin Program

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Bureau of Reclamation
2009
Reformatted, reedited, reprinted by
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September 2013

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Helena Valley Unit: Pick Sloan Missouri Basin Program

The Helena Valley Unit is a modest-sized irrigation and domestic water project on the upper Missouri River in central Montana. Prior to authorization of the Helena Valley Unit in 1944 as part of the Pick-Sloan Missouri Basin Program, there were approximately 10,800 irrigated acres of land cultivated in Helena Valley using water from small tributary streams and water pumped from Hauser Lake Dam on the Missouri River. The Helena Valley Unit changed that scheme by diverting water from Canyon Ferry Reservoir, constructed in 1954,[1] and building a new distribution system to service existing farm land and added another 15,800 acres of undeveloped farm land. The project also included providing water for municipal and industrial purposes in Helena. Like the dozens of other Pick-Sloan projects, Helena Valley Unit was not without its problems (leakage and drainage presented problems in its first years), but it provided a reliable water source to farmers and cities in central Montana.[2]

Project Location

In central Montana Broadwater County lies just east of the Continental Divide and north of Three Rivers—Jefferson, Madison, and Gallatin—which form the headwaters of the Missouri River. Helena Valley is a bowl-shaped depression bounded by mountain ranges on three sides. To the east are low-lying hills separating the valley from the Missouri River. The unit lands are situated in the southern end of the valley, adjacent to

[1] For more information on the Canyon Ferry Project, see Eric A. Stene, "Canyon Ferry Project: Pick-Sloan Missouri Basin Program," Denver, Colorado: Bureau of Reclamation, 1994, www.usbr.gov/history/projhist.html.
[2] U.S. Department of the Interior, Bureau of Reclamation, "PSMBP, Helena-Great Falls Division, Helena Valley Unit, Montana," http://www.usbr.gov/dataweb/html/helena.html; hereafter cited as Project Data, Online.

the city of Helena. Three lakes or reservoirs surround unit lands: Canyon Ferry Lake and Hauser Lake on the Missouri River, and Lake Helena on Prickly Pear Creek.[3]

Historic Setting

In 1877 Rev. James O'Conner observed from his travels to the Flathead Indian territory, "From time immemorial they [the Flathead] have occupied the district they now inhabit, extending from the Flathead lake, forty miles north of St. Ignatius Mission, to the Bitter Root valley, seventy miles south of it."[4] In fact, O'Conner had been sorely mistaken; the traditional homeland of the Flathead was east of the Continental Divide, not west, and stretched well into the Plains in the present state of Montana. By the eighteenth century the Flathead homeland began to constrict as pressure from enemy tribes and Euro-American expansion disrupted their traditional way of life. Small pox and other diseases reduced their numbers by nearly half. In 1808, a few years after initial contact with the Lewis and Clark party, the Crow and Blackfoot from the plains colluded in routing the Flathead near the Three Forks area and driving them west of the divide into the Bitterroot Valley.[5]

The other native group to occupy the Helena Valley was the Crow, whose traditional homeland is said to be near the Bear Paw Mountains and at Three Forks of the Missouri River. The Crow developed an extensive trading system with the Eastern

[3] U.S. Department of the Interior, Bureau of Reclamation, "Annual Project History, Helena Valley Unit, Helena-Great Falls Division, Missouri River Basin Project," Volume I, 1956 & 1957, 2, in Record Group 115, Records of the Bureau of Reclamation, Entry 10, Project Histories, Features Histories, and Reports, 1902-1932, Box 345, National Archives and Records Administration, Denver, Colorado. Copies of certain Project Histories are also located in Accession 8NN-115-92-130, Record Group 115, Records of the Bureau of Reclamation, National Archives and Records Administration, Denver, Colorado; and in the Great Plains Region. Hereafter cited as "Project History" with appropriate volume.

[4] James O'Conner, "The Flathead Indians," Records of the Catholic Historical Society of Philadelphia, Volume III, 97, http://digital.library.villanova.edu/.

[5] Deward E. Walker, Jr., editor, *Plateau*, in *The Handbook of North American Indians*, Volume 12, William C. Sturtevant, editor (Washington, D.C.: Smithsonian Institution, 1998), 297-99, 305-6.

Shoshone, Sioux, and other groups for European goods. After the arrival of Euro-Americans, the Crow took vital interest in the fur trade, which made them the target of other Indian tribes because of the possessions they acquired as a result of their trading networks. The Crow occupied nearly all of Montana east of Three Forks and north central Wyoming, only to see their homeland substantially reduced by the mid-nineteenth century. Today, the Crow Reservation is a mere remnant of what had once been Crow territory.[6]

The Lewis and Clark Expedition was but the first of successive waves of whites that looked to the upper Missouri River for wealth and land. The first group of whites in the upper Missouri came in the first decades of the nineteenth century as traders and trappers. The St. Louis Missouri Fur Company pushed as far west as the Three Forks area in 1810, only to be forced out by unfriendly Blackfoot Indians. The Rocky Mountain Fur Company, Columbia Fur Company, and John Jacob Astor's American Fur Company, which crushed its competition by using aggressive and sometime brutal tactics, also created a foothold in the upper Missouri. They were followed by gold seekers looking for riches in the hills of the Rocky Mountains. The first rush in Montana Territory was at lower Deer Lodge Valley in August 1853; soon followed by rushes in Bannack, Virginia City, Last Chance Gulch (later Helena), and Confederate Gulch followed in the 1860s. Bannack is only a few miles northwest of present Clark Canyon Reservoir; Virginia City is located to the east in Madison County. Also in the mid-

[6] Raymond J. DeMallie, editor, *Plains*, in *The Handbook of North American Indians*, Volume 13, William C. Sturtevant, editor (Washington, D.C.: Smithsonian Institution, 2001), 695-98.

nineteenth century, the military established forts on the Missouri River and along the Bozeman Trail during the height of the Indian wars.[7]

After 1870 settlement intensified as men, women, and children streamed into the territory looking for land and livelihoods. Rivers provided the arteries of transportation, but people and goods also moved along well-worn roads like the Northern Overland or Montana-Minnesota Road, the Bozeman Trail, and the Virginia City-Corinne Road. Later, railroads replaced rivers and roads as the easiest mode of transportation: the Utah Northern from Salt Lake City to Butte completed in 1881, Northern Pacific in 1883, and the Great Northern from North Dakota to Great Falls in 1877, which continued on to the West Coast in 1893.[8]

The town of Helena—adjacent to the Helena Valley Unit lands—got its start similar to other mining town in Montana. On July 14, 1864, four men from Georgia struck gold in one of the valley's rivers, and within a short period a boom town appeared. By 1875 the territorial capitol of Montana had moved to Helena, and arrival of the Northern Pacific railroad a decade later further solidified the city's preeminent position. Helena's mining boom eventually ended, but by that time the city's central geographic, economic, and political position had already made it one of Montana's important cities.

In nineteenth-century Montana the mining and livestock industries were central to the economy. Montana became well known for its numerous cattle herds grazing in mountain valleys and in the vast plains flatlands east of the mountains. As was the case elsewhere in the West, the livestock industry sustained heavy losses during the hard

[7] Clark C. Spence, *Montana: A Bicentennial History* (New York: Norton, 1978), 16-19; Howard R. Lamar, editor, *The New Encyclopedia of the American West* (New Haven, Connecticut: Yale University Press, 1998), 730.
[8] Spence, *Montana*, 16-19; *The New Encyclopedia of the American West*, 730.

winter of 1886-1887 and frequently butted heads with homesteaders prior to the end of the open range. There were also conflicts over financial control and government regulation of the copper industry in Montana. The major conflicts centered on the three Butte copper kings, Marcus Daly of the Anaconda Copper Mining Company, William A. Clark, and Frederick Augustus Heinze. Another important player in the mining industry and Montana politics was Charles Arthur Broadwater, the namesake of Broadwater County.[9]

Even as the mining towns and cattle industry took root in Montana, the economy always relied, at least in part, on agriculture. In a state of limited rainfall and irrigation development, the agricultural output was impressive. As early as 1870, Montana boasted 84,674 acres of farmland producing 181,000 bushels of wheat. The territory's agriculture was so advanced that Governor Potts remarked, at the territorial fair in Helena, that he saw "as fine as any Ohio wheat and vegetables that surpassed anything I ever expected to see." Men and women from the East settled down on tracts of land and grew grain and hay. Some farmers irrigated their crops from local streams and rivers. Many others dry farmed, which essentially meant planting in deep soil during cultivation season to retain water. In the late nineteenth century the price of grain and crops languished, but after the turn of the century farmers—many of whom were homesteaders—benefited from the steadily rising price of grain. In 1900 there were 258,000 acres of wheat in Montana; by 1920 the acreage jumped to 3,417,000. Whereas there had only been 851 farms in 1870,

[9] *The New Encyclopedia of the American West*, 130, 731.

the number grew to 13,097 in 1900, and the average size of these farms had multiplied from 164 acres to nearly 886 acres.[10]

As early as the 1860s the waters of the Prickly Pear, Tenmile, Silver, and McClellan creeks had been appropriated for irrigation purposes in the Helena area. Local water users formed the Water Corporation of Prickly Pear Valley in 1883 to claim the water rights to Prickly Pear Creek. For about half a century, before farm prices dropped rapidly following World War I, farmers in Helena generally enjoyed a good harvest. As elsewhere in the state, they grew mostly dry grains and wheat, sometimes using limited irrigation and sometimes by dry farming.[11]

Investigations

The Bureau of Reclamation set their sights on water development along the Missouri and Madison rivers from the beginning. In 1904 the Reclamation Service made a preliminary reconnaissance of these lands, and in 1905 a more thorough survey of main canal lines and irrigable lands as far north as Helena and south as Hyde on the Madison River, including about 53,000 acres in the Crow Creek Valley on the west side of the Missouri River. Reclamation originally proposed building a dam on the Madison River and two long gravity canals on each side of the river delivering water into Prickly Pear Valley near Helena. After the more detailed survey, it considered a number of alternatives and reconnaissance lines. Moreover, it considered constructing a small dam

[10] Spence, *Montana*, 130-4.
[11] Ibid., 133-34.

on Crow Creek and diverting the water in a canal near Radersburg, but neither this nor the other plans materialized.[12]

The Montana Power Company built Hauser Dam on the Missouri River, which created Hauser Lake and Lake Helena. The Montana Reservoir and Irrigation Company became a subsidiary of the Montana Power Company and in 1912 began to develop an irrigation system for the lands adjoining the city of Helena. The company built and operated the pumps that delivered water from Lake Helena to unit lands. The company's original contract expired in 1942, but the company continued to operate the water system until 1946 when the State Water Conservation Board temporarily assumed operation of the pumps. In thirty-plus years the pumps provided irrigation water to an annual average of about 7,700 acres. After 1946 the acreage dropped and operation and maintenance costs increased due to the deteriorated condition of the pumps.[13]

After the devastating floods of 1927 ripped through the Missouri River basin, the United States took interest in navigation, flood control, and development of the Missouri River. In 1933 the War Department completed its lengthy report "containing a general plan for the improvement of Missouri River." On the upper Missouri River, the report listed Canyon Ferry as a potential reservoir site for the purpose of hydroelectric power development. Irrigation was one component of the War Department's plans on the Missouri River. The report Maps note "Potential Toston Proj." or "Pot. Upper Missouri

[12] U.S. Department of the Interior, U.S. Geological Survey, *Fourth Annual Report of the Reclamation Service, 1904-5* (Washington, D.C.: Government Printing Office, 1906), 228-30; U.S. Department of the Interior, U.S. Geological Survey, *Fifth Annual Report of the Reclamation Service, 1906* (Washington, D.C.: Government Printing Office, 1907), 170.
[13] "Project History," Volume I, 1956 & 1957, 1-3.

River Project" extending as far north as Canyon Ferry Lake to just south of Toston, in the vicinity of present Crow Creek Unit.[14]

In 1938 the Bureau of Reclamation began field work studies that ultimately led to a reconnaissance report for the Missouri River and its tributaries. Senate Document 191, released in 1944, directly led to the passage of the Flood Control Act of 1944 and authorization of the Missouri River Basin Project. Essentially, the report ambitiously outlined the plan to construct ninety reservoirs on the Missouri and its tributaries for flood control, power development, navigation, and irrigation to 4,760,400 acres and supplemental water to over a half million acres presently irrigated. In the Helena Valley, Sen. Doc. 191 reported the findings of the reconnaissance investigations on the Missouri River above Great Falls, Montana. It concluded that rather than pump water from Hauser Lake as before, the water would be pumped from Canyon Ferry Reservoir, then via a tunnel, canal, and laterals make its way to unit lands.[15]

After Congress authorized the Missouri River Basin Project, Reclamation conducted detailed surveys and investigations into the development in Helena Valley in preparation of the definite plan report. Several years passed before the report was finally released in March 1954.[16]

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[14] United States Congress, House of Representatives, *Missouri River: Letter from the Secretary of War Transmitting a Report, Together with Accompanying Papers and Illustrations, Containing a General Plan for the Improvement of Missouri River*, H Doc 238, 73rd Cong., 2nd sess. (Washington, D.C.: Government Printing Office, 1935), 891, map of existing and potential irrigation, sheet 2.

[15] United States Congress, Senate, *Missouri River Basin: Conservation, Control, and Use of Water Resources of the Missouri River Basin in Montana, Wyoming, Colorado, North Dakota, South Dakota, Nebraska, Kansas, Iowa, and Missouri*, S Doc 191, 78th Cong., 2nd sess. (Washington, D.C.: Government Printing Office, 1944), 2-4, 63.

[16] "Project History," Volume I, 1956 & 1957, 3.

Project Authorization

Congress authorized the Helena Valley Unit by the Flood Control Acts of 1944 and 1946 (58 Stat. 887 and 60 Stat. 641). Congress released funds for construction of the project with passage of the Supplemental Appropriation Act of 1955, with the provision to hold off funding until a repayment contract had been signed by the United States and water users. In June 1955 local water users organized the Helena Valley Irrigation District, consisting of 12,533 acres, but the acreage was far less than the 17,630 acres in the unit. Congressional appropriation committees at hearings on appropriations for fiscal year 1956 decided that because the irrigation district was only little more than two-thirds the size of the unit, additional contracts were needed with either supplemental water users or the city of Helena. Meanwhile, Helena produced a report that proposed entering into a repayment contract for a municipal water supply from the Helena Valley Unit, which was subsequently executed by the United States and the city. The contract, finalized in December 1956, entitled the City of Helena to no more than 5,680 acre feet of water per year during the forty-year repayment period.[17]

Construction History

Reclamation engineers designed the project to release water from Canyon Ferry Dam into a pumping plant, to the Helena Valley Tunnel, and then flow by gravity through the tunnel into Helena Valley. Making an arc around the valley through canals and laterals, the water would terminate into a wasteway at Lake Helena. Although the original plan called for a construction start date of early 1956, Reclamation did not award the first contracts until after the repayment contracts had been executed. The

[17] "Project History," Volume I, 1956 & 1957, 3-4.

construction of the majority of the features stretched out over two years from 1957 to 1959.

Two contracts opened for bidding in late 1956: one for construction of the pumping plant, and the other for construction of the tunnel and a portion of the canal. Reclamation opened bids on the pumping plant at Canyon Ferry on December 4, but the low bidder withdrew the bid after finding it "to be grossly in error." Bidding opened for a second time and was awarded early the following year—on March 8 to Misco-West Coast in the amount of $1,056,383.25. At the same time Reclamation awarded other associated contracts for furnishing materials, including a 20-ton traveling crane to Moffet Engineering, Inc., of Albany, California; two hydraulic turbines and centrifugal pumps to C. H. Wheeler Manufacturing Company of Philadelphia; a 120-inch diameter steel penstock and 75-inch discharge pipe to Commercial Steel Fabricators, Inc., of Seattle; butterfly valves to American Electric Company, Inc., of New York; a fixed-wheel gate for the pump intake.[18]

Misco-West Coast began work on the contract by erecting the office and shop building, then began to build a cofferdam. It was partially built when high spring water required opening the spillway gates on the dam, and resulting high water washed the cofferdam away. This slowed construction significantly. The contractor resumed work on the cofferdam in August, installed pumps to clear water from the site, excavated the discharge line and began laying the pipe line, and placed concrete at the penstock. Still, dewatering the site presented problems, compounded by the fact that in 1958 the cofferdam leaked. The contractor decided to address this problem head on by changing

[18] "Project History," Volume I, 1956 & 1957, A10-A14, B20.

job superintendents and focusing on the need to dewater the site. At last it successfully dewatered the site, which meant it could begin actual construction on the pumping plant, making satisfactory progress until final completion in 1959.[19]

In November 1956 Reclamation opened bids for construction of Helena Valley Tunnel, for work under Specs. No. DC-4782. Having been given the go-ahead to begin construction, Guy H. James Construction Company, the winning contractor, subcontracted work out to A. J. Cheff Construction Company. The first steps were to bulldoze a road to the tunnel inlet area, erect a shop building near the outlet portal to be used for service and repair, and excavate the outlet portal area. In February the contractor began to tunnel through the compact sedimentary rock of the Spokane Hills. The work crews encountered little seepage and made good progress through the year. They lined the tunnel with concrete in 1958. This was accomplished by loading cars with concrete from the batching and mixing plant and driving them into the tunnel where the concrete was placed. The contract terminated at the end of the year.[20]

Reclamation awarded several contracts for construction of the Helena Valley Dam, regulating reservoir, and canal. The canal had four reaches: the first extended from the tunnel outlet to the regulating reservoir, the second continued on to Prickly Pear Creek, the third continued an additional five miles to Tenmile Creek, and the fourth terminated at Helena Lake. Reclamation opened bids on three schedules to complete the four reaches of the canal. Miles and William received the contract to work on the canal up to mile 10.8, while A & B Construction Company won the contract for construction of

[19] "Project History," Volume I, 1956 & 1957, B20, B22; "Project History," Volume II, 1958, A49-A57; "Project History," Volume III, 1959, A30-A31.
[20] "Project History," Volume I, 1956 & 1957, 6, A9-A10, B11-B16; "Project History," Volume II, 1958, A35-A40.

siphons along the same stretch. In August 1957 Reclamation awarded Schedule 3, miles 11.9 to 34.9, to Cherf Bros., Inc., and Sandkay Contractors, Inc. Several subcontractors were hired to furnish construction materials, earth lining, and reinforcement bars.[21]

Construction of the canal and siphons entailed excavation, embankment work and earth lining, placing concrete lining and culvert pipe, building bridges, and installing metalwork and slide gates. Construction on the first two schedules maintained through the summer. In the winter of 1957-1958, A&B Construction Company ceased placing concrete and excavating until the weather warmed. Thereafter it placed concrete at Siphon No. 2 and 3, essentially completing work by August, with the exception of backfilling and testing of the water structures. By the end of summer 1958, Cherf Bros., Inc., and Sandkay Contractors, Inc., had completed the siphons at Prickly Pear Creek, Silver Creek, and Highway 91. Later in the year it wrapped up work at the Ten Mile Siphon and Helena Valley Canal.[22]

Cherf Bros., Inc., and Sankay Contractors, Inc., also received the contract for construction of the Helena Valley Dam, an earthfill structure 76 feet high and 1,985 feet long on the crest. The contractor began construction activities in April 1957 by stripping the foundation and placing zone 1, 2, and 3 material in the site. They constructed concrete work at the outlet works, then completed the earthwork, placed riprap, and built outlet roads for operation and maintenance. Then, the contractor installed metal work and an electrical system at the outlet works. The duration of the contract lasted just over one year.[23]

[21] "Project History," Volume I, 1956 & 1957, 7-8, B40-B45, B47-B49, B51.
[22] "Project History," Volume II, 1958, A73, A77-A80a, A84-A89.
[23] "Project History," Volume I, 1956 & 1957, 8-9, B33-B39; "Project History," Volume II, 1958, A71-72.

The above construction projects constituted the main contracts awarded from 1956 to 1958. In 1958 Reclamation also awarded the contract for construction of the Initial Stage of Spokane Bench Laterals and North Side Laterals, and in 1959 it awarded the contract for construction of the north and east side laterals and drains, O&M buildings and utilities, bypass canal in Helena Valley Reservoir area, and various miscellaneous projects. Although the project as a whole was essentially completed by 1958, construction on these and other miscellaneous features carried over well into the 1960s. Many of the contracts were related to problems of seepage and drainage. Reclamation awarded contracts for blanketing the reservoir and lining the canal to prevent seepage. The seepage problem became so severe that several farmers threatened to file suit or a damage claim due to loss of water.[24]

Reclamation also constructed drains on the south and west sides of Lake Helena. Proper drainage became a major concern where high water tables made the land unfit for agriculture. The new drains worked splendidly—in fact, so much so that the water table lowered and farmers growing native hay (the only crop in the area that could grow if the water table level neared ground level) could no longer sub-irrigate their crop. The concern of some hay farmers likely prompted unidentified persons in early 1961 to plug up drains in the unit area in order to raise ground water levels. The plugged drains resulted in substantial expense to remove the plugs and to restore the earthwork slopes damaged by the high water level in the drains. Later, in the 1960s, Reclamation awarded construction contracts for installation of groundwater observation wells and additional

[24] "Project History," Volume II, 1958, A102-A106; "Project History," Volume III, 1959, 9; "Project History," Volume V, 1961, 7.

drains in the unit area—one of the larger contracts awarded to A&B Construction Company of Helena was worth just over ninety thousand dollars.[25]

Despite these late contracts, construction had essentially come to an end by 1960. On November 4, the construction office closed and personnel transferred to the East Bench Project Office. The Upper Missouri Projects Office located at the Helena Valley-Crow Creek Field Office took control of remaining construction as well as operation and maintenance. The Helena Valley Unit remained in construction status, however, due to seepage at the reservoir which rendered the reservoir inoperable until June 15, 1964. On January 1, 1965, the regional office transferred the unit from construction to operation and maintenance status.[26]

Post Construction History

In the post-construction period, Reclamation worked with local organizations to assist farmers who began to use water from the Helena Valley Unit. This effort established a settler assistance program to aid farmers with water distribution and agriculture problems during a five-year development period. During this time, Helena Valley Irrigation District was not required to make payments on reimbursable construction costs. After the development period ended, the district assumed responsibility for operation and maintenance of project facilities. Thereafter, the district was responsible for the annual O&M costs and for making payments toward the reimbursable costs of construction. The City of Helena, which awarded a contract in 1958 to A&B Construction Company for a water treatment plant and a pipeline to the

[25] "Project History," Volume V, 1961, 3-6; "Project History," Volume VI, 1962, 7; "Project History," Volume XI, 1967, 6, 17; "Project History," Volume XIII, 1969, 6.
[26] "Project History," Volume XIII, 1969, 3.

treatment plant and to the city, was also obligated to make payments toward its share of construction costs at the end of the development period. The United States left open the option of including an additional 5,100 acres outside the unit lands becoming eligible for unit water if it ever became desired.[27]

The unit started pumping water into the canal system on March 17, 1959, but had to discontinue when, reportedly, "a spring had developed at the downstream toe of the dam" at the regulating reservoir. Reclamation hurriedly built a temporary canal that bypassed the regulating reservoir on its south end and enabled the water to run the full length of the main canal without emptying into the reservoir. In the meantime, the Bureau initiated an investigation to study the hydraulic situation and to settle on a course of action to prevent further leaking at the reservoir. Personnel from the Denver, regional, and project offices inspected the reservoir site and recommended "grouting" the reservoir and filling it partially to test the extent of the leakage. By grouting, Reclamation intended to pulverize the soil at base of the reservoir and blanket it with non-compacted earthfill. The work on the grouting began in 1961 and continued through the next year, during which time the reservoir was trial filled at least six times.[28]

Despite problems with the regulating reservoir, in the mid-year months of 1959 the irrigation system delivered water to 4,274 acres for agricultural use and in the fall and winter to the city of Helena for municipal and domestic use. The total irrigated acreage jumped to 7,165 in 1960 and 11,685 acres in 1965. Nevertheless, Reclamation held the project in construction status and refused to finalize the repayment contract and initiate the five-year development period until it addressed the seepage problem. During this

[27] "Project History," Volume I, 1956 & 1957, 10-11; "Project History," Volume IV, 1960, 6.
[28] "Project History," Volume IV, 1960, 61-62; "Project History," Volume V, 1961, 21-22.

period water users entered into an interim water service contract with the United States. Reclamation filled the reservoir to capacity and kept it at high levels during the 1964 irrigation season. Although the reservoir continued to suffer water losses, the chief engineer approved the reservoir as fully operative on June 15, and the development period and the repayment contract began on January 1, 1965.[29]

In addition to the work on the regulating reservoir, the water system required extensive annual maintenance and repairs before becoming fully operational. In 1961 Reclamation placed a gravel blanket and bentonite slurry in the canal and laterals to prevent seepage and erosion, drilled holes for drainage investigations, and cleaned the canals and laterals of silt and debris.[30] After the project transferred to operation and maintenance status, contracts were still awarded for construction. To give two examples, in 1966 the Felton Construction Company from Missoula constructed open and closed drains, and in 1969 the Montana Fish and Game Department installed picnic and recreational facilities at the reservoir.[31]

Typical operation and maintenance activities ranged from inspecting and repairing the pumping plant to eradicating weeds. Reclamation eliminated weeds (such as Russian thistle, Mexican fireweed, and Jim Hill mustard) using chemicals, burning, and mechanical removal.[32] The water system had to be winterized annually and then returned to operation at the start of the irrigation season. Sometimes cold weather

[29] "Project History," Volume IX, 1965, 3, 7.
[30] "Project History," Volume V, 1961, 8.
[31] "Project History," Volume X, 1966, no page number; "Project History," Volume XIII, 1969, 18.
[32] "Project History," Volume VIII, 1964, 34-36.

damaged unit features, as in 1960 when frost damaged one of the valves at the pumping plant.[33]

As already discussed, seepage and drainage problems incurred a sizable expense to the district; so, too, did sediment accumulation in the distribution system. When sand found its way into the pipe line it became necessary to rent a diaphragm mud pump to rid the pipe of the debris. Heavy rainfall not only washed sediment downstream, jamming in the intake structures and pipes, but it also tore into canal banks or flooded onto roadways and caused considerable damage. Reclamation repaired and reseeded banks, which stabilized and minimized additional erosion caused by heavy rains.[34]

Project Benefits

The Helena Valley Unit complemented the construction of Interstate Highway 15 and increased tourism and development in providing economic stimulus to Helena Valley. The reservoir has 518 surface acres and six miles of shoreline, affording excellent fishing, picnicking, boating, and other forms of recreation. Most significant, the project provides a substantial share of water to the city of Helena and to farms in the valley. More than a third of Helena's annual water consumption comes from the Helena Valley Unit. Water from the unit is also delivered to 15,608 acres under long-term contracts and 1,500 acres under temporary water service contracts in the Helena Valley Irrigation District.[35]

[33] "Project History," Volume IV, 1960, 53-59. For specific O&M work on the pumping plant, see "History of Maintenance, 1959 through March 1967, for Helena Valley Pumping Plant," June 2, 1967, in "Project History," Volume X, 1966, 25-35.
[34] "Project History," Volume IV, 1960, 53-59.
[35] "Project History," Volume V, 1961, 11; Fact Sheet on the Helena Valley Irrigation District and Toston Irrigation District, http://www.usbr.gov/gp/mtao/canyonferry/contract_renewals/id_facts.pdf.

Conclusion

The Helena Valley Unit was one of several Pick-Sloan water projects in Montana designed to harness the waters of the Missouri River basin for the benefit of man. The unit is unusual as a Pick-Sloan project because it provides water for municipal as well as agricultural uses. Modest in size and scope compared to some other Reclamation projects, the Helena Valley Unit nevertheless provides a boost to the local economy and meets the objectives for which it was built.

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