

LOWER RAPID VALLEY IRRIGATION DITCHES  
On the North and South Sides of Rapid Creek  
Between Rapid City and Farmingdale  
Rapid City Vicinity  
Pennington County  
South Dakota

HAER No. SD-5

HAER  
SD  
52-RACI.V,  
6-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
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HISTORIC AMERICAN ENGINEERING RECORD  
LOWER RAPID VALLEY IRRIGATION DITCHES

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I. INTRODUCTION

**Location:** On the north and south sides of Rapid Creek, between Rapid City and Farmington, Pennington County, South Dakota, Rapid City Vicinity

**Quad:** Rapid City East, Box Elder, New Underwood SW, Hermosa NE, Caputa

**UTM:** Zone 13  
Most western diversion: 642560 E, 4882450 N  
Most eastern terminus: 43°58'45" Lat., 102°54'47" Long.

**Date of Construction:** c. 1878 - c. 1906

**Present Owner:** Hawthorne Ditch Company, Lower Rapid Water Company, Cyclone Ditch Company, South Side Ditch and Water Company, Lone Tree Water Company, Little Giant Ditch Company, St. Germain Irrigating Company, and others

**Present Use:** Irrigation

**Significance:** The Lower Rapid Valley Ditches are significant for their association with the development of irrigated agriculture in South Dakota. The ditches are representative examples of irrigation systems constructed, maintained, and operated by farmers.

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February 1994

## II. HISTORY

### A. INTRODUCTION

The Lower Rapid Valley irrigation ditches extend eastward from Rapid City, South Dakota, basically paralleling Rapid Creek for a distance of 20 miles. (See map on page 3.) Rapid City, western South Dakota's main population center, lies on Rapid Creek at the western end of the Lower Rapid Valley. The valley is about 40 miles long, and from one to two miles wide. Gently sloping bench lands rise from 75 to 200 feet above the valley floor. Originating on the eastern flank of the Black Hills and flowing easterly through the valley, Rapid Creek is a major tributary of the Cheyenne River. Accumulated snows in the higher elevations feed the creek, resulting in a spring flood; summer rainstorms can produce occasional flash floods.<sup>1</sup>

The Lower Rapid Valley Irrigation Ditches are farmer-owned irrigation systems which have provided water to between 9,000 and 15,000 acres for over a century. Beginning within the corporate limits of Rapid City and in downstream order, these farmer-owned ditches are the Iowa (abandoned), Lockhart (not part of this project) Hawthorne, Rapid Valley (commonly known as Murphy), Cyclone, Lower Rapid (commonly known as South Side), Little Giant, Lone Tree, St. Germain, and Hammerquist (abandoned and not part of this project). The Bennet, Leedy, and Storybook Ditches (not part of this project), located to the west of Rapid City, supply modest amounts of water for lawn and garden watering.

### B. FARMER-OWNED IRRIGATION DITCHES

Economic and social principles as well as physical and biological laws must be brought into operation to make irrigation projects successful.

John A. Widsøe, "History and Problems of  
Irrigation in the West"

Today, in the Western United States, the term "irrigation" is considered to be synonymous with the U.S. Bureau of Reclamation. Yet, this has not always been the case, nor does it accurately portray the role private irrigation development has played in reclaiming the arid lands of the west. As late as 1919, private irrigation systems served 25 million acres--representing 93.5 percent of all irrigated lands.<sup>2</sup>

John A. Widtsoe, in a paper published in *Proceedings of the American Society of Civil Engineers* in 1926, divided the "Modern Period" of irrigation into three categories: pioneer enterprises, capitalistic enterprises, and federal-aided enterprises. Widtsoe defined pioneer enterprises as "those in which the farmers themselves, chiefly by their own labor and always with limited capital, in the spirit of co-operation, set about to dig ditches and to bring water on dry land." Although he felt the pioneer period ended about 1880, in southwestern South Dakota, it extended into the 1890s. Capitalistic enterprises were generally large-scale projects funded by outside investors seeking to make a profit. It is estimated that by the turn-of-the-century, upwards of 90 percent of these projects were in financial trouble.<sup>3</sup>

For the purposes of this report, the term "farmer-owned" will be used in place of Widtsoe's "pioneer" designation. Farmer-owned includes those ditches which were constructed and operated by farmers, but never officially organized, as well as those systems owned by corporations in which stock was held by the farmers.

Some early examples of farmer-owned systems, such as those constructed by the Mormons in Utah beginning in 1847 and the Greeley Colony in Colorado beginning in 1869, have received wide attention from historians. Generally, however, farmer-owned systems have been discussed only in a local context, thus undervaluing the part they played in the evolution of "capitalistic" and then federal-aided systems. It was the early success of the farmer-owned systems that led outside speculators to promote huge reclamation projects to thousands of land-hungry farmers. When quick profits from water rents did not appear, the corporations established by the speculators failed, leaving the farmers stranded without water. Ultimately, the collapse of "capitalistic" enterprises culminated in passage of the Reclamation Act of 1902, and the involvement of the federal government in reclamation projects.

The Lower Rapid Valley ditches are but one example of farmer-owned systems which can be found throughout the West. In 1919, 8,378 of these ditches existed in Montana alone. Many of them continue to operate today.<sup>4</sup> The irrigation ditches had numerous shortcomings which later irrigation promoters and federal government reports were quick to point out. The ditches were inefficient, transporting water in leaky canals, and seldom incorporated the latest advances in irrigation technology. Also, farmers were accused of wasting water through continued use of outmoded agricultural practices.<sup>5</sup>

Still, for all of their faults, these ditches had one important feature that the later, more complex systems could not duplicate: the ditches were "fostered, supported, and managed by the water users themselves."<sup>6</sup> In most rudimentary

terms, the success of the farmer-owned ditches can be traced to their low cost. The farmers were not burdened with swollen construction loan repayments, operation and maintenance costs, and water rents. The actual water users set the annual assessments and, in general, they shared the same economic circumstances. Labor on the ditch was often equal in value to cash, an important factor for cash-starved farmers.

### C. IRRIGATION IN SOUTH DAKOTA

Every citizen will admit that all [South Dakota] needs . . . is more moisture, more rain, more water.

George W. Kingsbury, *History of Dakota Territory*

Irrigated agriculture in South Dakota first appeared in the 1870s in the six contiguous southwestern counties of Butte, Meade, Lawrence, Pennington, Custer, and Fall River. These counties remained the center of irrigated agriculture in the state until well into the twentieth century. In his 1907-1908 report to the Governor of South Dakota, the State Engineer noted "[t]here is practically no irrigation on a commercial scale in eastern South Dakota." He described the privately-owned irrigation systems in the southwestern counties as the "largest and most important" systems in South Dakota.<sup>7</sup>

In his 1909-1910 report, the State Engineer provided descriptions of five irrigation systems in the southwestern counties he felt representative of the principal, privately-built irrigation systems in the state. The Hawthorne and Iowa Ditches in the Lower Rapid Valley were included among the five. The ditches represented three different types of ownership. The Redwater and Edgemont Canals were constructed by companies with the intent of selling water to customers; the Cascade Ditch began as a private irrigation system and was extended by the owner to serve adjacent farmers; and the Hawthorne and Iowa Ditches were considered "community ditches," as they were actually owned by the farmers who used them for irrigation.<sup>8</sup>

In capacity and length, the Redwater Canal in Butte County was the largest of the irrigation systems. The main canal stretched for 42 miles (the last 12 miles had been abandoned by 1910), and served about 5,000 acres. The Edgemont Canal in Fall River County diverted water from the Cheyenne River. Its 14-mile-long canal had a capacity of 40 to 50 cubic feet per second, and served about 3,000 acres. In Fall River County, the Cascade Ditch diverted water from Cascade Creek. Although

the State Engineer provided no overall acreage or length figures, the ditch had a capacity of 30 cubic feet per second and the farmers in the upper reaches irrigated 900 acres.<sup>9</sup>

In comparison to the above figures, the Iowa Ditch was six miles long with a capacity of 15 cubic feet per second; it provided water to 1,023 acres. The Hawthorne Ditch (with a proposed extension) was 8.5 miles long, had a capacity of 30 cubic feet per second, and served 1,028 acres.<sup>10</sup> Taken as a whole, however, the statistics for the eight to ten ditch companies in the Lower Rapid Valley are much more impressive. In 1909, the combined companies diverted water from Rapid Creek to over 15,000 acres. They served three times more land than systems diverting water from any other creek in the Black Hills.<sup>11</sup>

Generally, outside of the southwestern counties, South Dakotans historically showed little interest in irrigation. Eastern South Dakota normally received adequate rainfall to produce fairly plentiful crops of corn and small grains. Conversely, most of the land west of the Missouri River could not sustain crops without irrigation. Outside the narrow river valleys of southwestern South Dakota, getting water to the bulk of arid lands in this part of the state was far beyond the financial capabilities of local farmers.

In the 1890s, irrigation from artesian wells briefly captivated the attention of farmers in the eastern part of the state. The South Dakota Legislature passed a law in 1889 permitting the sinking of artesian wells by petition of a township, and memorialized the U.S. Congress for an appropriation to study artesian irrigation. The Government Irrigation Commission's report of 1892 identified an artesian basin centered on the James River Valley; it was about 40,000 square miles in extent and from 500 to 1,800 feet deep. Encouraged by this finding, the state began a vigorous promotion of artesian irrigation. The initial euphoria, however, quickly abated as crops began to suffer from the detrimental effects of minerals in the water. By 1900, the craze had subsided and farmers in this area of South Dakota turned to more scientific methods of agriculture and drought-resistant crops.<sup>12</sup>

Passage of the Reclamation Act in 1902 created the U.S. Reclamation Service (later the Bureau of Reclamation) and empowered it to construct and maintain reservoirs and irrigation systems in 16 western states. The Reclamation Service selected an area to the east of Belle Fourche in Butte and Meade Counties as the site for its first irrigation project in South Dakota. Construction of the project's dam and reservoir continued from 1905 to 1911; although water was supplied to limited areas beginning in 1908. The Reclamation Service projected that upon completion 90,000 acres would be provided water.<sup>13</sup>

By any number of evaluations, the beginnings of the Belle Fourche project were a dismal failure, following the pattern of many other Reclamation Service projects in the West. Only about two-thirds of the original acreage projections were served by the project, and poor farming practices resulting in a large turnover in project land ownership. It was not until the late 1930s that the project finally began to turn around. Reductions in the irrigable acreage and the amount of construction costs to be repaid during the 1940s increased the project's viability. Even so, by 1974, the irrigators had paid back only 52 percent of the project's original construction costs.<sup>14</sup>

The Bureau of Reclamation funded no further major projects in South Dakota until construction of the Deerfield and Pactola reservoirs in southwestern South Dakota in the late 1940s and early 1950s. Although they did not expand the total irrigable acreage, these two projects provided supplemental storage for Rapid City and the irrigators in the Lower Rapid Valley. At about the same time, the Bureau completed Angostura Dam on the Cheyenne River in Fall River and Custer counties, supplying water to about 12,000 acres.

Since the beginning of agricultural settlement in South Dakota, covetous eyes have been cast toward the waters of the Missouri River. In 1915, historian George W. Kingsbury predicted, "It is only a question of time when [impounding the waters of the Missouri River] will be done. . . ."<sup>15</sup> He, as most people before and after him, saw these waters serving the arid lands to the west of the river. Kingsbury's 1915 prediction proved correct, although somewhat premature. It was not until 1968 that the U.S. Congress authorized construction of Oahe Dam on the Missouri River. Almost all of the water, however, was to be provided to the eastern part of the state: 445,000 acres in the James River Valley and 55,000 acres in and around Sully County.<sup>16</sup>

#### D. LOWER RAPID VALLEY SETTLEMENT

Why sensible people will let millions of acre feet of the best water in the world rush by their parched farms without an effort to store and save it, is one of the mysteries of husbandry.

George W. Kingsbury, *History of Dakota Territory*

A group of thwarted gold-seekers from the Black Hills laid out the town of Rapid City in February 1876. They envisioned the new town as the eastern supply point for the mines of the Black Hills. Attacks by Indians through the summer of

1876 delayed development, and by December, only three families remained. The original promoter's townsite company faltered when quick profits from an influx of settlers failed to materialize. Four years after its beginning, Rapid City's population stood at 292.<sup>17</sup>

The first permanent rural settlement in the Lower Rapid Valley coincided with the founding of Rapid City. In May 1878, the *Black Hills Journal* reported that the valley was settled for ten miles east of Rapid City, with half of the settlement occurring that year.<sup>18</sup> By August, farmers were providing the local market with fresh vegetables, including lettuce, radishes, onions, peas, beans, turnips, potatoes, beets, and cucumbers. Forecasts for the fall crops included green corn, squash, melons, cabbages, and tomatoes. Experimental plots of wheat, rye, oats, and barley were proving the success of small grains.<sup>19</sup>

In the typical language of the day, the *Black Hills Journal* took the opportunity of the first harvest to "boost" agricultural settlement in the Lower Rapid Valley:

The cause of [the] cheerful feeling among the Rapid creek farmers is easily explained. Farms are opened out here and put into a producing condition at very little expense; the soil is rich, "quick," and easily broken; pure flowing water is abundant; there is a plentiful supply of timber near at hand. . . .<sup>20</sup>

These first settlers in the Lower Rapid Valley were actually squatters on the public domain. The land had not been surveyed, and was therefore not open to preemption or homestead under public land entry laws. In the fall of 1878, the contracted government land surveyor arrived in Rapid City. He had adapted his survey lines so they would include the Lower Rapid Valley, but did not intend to survey townships until he had completed his work in the Spearfish and Redwater areas.<sup>21</sup>

By the spring of 1879, the inability to file homestead claims became critical. The "legitimate" farmers in the valley met in February, and organized a protective association. The existence of a house on a claim and a fence around the boundaries apparently provided some measure of security to an unrecorded claim (whether through local custom or general western practice is unknown). The predicament facing the farmers was that they were practically prisoners on "their" land; they could not leave for fear that their claims would be jumped.<sup>22</sup> The Lower Rapid Valley was surveyed and opened for settlement in either late 1879 or early 1880. When finally able to do so, farmers typically filed on 100- to 160-acre homesteads.<sup>23</sup>

An Indian scare in early 1879 resulted in a petition to the Secretary of War to establish a garrison of soldiers at the mouth of Rapid Creek on the Cheyenne River. An emotional *Black Hills Journal* article, published on March 8 of that year, chastised the settlers in the valley for "trying to disguise" the "imperiled conditions" under which they lived.<sup>24</sup> The settlers, however, appeared to take the threat more lightheartedly. One farmer told a questioning *Black Hills Journal* correspondent, when asked about his fear in meeting Indians, that he "had not lost any . . ."<sup>25</sup> Another farmer, with tongue in cheek, described the improvements in the valley since the previous winter which had transformed his log cabin from "a vast building--a great improvement--a terror to the redskins" to an insignificant building.<sup>26</sup> Nevertheless, the threat of attack was real, as the farmers were reminded in August 1879 when Indians raided a stage stop about 20 miles east of the mouth of Rapid Creek, killing mules and driving off horses.<sup>27</sup>

Many farmers in the Rapid Valley completed major improvements on their farmsteads during 1879. By April, "upwards of fifty dwellings" were reported in the valley. Log cabins were quickly being replaced by frame houses; fences and outbuildings were becoming plentiful.<sup>28</sup> The farmers continued their success of the previous year with vegetables, while planting increasingly larger acreage to small grains.<sup>29</sup> By the spring of 1880, the *Black Hills Journal* predicted that "[t]he time is near at hand when the last location stake will be driven. . ."<sup>30</sup>

## E. IRRIGATION IN THE LOWER RAPID VALLEY

It requires more courage, self-restraint, and good judgement to build a cheap system than to build an expensive one, especially if ample funds are available.

Augustus Griffin, *Land Settlement of Irrigation Projects*

In January 1878, the Rapid River Ditch and Improvement Company announced plans to build an irrigation system that would provide water to much of the Lower Rapid Valley. A newspaper account described a main canal taking water from Rapid Creek, about one-half mile west of Rapid City. The canal would then reach the divide on the north side of Rapid Creek between Rapid and Box Elder Creeks and extend 30 miles east. A natural basin, three and one-half miles long, at the termination point would serve as a reservoir, with smaller reservoirs in draws along the canal's route. The system, to reach completion the following year, would be capable of providing 96,000 acres with water.<sup>31</sup>

Nothing is known of the organizers of the Rapid River Ditch and Improvement Company, but the timing of the project and their grandiose plans suggest a previous knowledge of large-scale irrigation projects. The company also had the support of the editor of the *Black Hills Journal* to urge reason on the new farmers who ignored the need for irrigation.<sup>32</sup> The editor pronounced, "Like all farming land in the Rocky Mountains, the land has to be irrigated to produce a crop."<sup>33</sup>

Following the initial announcement, the planned irrigation project is never mentioned again. The reasons behind its failure to materialize are unknown. The proposed project may have been too far ahead of its time. Settlement was just beginning on the fertile valley floor, and there was little interest in the more arid bench lands. Adequate rain fell during the first two years of settlement, and the farmers along the creek found it easy to dig their own irrigation ditches.

Not until the 1890s, with the formation of the Iowa Irrigation Ditch Company, would an irrigation system be proposed that approached the breadth of the Rapid River Ditch and Improvement Company's project. If the Rapid River Ditch and Improvement Company's system had been built, it would have brought water to the bench lands lining the Rapid Valley on the north. These lands largely remain without water to this day.

Many farmers on the valley floor did dig irrigation ditches during 1878 and 1879, despite the plans for the Rapid River Ditch and Improvement Company's irrigation system and the plentiful rainfall. The motivation behind this construction is unknown. In May 1878, the *Black Hills Journal* reported that the Lower Rapid Ditch Company (predecessor of the South Side Ditch Company) would have its ditch completed within two weeks.<sup>34</sup> Also, in 1879, the newspaper reported that "Messrs. McCumber, Taylor, Theal, Chaffee, and Parker are busily engaged constructing an irrigating ditch, which we hope they will not have occasion to use this summer."<sup>35</sup> The Lewis Ditch and the Rapid Valley Irrigating Ditch are also mentioned providing water to several farms in 1880.<sup>36</sup> These ditches, originally constructed to serve one or a few adjoining farms, were the foundation for the farmer-owned ditch companies which endure to this day.

Most of the farmer-owned ditch companies which were organized in the Lower Rapid Valley during the 1880s and 1890s, took over the water rights and ditches of private individuals. For example, in 1890, the newly-organized St. Germain Irrigating Company purchased the water right and ditch of Oliver St. Germain for \$2,000. The company issued St. Germain 1,111 shares of stock as payment.<sup>37</sup> An enterprising St. Germain received actual payment by selling stock in the company to farmers along the ditch route.

Since the ditch companies were organized as private corporations, they did not have the legal power to condemn property. Ditch company records, however, do not document many difficulties in securing ditch rights-of-way. Negotiations with property owners apparently were usually successful in meeting the companies' needs since readily available water enhanced a property's value. Presumably, the main problems would have been in the upper reaches of the canal--from the diversion point which might traverse property already served by other ditches--to the location of the first beneficial use. Even so, some farmers took advantage of multiple ditches crossing their property and acquired stock in more than one company. The few references to right-of-way problems in ditch company minutes are rather vague. Oliver St. Germain, who had contracted to obtain a right-of-way for an extension of the St. Germain Ditch in 1891, did not receive final payment for his services until 1897.<sup>38</sup> In another right-of-way case, the Lone Tree Ditch Company was sued for damages to property after it constructed a new dam.<sup>39</sup>

The minute books of the Lone Tree Ditch Company provide fairly clear insight into how a farmer-owned ditch company was organized and how it went about constructing a ditch. On October 5, 1880, seven farmers in the Lower Rapid Valley met to organize the Lone Tree Ditch Company. The meeting resulted in a decision to construct a ditch about six miles long. Specifications called for a ditch six feet wide and one foot deep. The group elected I.C. Jackson, a farmer in attendance, as superintendent of the work. Per diem rates were also established for man and team. At a meeting two weeks later, the group voted to secure the services of E.S. Keller to survey the ditch route.<sup>40</sup>

Construction of the Lone Tree Ditch was underway in the spring of 1881, when the superintendent reported on the labor performed by the various farmers. As a result of this report, the directors set a sliding-scale, annual assessment based on the amount of labor performed. The minutes are not clear as to the reason for the sliding scale, but it is likely that it was meant to penalize farmers who were not doing their share of work. What is clear, however, is that \$40 in labor--16 days based on the established daily rate--was expected from each farmer. The assessments ranged from 30 percent for farmers performing between \$40 and \$60 in labor to as low as 10 percent for farmers contributing more than \$90 in labor. The directors also voted to allow a 20 percent discount to those members paying their assessments "in money."<sup>41</sup>

The farmer-owned ditch companies were organized solely for the purpose of increasing the productivity of the stockholders' lands. In practice, they operated almost as nonprofit corporations with no designs to make a profit or issue dividends. The stockholders met annually to vote that year's assessment to cover operating

and maintenance costs, salaries, and other miscellaneous expenses. A rate of pay for labor on the ditch also was set. For example, in 1893, the St. Germain Irrigating Company assessed each share of stock at ten cents. The assessment could be worked off by a man and team at \$3.00 per day or by a man at \$1.50 per day. The St. Germain records also document assessments being paid in construction materials and in grain.<sup>42</sup>

Limited remedies were available to the ditch companies for collecting delinquent assessments. In the case of the St. Germain Irrigating Company, each assessment notice carried a specific date of delinquency. If the delinquency continued, the company had the right to sell the owner's stock at public auction.<sup>43</sup> The records of the other ditch companies do not reflect whether this was common practice among all the companies in the Lower Rapid Valley.

#### F. IRRIGATION PRACTICES

Apparently the Ditch Companies down Rapid Valley are having their annual squabble.

Denu & Philip Attorneys,  
Letter to Cyclone Ditch Co., 1934

Rapid Valley irrigators historically practiced flood irrigation. Water was taken directly from Rapid Creek without any attempt at storage. Because of the need for large amounts of water to cover the farthest reaches of fields, distribution by rotation--the one longest without water being the next in order of taking--is the custom. Each farmer is supplied with water from the ditch for a specified period of time, and then must wait his turn again.<sup>44</sup> Only during periods of extreme drought is this practice modified.

An overview of the minute books of the ditch companies documents a clear pattern of operations under the rotation system. During years of plentiful rainfall, the most routine of corporate business matters--the election of directors and the fixing of annual assessments--were the only items of record to come before the stockholders at their annual meetings. In fact, some ditch companies were so loosely organized that they apparently did not even hold annual meetings. Periodically, one or another of the companies failed to file for extensions of their corporate existence and had to be reorganized.

Successive years of drought (i.e., in the 1890s, 1910s, and 1930s) prompted more attention to corporate matters. In these years, the records show that the ditch companies were concerned with protecting their own water rights, either individually or in alliance with other aggrieved companies. The companies frequently sought legal opinions, served notices on companies with junior water rights, and responded to injunctions. The companies also attempted to diminish disputes among water users on their own ditches.

Not unexpectedly, most ditch improvements occurred in years of water shortages as attempts were made to ensure equitable distribution of available water. During the 1890's drought, the Lone Tree Ditch Company undertook improvements to its dam and provided each stockholder with two turnout boxes which could be closed. As the drought continued, the company hired a ditch walker to monitor water usage.<sup>45</sup> At the same time, the St. Germain Irrigating Company also required farmers to install turnouts. The company's directors provided very specific instructions as to the size of the boxes, their location in the ditch, surfacing of the canal bottom, and method of turning out the water.<sup>46</sup>

The farmers of the Lower Rapid Valley approached the general economic collapse and drought of the 1930s as they had other such periods. But as the drought continued, the legal fights and ditch improvements were not sufficient to solve the continuing water shortages. The ditch companies began to soberly perceive the need for mutual cooperation. Amid a decade-long frenzy of legal opinions, lawsuits, court orders, and general bickering, the Rapid Valley Water Users Association was formed.<sup>47</sup> On the surface, the catalyst for the formation of the organization was the federal government's investigation of storage reservoir sites in the upper tributaries of Rapid Creek. At least one of the ditch companies, however, perceived a broader purpose. For the first time, the ditch companies were working together "in establishing better and more uniform and improved methods of handling the irrigation waters of Rapid Creek."<sup>48</sup>

Delegates from the ditch companies met to organize the Rapid Valley Water Users Association on October 1, 1938. The objectives of the organization were identified as (1) the protection of vested water rights, (2) cooperation with Rapid City to obtain a water storage facility, (3) seeking an appropriation for stream gauging, and (4) cooperation with Pennington County commissioners in revising the method of assessing lands.<sup>49</sup>

The second meeting of the Rapid Valley Water Users Association was held jointly with the Rapid City Chamber of Commerce's Water Committee. The two groups reviewed the Bureau of Reclamation's report on the feasibility of storage

reservoirs. Those present agreed on the need for additional storage, but could not concur on a source of funding for such a project. The ditch companies had already expressed a desire that the project be completed "without the dependence on Federal Aid." They also communicated a pervasive reluctance among the farmers to support a bond issue. The two groups did decide to notify the Bureau of Reclamation of their "accord on the fundamental principles" of a supplementary water supply. They also sought legislation through their Congressman to allow the Bureau of Reclamation to sell water to Rapid City and the ditch companies, thereby relieving them of the need to finance the construction costs.<sup>50</sup>

After construction of the Pactola and Deerfield reservoirs by the Bureau of Reclamation in the late-1940s and early-1950s, stored water became available to irrigators on demand. A Water Conservancy District was formed to take care of the administrative duties. During each irrigating season, the District hires a ditch master. The ditch master receives orders for water from the various ditch companies, and then transmits an order for water to the dam tender at Deerfield and Pactola. The ordered water is released from one of the two reservoirs and the cost charged to the users.<sup>51</sup>

## G. AGRICULTURAL PRODUCTS

Alfalfa—Greatest Gift of the Creator to People of Semi-Arid Regions

*Holiday Greetings from Rapid City, South Dakota,*  
Levi McGee

Until the arrival of the railroad in 1886, local demand and processing facilities dictated the products grown by farmers in the Lower Rapid Valley. For example, in 1878, farmers found the local breweries to be ready markets for barley, but found little demand for wheat because there was not a local grist mill.<sup>52</sup> The booming mining communities of Deadwood and Lead to the north of Rapid City likely accounted for the initially strong interest in irrigated truck gardening.<sup>53</sup>

Pennington County soon ranked among the top agricultural producing counties in South Dakota. An 1885 summary for the county shows the diversification into small grains. In that year, farmers produced 81,432 bushels of oats, 13,115 bushels of wheat, 6,315 bushels of corn, 5,076 bushels of barley, 76 bushels of rye, 12 bushels of buckwheat, and 24,029 bushels of potatoes.<sup>54</sup>

In 1887, the *Black Hills Weekly Journal* reported an abundant cutting of the first alfalfa planted in the Rapid City area. The experimental planting had been made on a quarter-acre dryland plot. Projecting yields of eight tons per acre, the newspaper enthusiastically recommended alfalfa as the crop for the unirrigated bench lands.<sup>55</sup> Alfalfa was also suited to the irrigation practices of the Lower Rapid Valley farmers. Often providing three or four cuttings, it primarily depended upon moisture for the first stand. This coincided with an abundance of water in the irrigation ditches during the spring runoff.<sup>56</sup>

Alfalfa soon became one of Pennington County's most important crops. At times, the acreage planted to alfalfa almost equaled that planted to small grains.<sup>57</sup> One author described "[t]he boom that occurred as a result of the activity in alfalfa was like the rush in the old days following a gold discovery."<sup>58</sup> "Black Hills alfalfa" seed became popular throughout the United States and provided farmers with a much needed cash crop. Eventually, an alfalfa seed grading and cleaning mill was constructed in Rapid City. A domed alfalfa palace dominated the Western South Dakota Fairgrounds in Rapid City beginning in 1912.<sup>59</sup>

By 1920, Pennington County farmers were producing the most diversified group of crops in the Black Hills counties. That year, alfalfa was sown on 28,536 acres producing 31,517 tons of hay and 3,553 bushels of seed. The county's other crops were wheat, corn, oats, rye, and barley.<sup>60</sup>

In 1910, Belle Fourche Project irrigators in Butte County planted the first sugar beets in South Dakota. The acreage steadily climbed, but as late as 1924, Butte County remained the only producer of sugar beets in the state. Sugar beets did finally spread to other Black Hills counties. In 1929, Pennington County ranked second in the state for sugar beet production with a total of 10,419 tons (about 10 percent of the Butte county total).<sup>61</sup>

Agricultural production plummeted in Pennington County as the drought of the 1930s continued year after year. The area harvested fell from 224,815 acres in 1930 to 35,329 acres in 1935, or by 85 percent. The yields of such grains as wheat, oats, and barley decreased by more than 90 percent. Natural hay and alfalfa tonnage dropped by 85 percent, with a corresponding decrease in acreage cut from 75,595 to 16,316.<sup>62</sup> In 1937, the Bureau of Reclamation reported that on irrigated farms "[t]he main crops *under the present conditions* are alfalfa and hay."<sup>63</sup> It also found that the water shortages limited delivery of water to about half of the 12,000 irrigable acres. With these figures, upwards of one-sixth of the total acreage harvested in Pennington County was located in the Lower Rapid Valley.

Following World War II, almost the entire acreage of irrigated land in the Lower Rapid Valley was again planted to small grains. In 1947, only 158 acres were planted to alfalfa. Livestock values far exceeded the crop values in that year.<sup>64</sup> The Bureau of Reclamation noted in 1951 that most of the livestock was raised "within the area." How much of this was on irrigated lands is unknown although it did specifically mention dairy cows on irrigated lands.<sup>65</sup>

#### H. BUREAU OF RECLAMATION INVOLVEMENT

Since the passage of the Reclamation Act in 1902 not many of the projects that have been built have been what might be called a "howling success," except from an agricultural standpoint; in fact, nearly ever since, every one of them has been *howling* more or less but not very much of a *success* financially.

South Dakota State Engineer, 1913-1914

Beginning in the 1890s, investigations into the feasibility of storage reservoirs to increase the number of irrigated acres in the Lower Rapid Valley periodically surfaced. The Iowa Irrigation Ditch Company had originally planned a 30-mile-long ditch when it was formed in 1893, but only built six miles due to a lack of an adequate water supply. The company continued to promote extension of the ditch into the next decade, with belief that supplemental water could be stored in reservoirs along the ditch route.<sup>66</sup>

The Dakota Power Company gave more serious consideration to additional storage reservoirs in 1915. It retained the Denver engineering firm of Strong and Bull to investigate adding irrigable lands in the valley. The firm looked at both the Deerfield and Pactola dam sites, and determined that 40,000 acres could be supplied from a reservoir at Pactola.<sup>67</sup>

In 1928, the Dakota Power Company again retained an engineering firm, this time Day and Zimmerman of Philadelphia, to study sources for additional power generation and irrigation storage. The firm concluded that no feasible sites existed. At all locations, they found the cost per irrigable acre to be excessive and reported that the power generated by such a project would be insignificant.<sup>68</sup>

Rapid City found itself increasingly embroiled in water disputes with the irrigators in the Lower Rapid Valley. The output of the springs from which the city derived its water decreased during the drought of the 1930s. Simultaneously, the city's growing population increased the demand for water. An attempt to pipe water from other springs was hampered by conflicting water rights. Finally, in 1936, the city drilled two deep wells, but found the water unsatisfactory. In supporting the construction of a reservoir, the city hoped to exchange stored water for the rights to the disputed springs.<sup>69</sup>

In response to local agitation by civic groups in Rapid City, the Bureau of Reclamation prepared a report on irrigation in the Rapid Valley in 1937. Funded by the Emergency Relief Act "for the investigation of irrigation possibilities," the report was equally concerned with providing an adequate municipal water supply to Rapid City. The report considered three storage plans. The first two plans evaluated reservoir sites at Deerfield and at Pactola. These plans were limited to supplying storage for Rapid City and providing a more stable water source for irrigated lands in the valley. The third plan combined these two objectives and added a 20-mile extension of the Iowa Ditch to provide water to an additional 6,000 acres.<sup>70</sup>

President Roosevelt approved construction of Pactola Dam and Reservoir in 1939. The \$1.23 million project included \$1 million for construction costs, \$100,000 for drainage on irrigated farms, and \$130,000 for the purchase of excess lands. Costs to relocate the Rapid City, Black Hills and Western Railroad and a main highway added significantly to the project's budget after its approval. When Rapid City and the irrigators refused to cover the additional costs, the Bureau of Reclamation substituted the Deerfield site for the Pactola site.<sup>71</sup> Deerfield Reservoir began operating in 1948.<sup>72</sup>

The \$1 million cost of construction of Deerfield was to be paid equally by Rapid City and the irrigators. The contract with the city called for 40 equal payments. Special legislation for this project was enacted by the South Dakota Legislature permitting the ditch companies to organize a Water Conservancy District. The Water Conservancy District was empowered to enter into a repayment contract with the government.<sup>73</sup>

In 1949, Rapid City officials petitioned the Bureau of Reclamation to build Pactola Dam and Reservoir. The central argument for building Pactola Dam and Reservoir focused on Rapid City's spiraling population. Even with the completion of Deerfield Reservoir, the limits of the city's water resources were already foreseen; sustaining growth and industrial development was dependent on finding an additional water source. Construction of the Rapid City Air Base (now Ellsworth Air

Force Base), just to the northeast of the city, during World War II had added significantly to the area's population. Water for the air base was supplied from deep wells, but the base was also seeking a surface supply.<sup>74</sup>

The "Definite Plan Report" for construction of Pactola Dam and Reservoir in 1952 again included irrigation as a justification for its construction. While admitting that "plans for the irrigation phase are not firm in all respects, pending further study and negotiation," the Bureau of Reclamation felt the increased water supply would allow construction of the Iowa Ditch Extension. The existing six-mile length of the ditch was to be extended to 25 miles and serve 2,200 irrigable acres. A supplemental water supply also would be available to the other ditches in the Valley.<sup>75</sup>

The Bureau felt that the assurance of water throughout the irrigating season might end the common practice of running the ditches full during the spring runoff, thus saving additional water. Other water savings were also forecast by using the Iowa Ditch Extension farms as models of good irrigation practices: "The influence of the Iowa Canal, where modern irrigation methods are expected to be used, will assist in bringing about better irrigation methods and greater efficiency of water on lands served by the other canals."<sup>76</sup>

Work began on Pactola Dam on November 25, 1952.<sup>77</sup> The \$12.17 million construction cost was assigned to four beneficiaries. Irrigators (including the proposed Iowa Ditch Extension) were to pay back \$4,385,000. Rapid City was assigned a cost of \$2,785,000 for municipal water. More than one-third of this was to be borne by the Department of the Air Force in return for the city supplying the air base with water through its facilities. The remainder of the construction costs was assigned to flood control and recreation.<sup>78</sup> For unknown reasons, the Iowa Ditch Extension was never built.

### III. RECENT HISTORY AND FUTURE OF THE LOWER RAPID VALLEY IRRIGATION DITCHES

Unchecked growth to the east of Rapid City has resulted in the upper reaches of some of the ditches being surrounded by urban and residential development--most specifically the Hawthorne, but to a lesser extent, the Cyclone and Rapid Valley ditches. Conflict between the irrigators and the new residents was inevitable. The irrigators have been blamed for wasteful practices which contribute to an elevated ground water level resulting in contaminated wells and flooded basements. Conversely, the large areas now devoted to development have caused storm water drainage problems.<sup>79</sup>

In 1990, the Bureau of Reclamation published a study of alternatives designed to conserve or augment the water supply in the Rapid Valley. Prolonged drought during the 1980s had reduced storage in Pactola and Deerfield Reservoirs to a critically low level. Rapid City and the Rapid Valley irrigators were faced with looming water shortages.<sup>80</sup>

Eleven alternatives were explored by the Bureau of Reclamation. As in earlier Reclamation reports, the central challenge was meeting Rapid City's escalating demand for municipal water. The study projected that Rapid City's population would double by the year 2030, and predicted that irrigation needs would drop as suburban development removed land from agricultural production.<sup>81</sup>

In 1988, the South Dakota Legislature enacted a law giving Rapid City a potential new source in its search for water. Irrigation water rights, which historically had been appurtenant to the land they served, could now be severed for domestic purposes. The Bureau of Reclamation's report considered an alternative by which the city could provide for its projected water needs by purchasing the four oldest irrigation water rights.<sup>82</sup>

The United States Department of Agriculture (USDA) Water Quality Hydrologic Unit Area, Lower Rapid Creek Project, in Pennington County, South Dakota, was approved for funding by the Secretary of Agriculture in December of 1990. This plan was approved to complement the goals stated in the "USDA Water Quality Plan to support the President's Water Quality Initiative" dated July 1989. The plan will be carried out by the USDA-Soil Conservation Service, USDA-Agricultural Stabilization and Conservation Service, and the USDA-Cooperative Extension Service in cooperation with the Pennington Conservation District and the Pennington County Drainage Commission. The project will be funded on a cost-share basis using the authority of the "USDA Water Quality Plan to Support the President's Water Quality Initiative." An interdisciplinary evaluation of the environment was made by the Soil Conservation Service in consultation with local, state and federal agencies and interested persons during the planning for the project.

The objective of the Hydrologic Unit Plan is to reduce the water quality impairments resulting from nonpoint sources of pollution in the Lower Rapid Creek basin. Treatment includes the installation and protection of enduring and management-type conservation practices on cropland, pasture, and rangeland and other land in the Lower Rapid Creek basin. Project goals include reduction in seepage of the irrigation delivery and distribution system, control of soil erosion, and promotion of livestock waste management systems to improve water quality within

the aquifer and Rapid Creek.<sup>83</sup> Modifications plans have already been prepared for the Hawthorne Ditch to control seepage and incorporate storm water drainage.<sup>84</sup>

Pursuant to 36 CFR 800, the regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470F), the Soil Conservation Service entered into consultation with the South Dakota State Historic Preservation Office and the Advisory Council on Historic Preservation. In 1992, they jointly executed a Memorandum of Agreement stipulating the measures the Soil Conservation Service would carry out in order to take into account the effect of the undertaking on historic properties.<sup>85</sup>

This Historic American Engineering Survey documentation complies with one of the stipulations of the Memorandum of Agreement providing for mitigation of loss of historic features of the irrigation system.

#### IV. ENDNOTES

1. For a general discussion of the geography of the area, see: U.S. Department of the Interior, Geological Survey, *Basin Characteristics, History of Stream Gaging, and Statistical Summary of Selected Streamflow Records for the Rapid Creek Basin, Western South Dakota*, by Daniel G. Driscoll and John S. Zogorski, Open-File Report 90-120 (1990).

2. Donald Conrad Jackson, "A History of Water in the American West: John S. Eastwood and 'The Ultimate Dam' (1908-1924)" (Ph.D. diss., University of Pennsylvania, 1986), 2.

3. John A. Widtsoe, "History and Problems of Irrigation Development in the West," *Proceedings of the American Society of Civil Engineers* 52 (March 1926): 396-397. For a similar discussion of early irrigation development, see: Robert G. Dunbar, "Farmers, Investors, and Ditches," chap. 3 in *Forging New Rights in Western Waters* (Lincoln and London: University of Nebraska Press, 1983).

4. Dunbar, 20.

5. For a lengthy discussion of wasteful irrigation practices, see: George W. Kingsbury, "Irrigation, Water Supply, Rainfall, Streams, Elevation, Temperature, Reservoirs, Conservation, Reclamation, Etc.," chap. 13 in *History of Dakota Territory*, vol. 3, *South Dakota: Its History and Its People* (Chicago: The S.J. Clarke Publishing Company, 1915); For one Bureau of Reclamation evaluation of irrigation practices in the Lower Rapid Valley, see: United States Department of the Interior, Bureau of Reclamation, "Definite Plan Report, Volume 1 - General Plan, Part 1 - Pactola Dam and Reservoir," Original Draft September 1951, Revised June 1952. Copy in Library, Bureau of Reclamation, Newell, South Dakota.

6. Widtsoe, 397.

7. South Dakota State Engineer, *Second Biennial Report of the State Engineer to the Governor of South Dakota for the Years 1907-1908*, (Pierre: State Publishing Co., [1909]), 59-60.

8. South Dakota State Engineer, *Third Biennial Report of the State Engineer to the Governor of South Dakota for the Years 1909-1910*, (Aberdeen: News Ptg. Co., [1911]), 71.

9. Ibid.

10. Ibid.
11. Kingsbury, 465.
12. For a general overview of irrigation in South Dakota, see: Kingsbury, chap. 13.
13. Herbert S. Schell, *History of South Dakota* (Lincoln and London: University of Nebraska Press, 1975), 359-360.
14. Ibid.
15. Kingsbury, 451.
16. Schell, 361.
17. For an overview history of early Rapid City, see: Ross P. Korsgaard, "A History of Rapid City, South Dakota, During Territorial Days," *South Dakota Historical Collections*, vol. 38 (Pierre: State Publishing Company, 1977).
18. *Black Hills Journal*, 11 May 1878.
19. Ibid., 3 August 1878.
20. Ibid., 16 November 1878.
21. Ibid., 7 September 1878.
22. Ibid., 15 February 1879.
23. Several articles in the *Black Hills Journal* in July and August 1880 detail the acreage claimed by each farmer. Some portions of claims are noted to be disputed. In one example, the newspaper mentions a 280 farm, 120 acres "filed upon under the timber culture act."
24. *Black Hills Journal*, 8 March 1879.
25. Ibid., 29 March 1879.
26. Ibid., 14 June 1879.
27. Ibid., 30 August 1879.
28. For example, see: *Black Hills Journal*, 29 March 1879.

29. For example, see: *Black Hills Journal*, 12 April 1879 and 23 August 1879.
30. *Black Hills Journal*, 14 February 1880.
31. *Ibid.*, 23 March 1878.
32. *Ibid.*, 23 June 1878.
33. *Ibid.*, 2 March 1878.
34. *Ibid.*, 11 May 1878.
35. *Ibid.*, 28 June 1879.
36. *Ibid.*, 31 July 1880.
37. St. Germain Irrigating Company, Minute Book, 31 October 1890.
38. *Ibid.*, 31 October 1890, 23 January 1892, 22 April 1895, and 21 January 1897.
39. Lone Tree Ditch Company, Minute Book, 26 May 1883.
40. *Ibid.*, 5 October 1880 and 19 October 1880.
41. *Ibid.*, 14 March 1881 and 14 April 1881.
42. Documentation of this practice can be found throughout the 1890s in the St. Germain Company Irrigating Company's Minute Book. For example, on January 8, 1895, J.C. Barber's account is credited with 1,000 pounds of grain valued at \$9.50, 93 feet of lumber valued at \$1.40, nails valued at \$.50, and 5 days labor valued at \$7.50.
43. See: St. Germain Irrigating Company, Minute Book.
44. Information on irrigation practices was gathered from officers in the various Lower Rapid Valley irrigation ditch companies by Lon Johnson in June 1993. Of particular assistance were Jerry Marsh (St. Germain Irrigating Company), Bud Steen (South Side Ditch and Water Company), and Bud Jones (Lone Tree Water Company).
45. Lone Tree Ditch Company, Minute Book, 28 July 1890, 20 February 1891, and 6 June 1893.
46. St. Germain Irrigating Company, Minute Book, 30 May 1892.

47. "Minutes of Meeting of Delegates from the Various Ditch Companies of Rapid Valley," 1 October 1938. Typescript copy located in the Cyclone Ditch Company records. A delegate from the Rapid Valley Ditch Company (Murphy Ditch) attended only part of the first meeting.

48. Cyclone Ditch Company, Minute Book, Special Meeting, 29 September 1938.

49. "Minutes of Meeting of Delegates from the Various Ditch Companies of Rapid Valley."

50. Ibid.; "Minutes of Meeting of Rapid Valley Water Users Association," 3 February 1939; "Minutes of Joint Meeting on February 3, 1939 of Rapid Valley Water Users Association and Rapid City Chamber of Commerce Water Committee." Typescript copies in Cyclone Ditch Company records.

51. State of South Dakota, Department of Water and Natural Resources, "Status of Water Use on Rapid Creek," 12 December 1980. Copy in the Soil Conservation Service office, Rapid City, South Dakota; "Irrigation Problems in Rapid Valley," c. 1950. Typescript copy in Hawthorne Ditch Company records.

52. *Black Hills Journal*, 3 August 1878.

53. Hyman Palais, "Agricultural History of the Black Hills," *The Black Hills Engineer* 28 (1942): 65.

54. Palais, 75-76.

55. *Black Hills Weekly Journal*, 15 July 1887.

56. Palais, 76.

57. Palais provides a year-by-year description of crop acreage and yields.

58. Palais, 73.

59. Ibid., 72-72, 87. See page 88 for a picture of the Alfalfa Palace.

60. Ibid., 90.

61. Ibid., 99.

62. Ibid., 100.

63. U.S. Department of the Interior, Bureau of Reclamation, "Report on Rapid Valley Irrigation Project, South Dakota," November 1937 (italics added). Copy located in Library, Bureau of Reclamation, Newell, South Dakota.

64. U.S. Department of the Interior, Bureau of Reclamation, "Annual Project History, Rapid Valley Project, South Dakota, Deerfield Dam, Calendar Year - 1948," Volume VII. Copy in Library, Bureau of Reclamation, Newell, South Dakota.

65. U.S. Department of the Interior, Bureau of Reclamation, "Appendixes to Definite Plan Report, Volume 1 - General Plan, Part 1 - Pactola Dam and Reservoir, Original Draft September 1951, Revised June 1952. Copy in Library, Bureau of Reclamation, Newell, South Dakota.

66. *Third Biennial Report of the State Engineer, 73.*

67. "Report on Rapid Valley Irrigation Project, South Dakota." A search of the files of the Black Hills Corporation, successor to the Dakota Power Company, failed to locate this report.

68. Ibid.

69. Ibid., 31-32.

70. Ibid.

71. U.S. Department of the Interior, Bureau of Reclamation, "Project History, Volume I, Calendar Years 1940-41-41, Rapid Valley Project, South Dakota," by H.V. Hubbell, construction engineer. Copy in Library, Bureau of Reclamation, Newell, South Dakota.

72. U.S. Department of the Interior, Bureau of Reclamation, "Project History, Volume 5, Rapid Valley Project," 30 October 1946. Copy located in Library, Bureau of Reclamation, Newell, South Dakota.

73. "Project History, Volume I, Calendar Years 1940-41-42." The Rapid Valley (Murphy) Ditch Company has never been part of the Rapid Valley Water Conservancy District. Natural flows from Rapid Creek under its second priority right have been adequate to serve the irrigators needs.

74. "Definite Plan Report, Pactola Dam and Reservoir."

75. Ibid.

76. Ibid., 23.
77. U.S. Department of the Interior, Bureau of Reclamation, "Annual Project History, Vol. 1, 1952." Copy located in Library, Bureau of Reclamation, Newell, South Dakota.
78. "Definite Plan Report, Pactola Dam and Reservoir," 49.
79. U.S. Department of Agriculture, Soil Conservation Service, "Lower Rapid Creek Basin, Pennington County, South Dakota, Annual Report - 1992," by Ronald K. Siers, 23 October 1992; U.S. Department of the Interior, Bureau of Reclamation, "Rapid Valley Water Management Study," July 1990. Copies located in the Soil Conservation Service Office, Rapid City, South Dakota.
80. "Rapid Valley Water Management Study."
81. Ibid.
82. Ibid., 106-111.
83. Quoted from: U.S. Department of Agriculture, Soil Conservation Service, "Environmental Assessment for Lower Rapid Creek Water Quality Project, Pennington County, South Dakota," 27 August 1992 and "USDA Water Quality Hydrologic Unit Area, Lower Rapid Creek, Pennington County, South Dakota, Finding of No Significant Impact." Also see: U.S. Department of Agriculture, Soil Conservation Service, "Lower Rapid Creek Water Quality Project, Water Budget Analysis," May 1992, and U.S. Department of Agriculture, Soil Conservation Service, "USDA Agricultural Nonpoint Source Hydrologic Unit Area Proposal: Lower Rapid Creek Basin, Pennington County, South Dakota." Copies in Soil Conservation Service offices, Rapid City.
84. U.S. Department of Agriculture, Soil Conservation Service, "Preliminary Design Report, Hawthorne Ditch, Pennington County, South Dakota," May 1992. Copy in Soil Conservation Service Office, Rapid City, South Dakota.
85. "Memorandum of Agreement Submitted to the Advisory Council on Historic Preservation Pursuant to 36 CFR 800.6(a)," March 1992. Copy in Soil Conservation Service office, Rapid City, South Dakota.

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