# Irrigation Report & Oral History Project

# Grant-Kohrs Ranch National Historic Site
# Deer Lodge, Montana

By Hannah Braun, M.A.
Program Associate & Research Associate III
with
Dr. Janet Ore
Principal Investigator & Associate Professor of History


Public Lands History Center
Colorado State University
Fort Collins, Colorado

June 22, 2017

Prepared under a Rocky Mountain Cooperative Ecosystem Studies Units cooperative agreement
with Grant-Kohrs Ranch National Historic Site

## Executive Summary

The following report resulted from a 2013 Rocky Mountain Cooperative Ecosystem Studies Units agreement (No. H1200-09-004) between Grant-Kohrs Ranch National Historic Site and the Public Lands History Center at Colorado State University. Central to the park's mission to preserve and interpret the evolution of western cattle ranching is the use and control of water, a critical resource in the semi-arid West. For both park resource management and interpretation, staff determined it needed a comprehensive history of water rights, administration, and use at the ranch.

This document fulfilled the need in two ways. First and most important, it pieced together the history of irrigation at Grant-Kohrs Ranch from its origins in the mid-nineteenth century to the contemporary management under the National Park Service and the Superfund cleanup era. Both extensive primary and secondary research sources revealed the site's complex story of water rights, legal adjudications, changing water usages and technologies, property acquisitions, and disputes. Local and small-scale, the water company partners of Grant-Kohrs Ranch, especially the West Side Ditch Company and the Kohrs-Manning Ditch Company, proved more difficult to research. Oral histories with Deer Lodge irrigators associated with these entities gave crucial, and sometimes the only, information about ditch company water history and practices on the ranch. Thus, these portions of the report are subject to the vagaries of memory that characterize all such interview-based evidence. The local narrative of irrigation at Grant-Kohrs is the heart of the report. The Table of Contents and report subheadings direct readers needing site-specific irrigation history to the appropriate pages.

The second project goal was to place Grant-Kohrs's individual irrigation story within state and regional contexts. In this way, the ranch's history becomes a microcosm showing the

centrality of water to Western U.S. expansion. Accordingly, the report follows a chronological organization: Anglo settlement in mid-nineteenth-century Deer Lodge Valley tied to gold mining, transformation of open-range cattle grazing to established ranches, contraction of agriculture after the 1920s, area degradation from copper mining and smelting, National Park Service acquisition, and finally, federal environmental mitigation mandates. Water, both broadly in Montana and the West and specifically at Grant-Kohrs, provides the flow that joins the small, local story to that of the entire region. Presenting Grant-Kohrs's irrigation within a larger Western context can assist park interpretation.

The story of Grant-Kohrs Ranch irrigation illuminates how the West's environment shaped history and how water, as both a cultural and natural resource, helped create cultural landscapes. Grant-Kohrs Ranch operators attempted to harness water for their economic ends, in this case, primarily hay production. But nature continually thwarted their efforts at control; irrigators continually adjusted water systems in the face of droughts, floods, dam-building beavers, washouts, to name a few of the environment's obstacles. Water that flowed and merged proved a slippery resource to commodify with abstract claims, rights, and company shares. This led to an increasing centralization of legal water recognition as claimants brought cases to court and states mandated adjudication of streams and water sources. On the ground, irrigators developed technologies that evolved from those that more closely conformed to nature—subirrigation and flood irrigation—to more industrial, expensive, and efficient methods dependent on large-scale systems: pumps, hand-laid pipes, wheel lines, and center pivot sprinklers. Water broke down property boundaries, tying the ranch to Montana's powerful copper mining and smelting industry; pollutants washed down the Upper Clark Fork River, despoiling the agricultural land and necessitating federally-mandated cleanup. Most importantly,

throughout Grant-Kohrs's long history, the centrality of water to its ranching pursuits demanded interaction and cooperation with others--private individuals, water companies, and civic entities. By detailing irrigation at Grant-Kohrs Ranch National Historic Site, this report reveals how water impelled creation of a water community.

# Table of Contents

# Irrigation Report

## Introduction

Grant-Kohrs Ranch National Historic Site is a working ranch that interprets the history and culture of the range cattle industry in the late nineteenth and early twentieth centuries. The well-preserved ranch homestead and outbuildings are set in the midst of Deer Lodge Valley, Montana, with a spectacular mountain backdrop. Interpreting the nation's cattle industry at the National Park Service site involves not just maintaining a herd of livestock and growing hay for feed as the original owners did. It also involves preserving and maintaining a complex web of irrigation, drainage, and other water systems that have provided water for the people, animals, and crops of the ranch for 150 years. Johnny Grant, the ranch's first owner, dug the earliest irrigation system, and later owners, including Conrad Kohrs, John Bielenberg, and Conrad Warren, expanded, improved, and added to the system over the following decades.

Today, the National Park Service holds many original water rights along the Clark Fork River and its tributaries that flow through the ranch site. The agency continues to use the water to irrigate hayfields that preserve the ranch's historic landscape and to water livestock. Although owners dug many of the irrigation ditches on the site as private, individual systems, mutual enterprises between multiple water users manage one ditch running through Grant-Kohrs and one ditch that ends on the property. The park staff has had to work closely with other users of the Kohrs-Manning Ditch and the West Side Ditch on issues related to water use and priority, assessments, and ongoing maintenance.

An additional concern for park staff is ongoing cleanup along the Clark Fork River and other streams of toxic mine waste and tailings from over 130 years of mining and smelting operations upstream from Grant-Kohrs Ranch at Butte and Anaconda. The ranch is part of the

Clark Fork Operable Unit of the Environmental Protection Agency's Superfund site, which encompasses 160 miles of the river and the area around Anaconda. Mine waste and tailings have contaminated stretches of the Clark Fork River through Grant-Kohrs Ranch, posing a hazard for human and animal health, vegetation growth, and ecosystem balance.

The purpose of this report is to provide a narrative of irrigation and water use at Grant-Kohrs Ranch. It uses secondary, primary, and archival sources related to the ranch, the irrigation and the ranching industry in the West, and the history of irrigation and water use in Deer Lodge Valley and Grant-Kohrs Ranch. The report is a comprehensive study of irrigation history and practices at the ranch and will enable park staff to make informed interpretive and management decisions regarding water use at the site. A Rocky Mountain Cooperative Ecosystem Studies Units agreement between Grant-Kohrs Ranch National Historic Site and the Public Lands History Center at Colorado State University funded this project. Christine Ford, Integrated Resources Program Manager at Grant-Kohrs, served as the National Park Service contact, and Dr. Janet Ore acted as Principal Investigator for the Public Lands History Center. Research Assistant Janell Bcyzkowski conducted oral history interviews, archival research, and other documentation. Research Associate Hannah Braun compiled research and wrote the report. Janet Ore undertook the final editing and revisions in conjunction with park personnel. As part of the project, Bcyzkowski conducted six oral history interviews with water users along Kohrs-Manning Ditch and West Side Ditch. Since the recorded history of these two organizations is limited and users conduct much of their operations through tradition and cultural practice rather than written documentation, these interviews provide a valuable record of the history of irrigation and water use in Deer Lodge Valley. The audio recordings and transcripts are part of

the project deliverables. A summary of the oral histories follows the report narrative. At the end of this document is an annotated bibliography of primary and secondary sources consulted.

**History of Grant-Kohrs Ranch**

Although not as famous as the Texas cattle industry that expanded in the decades immediately following the Civil War, the Northern Rockies experienced its own open-range cattle boom starting in the 1850s. In the early 1840s, as the fur trade ended due to declining beaver populations, shifting economic drivers, and changes in popular fashion, many long-time trappers and traders in the Northern Rockies sought other employment. The subsequent rise of overland migration to the Pacific Coast and to Salt Lake City provided an opportunity for many of these men to serve as wagon train guides, operators of trading posts, and cattle traders. By the time overland migrants reached Wyoming and Idaho in the summers, their farm stock was worn out, lame, and gaunt. Traders purchased these exhausted animals for a relatively low price or in exchange for flour or other goods. The entrepreneurs took the animals north to sheltered mountain valleys to graze and recuperate for the rest of the year. The following summer, they drove them back to the overland trail where they sold the fresh, fattened animals to new migrants, exchanging one good animal for two worn ones.[1]

Widely recognized as the founders of Montana's cattle industry, the Grant family got its start by trading for emigrants' worn stock. A former factor of the Hudson's Bay Company at Fort Hall, Captain Richard Grant left the fur trade in search of new opportunities, and in the 1850s, he and his two sons, Johnny and James, began purchasing livestock with overland trail migrants

[1] Robert H. Fletcher, *Free Grass to Fences: The Montana Cattle Range Story* (New York: University Publishers Incorporated, 1960), 12-14; Jordan, *North American Cattle-Ranching Frontiers: Origins, Diffusion, and Differentiation* (Albuquerque: University of New Mexico Press, 1993), 299; Douglas C. McChristian, *Ranchers to Rangers: An Administrative History of Grant-Kohrs Ranch National Historic Site* (Rocky Mountain Cluster, National Park Service, July 1997), https://www.nps.gov/grko/learn/management/upload/Administrative-History-full-version.pdf, Introduction; Anna Fay Rosenberg, *Hard Winter Endurance: Conrad Kohrs' Cattle Raising Operation, 1887-1900* (Bozeman: University of Montana, 1996, Master of Arts in History thesis), 4-5; Hon. Conrad Kohrs, "A Veteran's Experience in the Western Cattle Trade," *The Breeder's Gazette* (December 18, 1912): 1329.

between Fort Bridger, Wyoming, and Salt Lake City, Utah. The Grants herded the worn out animals to winter pastures in southwestern Montana's Beaverhead and Deer Lodge Valleys, lush with native grasses and protected from Indians and the worst of the winter blizzards. In 1859, Johnny Grant decided to establish a permanent base of operations in Deer Lodge Valley and built a home at the confluence of Little Blackfoot Creek and the Clark Fork River. The following year, he encouraged other former trappers and traders to settle nearby, and about a dozen families homesteaded at the confluence of Cottonwood Creek and Clark Fork River. There, they established a vibrant metis community, a pluralistic cultural milieu of French Canadian, Anglo, American Indian, and mixed-race peoples. They called their community Cottonwood, but renamed it Deer Lodge City in 1864. Many of the valley's first settlers established ranches with former overland emigrant stock, mostly English breeds and Shorthorns. In 1861, Johnny Grant relocated closer to the town, and the next year, he built a large, two-story home just north of Deer Lodge and moved his large, mixed-race family into it. He began to cultivate hay for his cattle and irrigate his fields and pastures with water from the Clark Fork River and other streams and springs. This laid the groundwork for an extensive irrigation system that later owners improved and expanded and which the National Park Service still uses 150 years later.[2]

[2] McChristian, *Ranchers to Rangers*, Introduction; Fletcher, *Free Grass to Fences*, 12-14; Rosenberg, *Hard Winter Endurance*, 4-5; John Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study, Cultural Resources Statement, and Historic Structure Report* (Denver: Denver Service Center, Historic Preservation Division, National Park Service, U.S. Dept. of the Interior, October 1979), accessed April 11, 2016, https://www.nps.gov/parkhistory/online_books/grko/hrs/index.htm, Chapter 1, Section A; John Milner Associates, Inc., *Grant-Kohrs Ranch National Historic Site, Deer Lodge, Montana: Cultural Landscape Report, Part One, Landscape History, Existing Conditions, and Analysis and Evaluation* (Deer Lodge, MT: National Park Service, Grant-Kohrs Ranch National Historic Site, 2004), pp. 2-17, 2-18, 2-21, 2-23, 2-24, 2-27; State Engineer's Office, *Water Resources Survey: Powell County, Montana, Part I: History of Land and Water Use on Irrigated Areas, Part II: Maps Showing Irrigated Areas in Colors Designating the Sources of Supply* (Helena, MT: State Engineer's Office, 1959), 12; For Grant's metis community, see Avana Andrade, "Thomas Stuart Homestead: Historic Context Report Grant-Kohrs Ranch National Historic Site" (Fort Collins, CO: Colorado State University Public Lands History Center, 2012).

In the 1860s, discovery of gold in Idaho and Montana brought many more people to the Northern Rockies, and area residents began establishing cattle raising operations to feed hungry miners.[3] One of the men who melded mining and cattle raising and emerged as one of the nation's most prominent cattlemen was Conrad Kohrs, a German immigrant from Danish-occupied Holstein Province. On his way to the Idaho mines but needing money and supplies, in 1862, Kohrs stopped in the Deer Lodge Valley. Intending to make only a short stay in the Deer Lodge Valley, Kohrs met Hank Crawford who needed help in his butcher shop. The short stay turned into a lifetime as Kohrs later took over Crawford's business and transformed it into a profitable, expanding operation with butcher shops in mining towns across western Montana.[4]

To ensure control over the meat supply and increase his profits, Conrad Kohrs began raising his own cattle. In 1864, Kohrs bought his first herd of 400 head of cattle and a few horses and wintered them at the Race Track Ranch south of Deer Lodge. In 1865, he purchased the ranch, stocked it with additional animals, and made it the basis of a cattle-raising business to supply his butcher shops.[5] Kohrs knew all the settlers in the Deer Lodge Valley and recognized that Johnny Grant's ranch was in a particularly favorable location near town with excellent access to water and hay meadows. In August 1866, Kohrs bought Grant's ranch for $19,200, which included the ranch house, equipment, corrals, haystacks, and 350 Shorthorn cattle.[6] The next month, Kohrs paid $1,000 for the 160-acre Louis Demers Ranch near Dempsey Creek on

---

[3] Jordan, *North American Cattle-Ranching Frontiers*, 299.

[4] Rosenberg, *Hard Winter Endurance*, 8-12; Fletcher, *Free Grass to Fences*, 20-22; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study,* Chapter 1, Section B; McChristian, *Ranchers to Rangers*, Introduction.

[5] Rosenberg, *Hard Winter Endurance*, 11-13; Fletcher, *Free Grass to Fences*, 22; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 1, Section B; McChristian, *Ranchers to Rangers*, Introduction.

[6] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 1, Section B; McChristian, *Ranchers to Rangers*, Introduction; Rosenberg, *Hard Winter Endurance*, 13-14; Fletcher, *Free Grass to Fences*, 22; Kohrs, "Veteran's Experience," 1328; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-31.

the west side of the Clark Fork River. Kohrs then owned most of the valley's cattle as well as three ranches, which he combined into one operation.[7] In 1867, he adopted his trademark CK brand for his cattle.[8] Kohrs secured himself economically through vertical integration of the entire meat chain from supply to processing to marketing. He diversified his enterprises by investing in mining, butcher shops, and cattle raising and selling. He was one of Montana's largest cattlemen and the largest purveyor of meat in western Montana.[9] As Kohrs developed his operation, he depended on his half-brother, John Bielenberg, to help him manage it. Kohrs made cattle, land, and mining deals and traveled extensively, while Bielenberg oversaw the ranch's daily operations.[10] Kohrs was one of a number of area ranchers to raise beef for the mining camps. By the 1870s, southwestern Montana soon had 45% of the state's cattle with 75,000 head in Deer Lodge County alone.[11]

By the 1870s and 1880s, ranchers let their huge herds graze over vast swaths of open, federal land in Montana's eastern plains. They drove or shipped the fattened stock to eastern markets each fall, restocking their herds with fresh animals for the next season.[12] Initially, Montana ranchers like Conrad Kohrs herded their stock across the open range over the course of several months, eventually arriving at rail termini in the Nebraska. Expanding railroad lines in the 1880s enabled ranchers to get their cattle to markets like Chicago more easily. The Northern Pacific Railroad reached Miles City on Montana's eastern plains in 1881 and completed its transcontinental line in 1883. In 1879, the Utah Northern Railroad laid track through Deer Lodge. Northern Pacific bought the line in 1888 and operated it until Burlington Northern

[7] Rosenberg, *Hard Winter Endurance*, 13-14; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 1, Section B.

[8] Kohrs, "Veteran's Experience," 1329; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Section A.

[9] Rosenberg, *Hard Winter Endurance*, 16-17; McChristian, *Ranchers to Rangers*, Introduction.

[10] McChristian, *Ranchers to Rangers*, Introduction.

[11] Jordan, *North American Cattle-Ranching Frontiers*, 300.

[12] Fletcher, *Free Grass to Fences*, 29.

purchased it. The tracks crossed Conrad Kohrs' land, giving him and other valley ranchers a direct rail shipping point for their cattle.[13] The Chicago, Milwaukee, St. Paul, and Pacific Railroad completed its line through Deer Lodge and the Grant-Kohrs Ranch in 1908; a year later, it connected Chicago to Seattle until its bankruptcy in 1982.[14] As Montana ranchers made the switch from trading to raising cattle, they often improved the grade and bloodlines of their stock, buying Shorthorn farm cattle from Oregon or blooded stock from the East and Midwest. These animals were hardier and better adapted to Montana's harsh climate than Texas longhorns, although some ranchers did purchase Texas stock.[15] Conrad Kohrs and John Bielenberg owned mixed herds of purebred Shorthorn and Hereford cattle that they bought from the East. They also purchased and bred thoroughbred horses for racing and Clydesdales for draft labor.[16]

Prior to 1886, Conrad Kohrs practiced two kinds of cattle ranching prior. On his home ranch in the Deer Lodge Valley, he kept herds of purebred and blooded Shorthorn cattle that he used for raising and for stocking his butcher shops. He grew hay in meadows along the Clark Fork River and other streams, and grazed his animals in fenced pastures most of the year, and gave them hay through the winter. Initially, he fed his beef on native grasses, but by the 1870s, he supplemented this with cultivated hay crops like timothy and clover irrigated from ditches that diverted water from mountain streams.[17] In 1869, concerned about the dwindling grass in Deer Lodge Valley, Kohrs grazed 1,000 head of cattle into Montana's Sun River region and then

---

[13] Fletcher, *Free Grass to Fences*, 30, 47; Kohrs, "Veteran's Experience," 1329; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Section D; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-26; State Engineer's Office, *Water Resources Survey: Powell County*, 13.

[14] Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement,* Chapter 2; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-48, 3-9; State Engineer's Office, *Water Resources Survey: Powell County*, 13.

[15] Fletcher, *Free Grass to Fences*, 38-40; Jordan, *North American Cattle-Ranching Frontiers*, 237-238; Kohrs, "Veteran's Experience," 1329.

[16] Fletcher, *Free Grass to Fences*, 57; Rosenberg, *Hard Winter Endurance*, 15, 48-51; Kohrs, "Veteran's Experience," 1328-1329; McChristian, *Ranchers to Rangers*, Introduction.

[17] Rosenberg, *Hard Winter Endurance*, 22-23, 34-36; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Section A; McChristian, *Ranchers to Rangers*, Introduction; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-23, 2-33, 2-40.

trailed them through Montana, Idaho, Utah, and Wyoming until reaching North Platte, Nebraska in 1870 and shipping the animals to Chicago. This marked the beginning of Kohrs' open range operation, as each year he drove his stock from distant ranges to the nearest railroad terminus and thence to the Chicago stockyards.[18] In 1883, with co-owners Samuel Hauser and Granville Stuart, Kohrs purchased the Andrew and Erwin Davis interest in the huge DHS open range ranch in Montana's Judith Mountains.[19] By the mid-1880s, Kohrs had large herds of his own cattle on ten million acres of open range in northern and eastern Montana and throughout Utah, Idaho, Wyoming, Colorado, and the Canadian province of Alberta.[20] Kohrs added small parcels to the home ranch, but it stayed relatively small since he grazed most of his herds on public land. It was not until the 1890s as homesteaders claimed land on the open range that Kohrs began to purchase larger parcels in Deer Lodge Valley.[21]

Open range cattle ranching expanded so rapidly across the Plains in the 1870s and 1880s that it was only a matter of time before a major environmental catastrophe forced a reorganization of the industry. Prior to the winter of 1886-1887, ranchers assumed the market would continue to expand indefinitely. Some people worried about overstocking and overgrazing, but others grew excited by the inflated numbers of cattle and acreage. Few people really believed the system would crash.[22] However, cattle sold in the fall of 1886 were poor in quality due to drought, scarcity of grass, and overstocking. Then disaster struck. An unusually

---

[18] Rosenberg, *Hard Winter Endurance*, 17-20, 22-23; Kohrs, "Veteran's Experience," 1329; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Sections A and D; McChristian, *Ranchers to Rangers*, Introduction.

[19] Rosenberg, *Hard Winter Endurance*, 20; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Sections A and D.

[20] Rosenberg, *Hard Winter Endurance*, 8, 21; Kohrs, "Veteran's Experience," 1329; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Sections A and D; McChristian, *Ranchers to Rangers*, Introduction; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 1-1, 2-23.

[21] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Section C; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 1-1.

[22] Fletcher, *Free Grass to Fences*, 54-55.

severe winter brought harsh storms with heavy snow and frigid temperatures that decimated thousands of the already famished cattle across the Northern Plains.[23] That winter saw losses of between 60% and 90% of the Plains cattle herds and effectively ended the open range cattle industry.[24] Montana ranchers estimated losses on the open ranges of between 30% and 50% of original herd size. The devastation in western Montana was much lower than in the eastern part of the state with less than 10% loss in most areas and 8% losses in the Beaverhead and Deer Lodge Valleys. At the time, Conrad Kohrs had cattle grazing all over Canada, Montana, Idaho, and Wyoming, and his open range operation was hit the hardest with the deaths of possibly as much as two-thirds of his CK brand cattle. In Deer Lodge Valley where he kept most of his purebred stock, his losses were much lower since the valley was sheltered from the worst of the storms.[25]

The bad winter of 1886-1887 led to a shift in the mindset of Northern Plains cattlemen. Ruined, ranchers left the industry, and those who remained took a more cautious approach to cattle raising. Many cattlemen began reducing herd size, upgrading stock quality through purchase and breeding, buying land to augment their use of the open range, and cultivating hay for winter feed. Those who remained fed and finished their stock on site rather than shipping them east to the stockyards for finish and processing.[26] Conrad Kohrs' early success in the cattle industry had rested on his practice of feeding his purebred stock on hay over the winter. After the winter of 1886-1887, he abandoned most of his open range operation and returned his attention to his stock in the valley where he increased his hay farming operations by purchasing additional

[23] Fletcher, *Free Grass to Fences*, 87-88.
[24] Jordan, *North American Cattle-Ranching Frontiers*, 237-238.
[25] Fletcher, *Free Grass to Fences*, 89-90; Rosenberg, *Hard Winter Endurance*, 22-23, 31-32; McChristian, *Ranchers to Rangers*, Introduction.
[26] Fletcher, *Free Grass to Fences*, 117-118; Jordan, *North American Cattle-Ranching Frontiers*, 238; Kohrs, "Veteran's Experience," 1399; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 4; McChristian, *Ranchers to Rangers*, Introduction.

land for hay fields and pasture. Kohrs also bought more stock including purebred steers from Idaho and heifers from Texas, which he bred with his purebred bulls to produce high-grade calves.[27]

Conrad Kohrs engaged in what folklorist Terry G. Jordan calls the Midwestern practice of cattle ranching that differed from the Texas style of open range operations that resulted in the catastrophic winter of 1886-1887. Midwestern-style ranchers close tended their stock and provided native grasses or cultivated hay for winter feed, the key to successful stockgrowing in places like Deer Lodge Valley. Cattle needed feeding for three to five months each winter, and each animal could consume as much as a ton or more of hay. Winter feeding reduced cattle die-offs in severe winters, proving that the Midwestern model was better suited to the Plains than the Texan model. Early ranches lay close to poorly drained natural meadows. The spring thaw caused small snow-fed streams to spread out over these meadows, providing good hay in the form of native wild grasses and sedges. In the 1870s and 1880s, ranchers began cultivating grass varieties such as timothy, clover, and alfalfa. They also began augmenting natural floodplains by building irrigation dams and ditches to spread snowmelt from the creeks over a wider area for hay cultivation. Ranchers practiced seasonal pasturing, shifting from low streamside pastures in the winter to mountain pastures in the summer. These agriculturists displayed a greater emphasis on cattle bloodlines, importing animals from the Ohio River Valley and even Britain, and they chose mixed herds of Herefords and Shorthorn varieties rather than Texas longhorns.[28]

From the 1890s until the 1910s, Conrad Kohrs continued to expand his cattle ranching operations in Deer Lodge Valley. In 1890, he built a two-story brick addition to the ranch house and installed running water in the residence via a hydraulic ram that used a spring and Kohrs-

[27] Rosenberg, *Hard Winter Endurance*, 22-23, 45-46; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 4; McChristian, *Ranchers to Rangers*, Introduction.

[28] Jordan, *North American Cattle-Ranching Frontiers*, 272-274, 302.

Manning Ditch. Between 1890 and 1900, Kohrs and Bielenberg added over 19,000 acres to the home ranch, giving them more grazing pastures and hay fields and access to new water sources for irrigation.[29] Between 1888 and 1913, the ranch shipped between 8,000 and 10,000 head of cattle to Chicago each year.[30] Kohrs and his wife Augusta moved to Helena, Montana in 1899, but he continued to direct ranch operations with Bielenberg who remained in Deer Lodge.[31]

With no surviving male heir to take over the ranch, after the turn of the century, Kohrs began consolidating and incorporating his holdings. In 1907, Kohrs and Bielenberg formed the consolidated Kohrs mining properties under the Rock Creek Ditch and Mining Company. The following year, Kohrs and his wife formed the Kohrs and Bielenberg Land and Livestock Company to which they sold the home ranch along with 22,307 acres of land for $200,000. With leased lands in the valley included, in 1908, the size of the ranch peaked at 26,787 acres.[32] In 1915, Kohrs and Bielenberg began liquidating their land holdings and leased the upper ranch. Between 1919 and 1922, ranchers Charles H. Williams and Peter Pauly purchased twelve sections of land east of the ranch house for $100,000 and then an additional 12,000 acres along with the Rock Creek Ditch and Mining Company's water rights for $50,000. After Conrad Kohrs died in 1920 and John Bielenberg in 1922, the remaining 1,000 acres went into caretaker status. In 1930, the charter of the Kohrs and Bielenberg Land and Livestock Company expired and the Conrad Kohrs Company took over the real estate, mining property, and water rights.[33]

---

[29] Rosenberg, *Hard Winter Endurance*, 47-48, 59; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-46.

[30] Rosenberg, *Hard Winter Endurance*, 62.

[31] Rosenberg, *Hard Winter Endurance*, 68-69; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 4.

[32] Rosenberg, *Hard Winter Endurance*, 68-69; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 5; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 1-1.

[33] Rosenberg, *Hard Winter Endurance*, 69; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 5 and Chapter 5, Section B; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-50.

Environmental and economic hardship plagued Montana ranchers in the 1920s and 1930s as the Conrad Kohrs' cattle empire ended. Severe drought dominated the region from 1918 throughout the 1920s and necessitated the careful stewardship of irrigated hay production used by many ranchers to keep their stock well fed. The Great Depression's economic collapse exacerbated the ongoing drought. Ranchers faced depressed prices for their stock and struggled to feed their animals on the overstocked and abused ranges. Many took advantage of New Deal programs that provided subsides to exterminate starving stock or utilized soil conservation and rangeland improvement programs to address erosion, desertification, and other environmental problems. However, in general, Montana ranchers were leery of New Deal programs, particularly irrigation projects that purported to reclaim the dry, arid land. They worried that the steep price of federal water would cut too deeply into any profits gained from irrigated cropland.[34]

Despite these hardships, in the 1930s, the old Kohrs cattle empire transformed into a new, smaller-scale cattle raising and breeding operation under the able hands of Conrad Kohrs Warren, grandson of Kohrs. Conrad Warren grew up working summers on the ranch, and in 1930 moved there permanently as a hired hand. In 1932, when the ranch's caretaker retired, Warren convinced the Conrad Kohrs Company to make him the new manager. Since its existing size was too small to support a sustainable operation, Warren persuaded the trust to purchase more land to run the ranch more efficiently. Warren went into the Hereford-raising and breeding business and by 1933 grew the ranch's small herd into 150 purebred Herefords. He also bred Shorthorn cattle and Belgian draft horses and kept a few dairy cows. In the 1930s, Warren began artificial

[34] Fletcher, *Free Grass to Fences*, 149, 169-170; Charles Morrow Wilson, "6000 Acres and a Microscope," *Scribner's Magazine* (September 1937): 69,

insemination of his Belgian horses, one of the largest herds in the nation, and he was likely the first rancher in the nation, or at least Montana, to use the process.[35]

Warren soon became a leader in livestock breeding and raising, and he was agile in making necessary adjustments to his operations to ensure efficiency, productivity, and profits. Well known for the quality of his stock, he practiced scientific cattle management and conducted feed experiments to judge cost and efficiency using different methods.[36] He built numerous structures and outbuildings during his tenure at the ranch, including a small cottage in 1934 on land east of the railroad tracks.[37] By 1937, Warren managed 6,200 acres of land, growing crops on 500 acres and leaving the rest as pasture. On irrigated fields, he grew timothy, clover, alfalfa, and native hay for his horses and cattle. He devoted a few acres to grains like barley, oats, and wheat.[38] During the late 1930s, Warren supported the Conrad Kohrs Company in acquiring land to the west that included access to the West Side Ditch and shares in its water rights, which he used to expand his irrigated hay fields and pastures.[39] In 1940, Warren bought the ranch from the Conrad Kohrs Company and purchased the old "upper ranch" formerly owned by Kohrs and Bielenberg. That same year, he sold his Belgian horses, since increasing mechanization of farm and ranch equipment had made draft horses virtually obsolete. In an effort to consolidate his operations, Warren sold off the "upper ranch" south of Deer Lodge in 1945. His ranch then became the Warren Hereford Ranch but still carried Kohrs' CK brand. Warren focused on raising and breeding purebred cattle, which he sold at auctions at the ranch and across the

[35] Rosenberg, *Hard Winter Endurance*, 69-70; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 5, Section B and Chapter 6; McChristian, *Ranchers to Rangers*, Introduction and Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-59, 2-60.

[36] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-73.

[37] Rosenberg, *Hard Winter Endurance*, 70; McChristian, *Ranchers to Rangers*, Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-60.

[38] Wilson, "6000 Acres and a Microscope," 44-46; McChristian, *Ranchers to Rangers*, Chapter 1.

[39] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-62.

Northern Rockies.[40] In 1954, Warren built a new barn east of the railroad tracks near his home, and this area, rather than the historic home ranch site, became his new base of operations. The historic buildings fell into decay, used mostly for storage.[41] In 1958, Warren sold his registered Herefords after discovering that the bloodline had genetic dwarfism. He switched to raising commercial Hereford feeder cattle, maintaining a herd of 350 animals that he sold to stockyards. In 1963, he sold the feeder cattle and started raising and selling yearlings, then in 1966 switched to feeding and marketing cows and calves. Warren was adept at reading the economic outlook, choosing to go into niche markets when he realized that small operations like his could not compete with corporately owned large-scale feedlots.[42]

**Creation of Grant-Kohrs Ranch National Historic Site**

Meanwhile, the National Park Service developed an interest in the ranch and began a process of survey and negotiation that resulted in establishment of the Grant-Kohrs and Warren Hereford Ranch property as a national historic site. In 1957, the Department of the Interior's Survey of Historic Sites and Buildings, a program to identify and evaluate nationally significant properties for designation as National Historic Landmarks, began a survey of sites associated with the cattle ranching industry. A report issued in 1959 listed twenty-seven sites, six of which had exceptional significance including the Grant-Kohrs Ranch.[43] The Secretary of the Interior designated the ranch as a National Historic Landmark on December 19, 1960 and in 1972, put it

[40] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 6, Section B; McChristian, *Ranchers to Rangers*, Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-72.

[41] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 6, Section B; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-75.

[42] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-76, 2-82, 2-83; McChristian, *Ranchers to Rangers*, Chapter 1.

[43] McChristian, *Ranchers to Rangers*, Introduction and Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-82.

on the National Register of Historic Places.[44] By the 1960s, knowing that neither of his children would take over the ranch, Conrad Warren began thinking about how to preserve his legacy. His wife, Nell, suggested that he talk to the National Park Service, given the publicity generated through the historic site survey and National Historic Landmark designation. In 1970, Warren submitted a proposal to the National Park Service to sell thirty-five acres, the historic home ranch buildings, and ten acres east of the railroad tracks for visitor parking and access with easements placed on adjacent lands for $311,000. The parties would negotiate a separate contract for the antique furnishings and ranch equipment based on their appraised value. Settled later that year, the final agreement included 130 acres for $250,000, plus 1,180 acres of scenic easement.[45] On August 25, 1972, President Richard Nixon signed the legislation designating Grant-Kohrs Ranch National Historic Site.[46] The National Park Service held the official dedication ceremony on July 16, 1977, and Grant-Kohrs Ranch National Historic Site officially opened to the public.[47]

When the National Park Service acquired Grant-Kohrs Ranch, it did so with the intent to manage the site as a large-scale living history museum and working ranch.[48] At the time, it was the only historic site set aside by Congress for the explicit purpose of interpreting the nation's frontier cattle industry. Unique for its size, completeness, and integrity, the site included sixty-one historic buildings and twenty-seven historic structures dating from 1860 to 1960. Unusually

---

[44] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 1-2, 1-3, 2-87; Kathy Allen, et al., *Grant-Kohrs Ranch National Historic Site: Natural Resource Condition Assessment, Natural Resource Report NPS/GRKO/NRR—2015/1071*, prepared by GeoSpatial Services, Saint Mary's University of Minnesota, Winona, Minnesota, for U.S. Dept. of the Interior, National Park Service (Fort Collins, CO: U.S. Dept. of the Interior, National Park Service, Natural Resource Stewardship and Science, 2015), 5. Researchers completed a revised National Historic Landmark boundary study in 2002 and updated the site's National Register documentation in 2003 as the Grant-Kohrs Ranch/Warren Ranch historic district.

[45] McChristian, *Ranchers to Rangers,* Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-83; Kathy Allen, et al., *Natural Resource Condition Assessment*, 5.

[46] McChristian, *Ranchers to Rangers,* Chapter 1; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-87.

[47] McChristian, *Ranchers to Rangers,* Chapter 6; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-89.

[48] McChristian, *Ranchers to Rangers,* Chapter 2 and Chapter 3; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 1-3, 1-4, 2-83.

intact, the ranch house featured original furniture and domestic objects, and ranch equipment, vehicles, and tack filled the barns and outbuildings. In time, the park amassed a museum collection of 29,000 items and ranch archives dating from the 1860s to 1980s.[49]

Over the years, the National Park Service acquired additional acreage from Conrad Warren, ultimately obtaining the entire Warren Hereford Ranch and scenic easements on land surrounding park holdings. Warren retired from active ranching in 1982, selling his remaining stock and equipment and leasing easement lands on the West Side to other ranchers who installed irrigation systems and plowed up the meadows to plant potatoes. This disrupted the traditional scenic view of early ranching practices that the National Park Service had sought to create with the easement lands. Consequently, in 1988, the National Park Service completed an agreement with Warren to purchase the rest of his land including the parcels leased to local ranchers. This resulted in an addition of 1,059.85 acres to the historic site, along with thirty-four structures and the Warren Hereford Ranch property. As part of the agreement, Warren received a life estate to his residence and outbuildings on an acre of land. When Conrad Warren died in March 1993, the National Park Service took over the life estate property.[50] In 1989, the park instituted a program to lease some of its agricultural lands to neighboring ranchers for hay production and cattle grazing. The annual lease payments allowed the National Park Service to help fund maintenance of the irrigation systems and address other land management needs.[51] Today, Grant-Kohrs Ranch National Historic Site spans 1,618 acres. The National Park Service

---

[49] McChristian, *Ranchers to Rangers,* Chapter 6; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan* ([s.l.]: U.S. Department of the Interior, National Park Service, 1980), 10; U.S. Department of the Interior, National Park Service, *Statement for Management: Grant-Kohrs Ranch National Historic Site* ([Denver?]: Rocky Mountain Region, National Park Service, 1990), 9; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 1-3, 2-87; Kathy Allen, et al., *Natural Resource Condition Assessment*, 5.

[50] McChristian, *Ranchers to Rangers,* Chapter 3; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-87, 2-91, 2-99, 2-103; Kathy Allen, et al., *Natural Resource Condition Assessment*, 5.

[51] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-99, 2-100.

owns 1,326 acres and has scenic easements on 165 acres owned by neighboring landowners. The City of Deer Lodge owns seventy acres for its sewage treatment ponds in the northern portion of the site, and the Burlington Northern Railroad owns fifty-seven acres of right of way.[52]

The National Park Service continued to operate the ranch much like Johnny Grant, Conrad Kohrs, and Conrad Warren had. In 1975, the park hired Pete Cartwright, a friend of Conrad Warren, to manage the daily operations of a working ranch in cooperation with the site superintendent. He oversaw the Belgian horses and established a small cattle-breeding program with Herefords, Shorthorns, and longhorns. In the late 1970s, the National Park Service began contracting out the cultivation, harvesting, and baling of its hay on a share basis with the park retaining enough hay to feed its stock. Recently, the park has made efforts to reflect the mixed-bred cattle of the Kohrs and Bielenberg era rather than the pure Herefords of the Warren era.[53] Grant-Kohrs has Hereford, English Shorthorn, Longhorn, and Angus cattle, saddle horses, Percheron and Belgian draft horses, and chickens.[54] The park staff cultivates and harvests hay and alfalfa on the irrigated fields. The park livestock graze the pastureland and meadows on a field rotation. After the July or August harvest, rangers move cattle to the hay meadows where they remain until time for winter feeding.[55] As much as possible, the National Park Service practices hay cultivation and grazing operations on the same fields that Kohrs and Warren historically used for those purposes, and it irrigates historically watered fields.[56] Since the site is a working cattle ranch, the National Park Service must constantly balance cattle and agriculture operations with visitor use and interpretation and practice careful resource management while

---

[52] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 1-11; Kathy Allen, et al., *Natural Resource Condition Assessment*, 6.

[53] McChristian, *Ranchers to Rangers,* Chapter 6; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-89, 2-91.

[54] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-7, 3-8; Kathy Allen, et al., *Natural Resource Condition Assessment*, 5-6.

[55] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-102, 3-8, 3-5-5, 3-6-3.

[56] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 4-24, 4-25.

also maintaining historic structures and landscape features integral to ranch operations, including ditches, head gates, and hayfields.[57]

**Irrigation in the West and Montana**

The history of irrigation and water use in Montana and the Deer Lodge Valley necessitates a broad overview of irrigation in the nineteenth- and twentieth-century West. Many of the trends in western water use affected development in southwestern Montana. The state generally still follows old modes of water use rather than more recent efforts to increase efficiency and centralization in water resource management.

In the United States, people have applied two different doctrines or methods of water use. In the humid East with its numerous rivers and streams, water users have long practiced the riparian doctrine. Under this method, only landowners located along a river or stream have the right to use the water, and they cannot alter its course, store it, divert it to another location, or reduce its flow. They must also share the water with other users along the stream. However, this system was not as functional in the arid West where land was abundant but water sources scarce, few people owned land along streams, and the flow of most streams was insufficient to provide all users with adequate water. Starting with miners in California and Colorado, early western water users began to practice a new type of water use, that of prior appropriation, or "first in time, first in right." Under prior appropriation, the first person to claim water could exploit it and use it, no matter how far he lived from the water source or how he diverted it to where he wanted to use it. The only stipulation was that users had to put the water to "beneficial use," a relatively flexible and fluid term. Prior appropriation enabled exploitation and development of waterways,

[57] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 1-4.

treating them as a natural resource to be used, manipulated, transformed, and consumed.[58] Some western states, like Colorado, Wyoming, Nevada, Idaho, Utah, Arizona, and New Mexico, exclusively practiced prior appropriation by the 1870s. Other states, like California, Montana, the Dakotas, Oregon, Washington, Oklahoma, Kansas, Nebraska, and Texas, used a combination of both prior appropriation and riparian rights.[59]

Prior to whites arriving in the West, many western residents practiced local, communal forms of water use systems. Thousands of years ago, Native peoples, particularly the farmers of the arid Southwest, were the first to undertake irrigation in North America. The Spanish also employed irrigation in the Southwest, constructing the first acequias, community-operated irrigation ditches, around 1800. People could buy and sell rights to water with the land, but this gave merely a right of use rather than a right to the water itself or to a specific amount. This meant that in dry years, everyone suffered and in good years, everyone prospered.[60]

White settlers implemented their own methods of water use in the western environment. Beginning in 1847, Mormon settlers in Utah created an extensive and profitable irrigated landscape. Their success was due to their emphasis on hierarchies and group discipline and on communal ownership overseen by the church, rather than individual ownership. In 1870, the Union Colony at Greeley, Colorado, utilized agricultural irrigation under a communal model along the Cache la Poudre River. In its early years, the community struggled as the costs of irrigating proved much higher than the founders had anticipated, but the town survives today and continues to use many of its original water diversion structures. The Greeley experiment was

---

[58] Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Pantheon Books, 1985), 88-89; Stanley W. Howard, *Green Fields of Montana: A Brief History of Irrigation* (Manhattan, KS: Sunflower University Press, 1992), 118-119; Donald J. Pisani, *To Reclaim a Divided West: Water, Law and Public Policy, 1848-1902* (Albuquerque: University of New Mexico Press, 1992), 31; Mark Fiege, *Irrigated Eden: The Making of an Agricultural Landscape in the American West* (Seattle: University of Washington Press, 1999), 87.

[59] Pisani, *To Reclaim a Divided West*, 35.

[60] Worster, *Rivers of Empire*, 32-35, 74-75; Pisani, *To Reclaim a Divided West*, 39.

most noteworthy in the way it led Colorado and other states toward assessing the way irrigation worked and reshaping of prior appropriation as the basis of water rights.[61] Prior appropriation sounded good in principle, but it did not always work effectively. In an effort to control as much water as they could, many users claimed enormous amounts, far more than they needed and in some cases even more than flowed in a stream. Many early users never bothered to record water claims, assuming always-abundant water. Even after states established an official system for recording water claims, appropriators often included vague dates, locations, and amounts or left these details out entirely.[62] Colorado was one of the first western states to realize the problems with prior appropriation when users in Greeley began complaining that newer users upstream on the Cache la Poudre River took more than their fair share and deprived the first appropriators of their allotted amount. In 1879, Colorado passed a law that divided the state into five water divisions based on watershed basins, each managed by a commissioner who established a clear record of prior appropriation and apportioned water among users. In 1881, the state passed another law to create a state engineer's office to oversee water claims. Other states quickly adopted Colorado's method of state control and adjudication of water rights, including Wyoming, which appointed a state engineer and required the recording of water rights in one central, state-run office.[63]

Across the West, early water users formed communal, local, and regional entities to allocate water and pay for the costs of building ditches and other conveyance systems. Many groups, like the Mormons or utopian societies like Greeley's Union Colony, formed irrigation colonies, using communal effort to create an irrigation system that divided expenses equitably

[61] Worster, *Rivers of Empire*, 76-78, 83-84, 87; Pisani, *To Reclaim a Divided West*, 47-48, 77-82.
[62] Fiege, *Irrigated Eden*, 88-89.
[63] Worster, *Rivers of Empire*, 94-95; Pisani, *To Reclaim a Divided West*, 56-57; Robert G. Dunbar, "The Search for a Stable Water Right in Montana," *Agricultural History* 28, no. 4 (October 1954): 144.

and benefited all settlers.[64] Other settlers formed mutual ditch companies to provide water democratically and efficiently to a large number of users by selling water shares to finance construction. However, sometimes mutual companies could not raise enough money for expensive, large-scale projects. Consequently, some settlers formed irrigation districts, which could issue bonds to help pay for infrastructure. Private and corporate irrigation grew in the 1880s and early 1890s, but they struggled against economic vagaries, nature's fickleness, and the huge expense of infrastructure and its regular maintenance.[65]

By the 1880s and 1890s, people began to realize that large-scale water management and irrigation systems were necessary to conquer the problem of Western aridity. In 1877, Congress passed the Desert Land Act that allowed settlers to acquire up to 640 acres of arid land in the West for $1.25 per acre if they improved and irrigated it. Many ranchers simply claimed the land, fenced it for pasture, and then most never proved up and stayed on the land until the government evicted them. Some ditch companies filed to irrigate land under the act and even began building ditches, but few companies ever completed construction and delivered water. The act did help stimulate the growth of private water companies, but it failed to address the fundamental issue of aridity.[66] In 1878, John Wesley Powell of the U.S. Geological Survey published *Report on the Lands of the Arid Region of the United States*, arguing that much of the West was too arid to support farming and that many areas required irrigation. He recommended clustering future settlement around irrigable regions and making maximum use of the West's waterways.[67] Discussion about aridity increased when drought in the 1890s followed the severe

[64] Pisani, *To Reclaim a Divided West*, 77-82.
[65] Pisani, *To Reclaim a Divided West*, 101-102, 104-108.
[66] Pisani, *To Reclaim a Divided West*, 88-90; PBS&J, *Irrigation in Montana: A Preliminary Inventory of Infrastructure Condition*, prepared for Montana DNRC, Conservation & Resource Development Division, Helena, Montana (Missoula, MT: PBS&J, January 2009), 4.
[67] Worster, *Rivers of Empire*, 133-134.

winter of 1886-1887. Ranchers across the Northern Plains growing irrigated hay for their cattle joined farmers in pushing for large irrigation projects to meet the demand for water.[68] However, they lacked the private capital to build large-scale, successful irrigation projects and infrastructure. The economic depression of 1893 further weakened settlers' access to capital, and they were unwilling to take on the huge financial investment that large-scale irrigation projects entailed.[69] Even states were helpless to address the issue since the federal government owned 84% of the land in nine arid states, leaving the state governments with too small a tax base to implement their own irrigation projects.[70]

**Federal Government Aid for Western Irrigation**

Federal assistance in implementing, constructing, and funding major irrigation projects in the West seemed to be the only solution to aridity and lack of private and state capital. In its first attempt to solve the irrigation dilemma, Congress passed the Carey Act of 1894. The federal government gave each of the eleven semi-arid states, including Montana, one million acres of land to irrigate and sell to farmers. The states planned the irrigation systems, contracted companies to do the work, and then sold settlers up to 160 acres each for a nominal rate plus the price for the water based on construction costs. States were hesitant to underwrite large projects and so applied for little land and irrigated even less, while settlers were reluctant to pay for the high cost of the water.[71] The federal government's next answer to the irrigation problem was the Reclamation Act of 1902. The act put money from the sale of public domain lands into a reclamation fund that the government could use for irrigation projects, managed by the newly

[68] Pisani, *To Reclaim a Divided West*, 139-140; Howard, *Green Fields of Montana*, 20-21.

[69] Worster, *Rivers of Empire*, 131-132; Pisani, *To Reclaim a Divided West*, 72-74; Howard, *Green Fields of Montana*, 48, 50.

[70] Worster, *Rivers of Empire*, 158.

[71] Worster, *Rivers of Empire*, 157; James E. Sherow, "'The Fellow Who Can Talk the Loudest and Has the Best Shotgun Gets the Water': Water Regulation and the Montana State Engineer's Office, 1889-1964," *Montana: The Magazine of Western History* 54, no. 1 (Spring 2004): 60; Howard, *Green Fields of Montana*, 22.

created Reclamation Service, renamed the Bureau of Reclamation in 1923. The government sold land in the project areas in 160-acre parcels at a price determined by the cost of development, and settlers paid the fee in ten annual installments. The Bureau of Reclamation used the payments to fund future irrigation projects.[72]

The Reclamation Act was a visionary idea for financing large-scale projects, but its numerous loopholes hindered effective implementation. Many of the projects occurred on private, not public, land, thus benefiting speculators and established landowners rather than new settlers who the act had intended to support. Speculators frequently bought land claims under irrigation projects and, once the water arrived, sold the claims to late-arriving settlers for a hefty price. Laxness in enforcing the acreage limit meant that the wealthy bought far more land than was legal, blocking poorer farmers from purchasing parcels. Projects ended up costing much more than initial construction estimates. New farmers who had little experience with irrigation, and the act seldom gave them enough land to run a sustainable operation. Many settlers struggled to pay back construction costs when the cost per acre-foot of water increased dramatically from a project's beginning to its completion. The act's major weakness was its sale of land on credit, giving farmers ten years to repay the cost of infrastructure. Congress had not planned for how to deal with settlers who defaulted on payments due to the high cost of project irrigation, and it could only extend debts or cancel them. The Bureau of Reclamation struggled to create sound central planning, lacked substantial revenue from land sales, and ultimately acknowledged that reclamation could not pay for itself. The Bureau's primary value lay in stimulating local economic development through dam construction.[73]

---

[72] Worster, *Rivers of Empire*, 160-161, 170; Howard, *Green Fields of Montana*, 29.

[73] Worster, *Rivers of Empire*, 171-173; Howard, *Green Fields of Montana*, 37-43; Pisani, *To Reclaim a Divided West*, 322-324.

Sustained drought, soil degradation, and erosion in the 1920s coupled with the Great Depression of the 1930s necessitated a radical change in how the federal government approached western water management. Drought and economic decline brought hardships for farmers, and many were delinquent on payments for federal water projects. By 1923, federal projects irrigated only 1.2 million acres of land out of a total of 20 million acres of western irrigated land; private investment remained the mainstay of irrigation funding. Furthermore, farmers in other parts of the nation could produce crops more cheaply than could farmers on irrigated land. It seemed as though irrigation in the West was doomed.[74] However, the massive public works funding of the New Deal enabled the nation to enter a new era of water management. From the 1930s through the Cold War, the Bureau of Reclamation and the Army Corps of Engineers raced to authorize irrigation projects, manage waterways, and build dams to save, conserve, and manage every drop of the region's water. An extensive network of irrigation and water management infrastructure transformed the West.[75]

**Irrigated Water Rights in Montana**

Irrigation in Montana unfolded somewhat differently than in other western states due in part to unique circumstances and to Montanans' opposition to centralized management of its water. Beginning in 1842, Jesuits at St. Mary's Mission near Stevensville in Ravalli County practiced the first irrigation in Montana, growing potatoes, wheat, and oats using water from Burnt Fork Creek. After the Jesuits closed the mission in 1850, they sold the property to Major John Owen who probably took out the first irrigation water right in the state with a priority date of 1852. In western Montana, most of the earliest irrigation projects began with miners, many of

[74] Worster, *Rivers of Empire*, 178-179; Howard, *Green Fields of Montana*, 52-86.
[75] Worster, *Rivers of Empire*, 266-277.

whom later turned to irrigated agriculture.[76] By the 1870s, mountain valleys in southwestern Montana, including Deer Lodge Valley, contained a widespread system of ditches that supplied farms and ranches with water.[77] Hay and alfalfa were some of the most common and popular irrigated crops because they went hand-in-hand with livestock raising, the state's major industry. Growing irrigated hay helped sustain cattle herds through the winter, and farmers and ranchers could sell extra hay to neighboring ranchers who did not have enough feed.[78] Although Montanans irrigated land throughout the state by the twentieth century, by 1909, some three-quarters of the state's irrigation took place in the mountainous western valleys, especially Deer Lodge Valley, while the eastern plains of the state was primarily dry farmed.[79]

From the 1860s until the 1920s, Montana water users employed a unique blend of riparian and prior appropriation rights. Early farmers and ranchers claimed land along streams and asserted riparian water rights, but they modified the system to divert streams for irrigation, even if this reduced the flow of water for downstream users. Miners were among the first in the state to apply prior appropriation's doctrine of first in time, first in right to the water they diverted to their claims. In the first territorial legislature in 1865, Montana acknowledged the territory's hybrid nature of water rights by recognizing prior appropriation and yet continuing to allow riparian rights. In 1870, the territorial legislature further affirmed prior appropriation by authorizing the diversion of water for users not located along streams. A 1899 bill allowed for appointment of water commissioners who could regulate headgates to satisfy all claims on the water in accordance with priority rights at times of low stream flow. For decades, users

---

[76] PBS&J, *Irrigation in Montana*, 4; Howard, *Green Fields of Montana*, 2, 4.

[77] Howard, *Green Fields of Montana*, 10.

[78] Fiege, *Irrigated Eden*, 52-53, 146-150; Jordan, *North American Cattle-Ranching Frontiers*, 302-303; U.S. Bureau of the Census, *Thirteenth Census of the United States Taken in the Year 1910, vol. VI, Agriculture 1909 and 1910, Reports by States, with Statistics for Counties: Alabama-Montana* (Washington, D.C.: Government Printing Office, 1913), 972-973, accessed June 7, 2016, https://www.census.gov/prod/www/decennial.html.

[79] U.S. Bureau of the Census, *Thirteenth Census of the United States Taken in the Year 1910*, 969-970.

continued to practice a mix of riparian and prior appropriation methods. Finally, a lawsuit in 1921 between two users who claimed their water under different methods motivated the state's Supreme Court to rule in favor of prior appropriation, and Montana officially discarded the riparian doctrine. Instead of commissioners apportioning the water, users would now settle controversies over rights in district court.[80]

The practice of prior appropriation in Montana meant that people needed only to assert a claim over water to use it. In the early years, Montana miners, ranchers, and farmers simply laid claim to water and began digging ditches and diverting stream flow for their needs. Few users gave written notice of their claims or kept records of their claims and diversions. However, as settlement increased and more people wanted to divert water, it became a challenge to determine the dates and amounts of earlier appropriations.[81] A bill passed by the legislature in 1885 required water users to register the quantity and use of their water with the county courthouse. The law stipulated that an appropriator should post visible notice at the point where he intended to divert, stating the diversion point, the amount of water he claimed, the purpose of the diversion and intended use, the means of diversion, the date of posting, and the appropriator's name. The law required the appropriator to file a copy of the notice with the county clerk within twenty days. Construction of the diversion had to begin within forty days and continue with "reasonable diligence." The Montana Supreme Court later ruled that any user who did not comply with the procedure of posting and filing notice could still acquire a right to the water simply by digging a ditch and putting the water to beneficial use. The many loopholes in the law and its lax enforcement led to many problems. The law did not restrict how much water a user

[80] Pisani, *To Reclaim a Divided West*, 50; Brian Shovers, "Diversions, Ditches, & District Courts: Montana's Struggle to Allocate Water," *Montana: The Magazine of Western History* 55, no. 1 (Spring 2005): 4; Howard, *Green Fields of Montana*, 118-119; Dunbar, "Search for a Stable Water Right," 139-141, 143; State Engineer's Office, *Water Resources Survey: Powell County*, 2.

[81] Dunbar, "Search for a Stable Water Right," 141.

could claim, resulting in over-appropriation of streams or of users asserting rights to more water than actually flowed in a stream. Furthermore, the amount of water recorded on a filing did not necessarily correlate to the amount a user actually diverted. Appropriators did not have to keep records of completion of ditch or diversion construction or of when they put the water to beneficial use. Appropriations were dated to the commencement of ditch or diversion construction, not their completion, and so many appropriators never completed their diversion structures but still claimed the water. Additionally, most streams flowed through more than one county, which meant that multiple county courthouses held appropriation notices for each stream. Lack of a centralized place to store and access appropriation records contributed to the claiming of more water than streams provided.[82]

Only if contending water users resorted to litigation would the district courts file an adjudicated water right fixed by court degree in the county of the suit with the dates of priority and the amount of diversion determined by evidence and proof. Although Montana did not require water users to file official records once they completed a diversion, records were useful when the demand for water became greater than its supply, and adjudication ensued a determination of the priority rights along a stream. The district court examined all claims and issued a decree establishing each user's priority of right and the amount of water to which he was entitled. If someone purchased property that included rights to irrigate from an unadjudicated stream, that person had no way of determining the validity or priority of his/her right and could not gain clear title to the right until the court adjudicated the waterway. If courts had already adjudicated the stream, individuals wanting to begin using water had to petition the district court

[82] Dunbar, "Search for a Stable Water Right," 141-143; Sherow, "'Fellow Who Can Talk,'" 58-59; Shovers, "Diversions, Ditches, & District Courts," 4-5; Fiege, *Irrigated Eden*, 87-89; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana, Part I: History of Land and Water Use on Irrigated Areas, Part II: Maps Showing Irrigated Areas in Colors Designating the Sources of Supply* (Helena, MT: State Engineer's Office, 1955), 1; State Engineer's Office, *Water Resources Survey: Powell County*, 2-3.

for permission to make an appropriation. If existing appropriators did not object, the court issued a supplementary decree. Adjudication was costly and could last for years, so users were reluctant to file suits. Even during the adjudication process, the courts often made decisions based on inaccurate or faulty evidence and missing or incomplete records, and judges often had little understanding of hydrology and water measurements.[83]

Over-appropriation discouraged the establishment of new water rights because no flows remained, at least on paper, and because adjudication was a long and costly process. This meant that old-time, entrenched water users seldom had their rights challenged. These users also worked to prevent the state from appointing a state engineer who would doubtless adjudicate all claims and threaten local interests. Reformers wanted scientific management of the water for maximum economic use while established water users clung to their rights and the status quo.[84] Despite the efficiency of centralized systems under a state engineer like in Colorado and Wyoming, Montana resisted implementing this model, although some residents did try to pass bills to create a centralized, state-run system. Montanans did not accept a reformed system because farmers in the mountain valleys feared the state would deprive them of their water rights, ranchers on the plains generally did not use irrigation at all, and lawyers did not want what they believed was a new unconstitutional system.[85]

Miners in the state were the first to adopt water codes and set measurement units and seasons. From them comes the term "miner's inch" for water flow, a term still used by many irrigators particularly in Montana's intermountain valleys. The "miner's inch" was the quantity

[83] Sherow, "'Fellow Who Can Talk,'" 59; Fiege, *Irrigated Eden*, 87-89; Dunbar, "Search for a Stable Water Right," 142-144; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 1; State Engineer's Office, *Water Resources Survey: Powell County, Montana*, 2-3.

[84] Sherow, "'Fellow Who Can Talk,'" 59; Fiege, *Irrigated Eden*, 87-89; State Engineer's Office, *Water Resources Survey: Powell County, Montana*, 3.

[85] Dunbar, "Search for a Stable Water Right," 145, 148.

of water that would flow through a 1-inch square opening in a vertical wall under a given pressure. However, early miners did not use a standard pressure head, so the miner's inch varied between four and seven inches. Between 1885 and 1898, Montana mandated that the miner's inch box was the only legal way to measure irrigation water and installed weirs in streams to record measurements. In 1899, the legislature switched to cubic feet of water per second as the legal standard. Many western states adopted this as a standard since the measure of miner's inches varied from state to state. In Montana, one cubic foot per second was equivalent to forty miner's inches. Another key water measurement was the acre-foot, which was the amount of water that would cover an acre of land to the depth of one foot.[86] The water year began October 1 and ended September 31, and was the period used to calculate annual flows. The irrigation season opened in the spring, usually April, and ran until early fall, usually September.[87]

**Management of Montana's Irrigation Systems**

Until the turn of the twentieth century, individuals or mutual companies managed most of the irrigation in Montana including in places like Deer Lodge Valley. In many rural areas in the mountain states like Montana, individuals built dams and dug private irrigation ditches, sometimes collaborating on projects with friends or family. These small irrigation systems serviced only a few farms or ranches, and the owners worked together to regularly maintain irrigation systems and features. In areas where larger, more expansive systems were warranted, settlers formed mutual companies as legal corporations to handle the construction and maintenance of ditches. Each irrigator purchased shares in a company that levied annual assessment fees to pay for maintenance of the system. If users paid their assessments in cash, the

[86] Howard, *Green Fields of Montana*, 116-120; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 12-13; State Engineer's Office, *Water Resources Survey: Powell County, Montana*, 19.

[87] State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 12-13; State Engineer's Office, *Water Resources Survey: Powell County, Montana*, 19.

company hired laborers to perform construction or maintenance, but often users simply paid their fees with in-kind labor. To reduce labor and expenses, most companies constructed ditches over the easiest terrain, for the shortest distances possible, and made use of existing draws or sloughs. They dug ditches by hand with picks and shovels or by hitching plows to horse and mule teams to loosen the soil and then scoop it with horse-drawn scrapers. By the 1940s and 1950s, some farmers and ranchers used dynamite blasting to cut ditches, which was expensive, but reduced labor and machinery needs. The irrigation systems built by mutual companies were usually small with narrow, shallow ditches seldom more than ten miles long; they irrigated anywhere from a few hundred to a few thousand acres. As landowners became more prosperous, they expanded, widened, and lengthened the ditches, sometimes even forming irrigation districts to finance larger-scale improvements.[88]

Whether operated by individuals or mutual companies, ditches and other irrigation infrastructure required regular maintenance and cleaning. Users had to dredge ditches of debris, silt, and vegetation, stabilize ditch banks damaged by rodents or spring floods, and repair or rebuild dams, headgates, flumes, and other structures periodically to ensure they functioned properly.[89] Aquatic plants growing in and along ditches inhibited water flow and clogged pipes. Large plants absorbed ditch water through their roots, lowering the water flow. Irrigators had to clean ditches of vegetation regularly to prevent interference with the smooth and effective operation of irrigation systems.[90] Irrigators used a variety of methods to clean ditches. Some users drained them in the summer to kill the plants by depriving them of water. Others hitched

[88] Fiege, *Irrigated Eden*, 118-123; Howard, *Green Fields of Montana*, 93; U.S. Bureau of the Census, *Thirteenth Census of the United States Taken in the Year 1910,* 971. See also annual extension reports for Deer Lodge and Powell Counties from the 1940s and 1950s in the Montana State University Extension Service Records, 1912-1970, accession 00021, boxes 1-70, Montana State University Library, Merrill G. Burlingame Special Collections.

[89] PBS&J, *Irrigation in Montana*, 85, 87; Fiege, *Irrigated Eden*, 120-121.

[90] Fiege, *Irrigated Eden*, 50; PBS&J, *Irrigation in Montana*, 85.

horses to disc harrows or chains that the animals dragged through the canals to uproot plants that laborers then raked out. However, mechanical attempts to control ditch vegetation could cause problems—draining the ditches deprived crops of water, and dredging wore down ditch banks and contributed to erosion. Consequently, some irrigators turned to chemical herbicides on plants in and along ditches. However, herbicides came with their own problems. Farmers found it difficult to balance using enough of the chemicals to kill aquatic plants but not so much that the chemical-laden water poisoned crops. Adding additional chemicals to the soil through herbicides could hamper the growth of crops, and chemicals that entered the ground water or surface drinking water sources could pose health hazards to humans and animals.[91] Irrigators also had to monitor and eradicate pests along ditches because the animals could divert water flow or destabilize ditch banks. Irrigated waterways attracted beavers and muskrats because the canals simulated natural streams with plant life flourishing in and along the ditches as a food source and building material for lodges and dams. Beaver dams and lodges intercepted the flow of water in ditches and caused erosion and bank damage. Beavers also cut down cottonwoods along streams, reducing shade and contributing to higher water temperatures adversely affected water-dwelling organisms. At places like Grant-Kohrs Ranch, cottonwood trees were important natural and cultural resources, and wire fencing around their trunks protected many of the trees. Even more destructive were ground squirrels that burrowed into ditch banks. The holes caused seeping and weakened the dirt slopes, eventually causing them to collapse. Slumped or breached ditch walls flooded fields and destroyed crops and left lower fields without water for extended periods.[92]

[91] Fiege, *Irrigated Eden*, 67, 73-74. See also annual extension reports for Deer Lodge and Powell Counties from the 1940s and 1960s, Montana State University Extension Service Records, 1912-1970, Montana State University Library.

[92] Fiege, *Irrigated Eden*, 49-51; Kathy Allen, et al., *Natural Resource Condition Assessment*, 70-71, 88; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report, Part Two: Treatment Recommendations, Pasture/Hay Fields Component Landscape, Upland Pastures Component Landscape, Final 100% Draft*, submitted

Some irrigators placed strychnine poison near burrows to eradicate ground squirrels. Farmers often worked in cooperation to eradicate pests, since if they were problems for one farmer, they would likely spread to neighboring farms if not eradicated. Controlling animal pests was expensive and time-consuming, however, and farmers struggled to keep their systems operational. Animals driven from ditches took up homes in the drainage ditches, which farmers did not maintain as well, and then the animals migrated back to the ditches. Sometimes people trapped beavers and muskrats to sell them for their fur. Where this was not profitable, residents still trapped or killed the animals to collect bounties that desperate farmers or irrigation companies sometimes offered for squirrels, beaver, and other pests. However, killing and trapping mammals had its limits; many states passed wildlife statutes that regulated hunting and trapping.[93]

In the twentieth century, federal and state involvement in Montana irrigation began as federal monies helped to fund large projects, starting with the Carey Act of 1894 and the Newlands Reclamation Act of 1902. Under the Reclamation Act, Montana received four of the initial nine projects approved in public lands states: Milk River (authorized in 1903), Lower Yellowstone (authorized in 1904), Huntley (authorized in 1905), and Sun River (authorized in 1906). Another early venture, the Flathead project (authorized in 1904), operated in cooperation with the Flathead Indian Reservation.[94] Most of these systems were located in the central or eastern plains of the state, home primarily to ranchers and some farmers who had previously attempted dry land farming with marginal success. When New Deal funding in the 1930s paved the way for more federal irrigation projects, many Montanans were leery, suspicious that

---

Under Contract to National Park Service, Intermountain Region (Boulder, CO: Shapins Belt Collins (formerly Shapins Associates), February 2009), 18.

[93] Fiege, *Irrigated Eden*, 68-76; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 18.

[94] Howard, *Green Fields of Montana*, 31; Fletcher, *Free Grass to Fences*, 134-135; PBS&J, *Irrigation in Montana*, 4-5.

expensive undertakings, which they would have to pay for, would actually transform dry land scarred by erosion, dust storms, and over-grazing.[95] However, few residents could manage without federal assistance. Below average rainfall in Montana between 1917 and 1939 led to additional Bureau of Reclamation Projects, including the Bitter Root Project in Ravalli County, the Frenchtown Project on the Clark Fork River west of Missoula, and the Buffalo Rapids Project on the Yellowstone River. In 1934, the Montana State Water Conservation Board formed to funnel federal New Deal funds into state irrigation projects. By 1952, the board had overseen the building of 173 projects. Ownership of these still lies with the state that manages them through the Department of Natural Resources and Conservation's Water Projects Bureau. From the 1940s through the 1960s, Montana added more Bureau of Reclamation and State Water Conservation Board projects, including the Pick Sloan Missouri River Basin Program to provide flood control, hydroelectric power, municipal water supply, and irrigation.[96]

Despite the plethora of private, mutual, state, and federal irrigation systems in Montana and the urgent need for systematic oversight and management of the state's water use, residents were reluctant to adopt the centralized state-run water management systems used by many other western states. Although these states implemented mechanisms to consolidate functions and efficiently manage and oversee water rights, Montana's decentralized system caused no end of problems. Users could still make huge water claims without verifying use, and district courts were constantly adjudicating water rights but often without accurate data on past use or streamflow measurements and without knowledge about other litigation on the same stream in other counties. In 1903, Montana finally created the post of state engineer, but it confined the position's duties to administering state water projects under the Carey Land Act and the

[95] Wilson, "6000 Acres and a Microscope," 69; Howard, *Green Fields of Montana*, 48, 50, 52-86.
[96] Sherow, "'Fellow Who Can Talk,'" 65-66; Shovers, "Diversions, Ditches, & District Courts," 4-5; PBS&J, *Irrigation in Montana*, 5-6; Howard, *Green Fields of Montana*, 64-65.

Reclamation Act. The position received limited funding, left water rights files and records of appropriation in the county offices, and retained authority of water rights adjudication in the district courts. Frustrated with their limitations, many holders of the office pushed for a more expansive role and the authority to oversee all water use in the state and adjudicate all water rights.[97] One of the office's victories was the 1940 authorization of a project to survey, record, and map Montana's water resources statewide. The Montana Water Resources Survey's major task was to investigate water rights origins, establish dates of filing and construction, discover the extent of appropriations, and show present water uses. The information compiled by the survey, often through direct conversations with long-time water users, proved invaluable since the records on file in most counties were lacking. The state engineer's office compiled the survey results and published them on a county-by-county basis.[98]

With the 1960s and 1970s came the beginnings of a slightly more centralized method of water rights recording and adjudication. In 1965, the Montana legislature eliminated the State Engineer's Office and assigned recording and other duties to the State Water Conservation Board. In 1967, the legislature passed the Montana Water Resources Act that replaced the board with the Montana Water Resources Board. It developed a state water plan and required that all water-rights holders must declare their appropriation to their county clerk. The county clerks passed on appropriation notices to the board, which compiled the records into a comprehensive inventory. However, adjudication of water rights remained with the local courts.[99] Lawsuits ensued over whether the state should centralize water rights records with the state board; some people opposed the idea because they felt it would limit their rights and empower a central

[97] Shovers, "Diversions, Ditches, & District Courts," 7-8; Sherow, "'Fellow Who Can Talk,'" 60-61; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 1.

[98] Dunbar, "Search for a Stable Water Right," 149; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 1.

[99] Shovers, "Diversions, Ditches, & District Courts," 12; Sherow, "'Fellow Who Can Talk,'" 69.

bureaucracy. In 1971, the state created the Department of Natural Resources and Conservation (DNRC) to take over the duties of the Montana Water Resources Board. Then in 1973, the state passed the Montana Water Use Act that required the DNRC to manage water rights record-keeping and established a state water court with the authority to adjudicate disputed claims. In 1979, the legislature passed Senate Bill 76, requiring users to submit their claims to the DNRC by January 1, 1982 for adjudication. Public resistance led to delays and court cases over implementation, so the filing process began slowly, and the state extended the deadline to April 30, 1982. Rights not filed by this date were considered abandoned, although another bill passed the legislature in 1993 to allow late filing under certain terms and conditions. Although users filed 219,000 claims with the DNRC by 2003, only 16,000 of them had final, adjudicated decrees, seven percent of the total. Nevertheless, that year the DNRC issued a temporary preliminary decree water rights listing showing all the claims filed. In 2003, the DNRC also closed Basin 76G, where Deer Lodge Valley and Grant-Kohrs Ranch sit, to new water rights due to the full appropriation of all its streams. To date, the DNRC has not yet adjudicated many water claims in Montana. Even with the process completed, enforcement of the final decrees was difficult, relying on ditch riders monitoring headgate flows and district courts hearings. This dysfunctional system has persisted in Montana because in the early years water was plentiful and no one bothered to enforce centralization. Only when water shortages began to occur in the twentieth century did problems emerge, and the district courts were unable to handle the resulting lawsuits in an efficient and accurate manner. The rights of the individual property owner were of paramount concern to Montanans whose suspicion of centralized authority has led them to oppose reforms in water management.[100]

[100] Shovers, "Diversions, Ditches, & District Courts," 13-15; Howard, *Green Fields of Montana*, 115; "Grant-Kohrs Ranch National Historic Site Water Rights" (2003), 2-3, in GRKO Water Rights, RGN12, Accession

Today, Montana has a diverse and extensive irrigation system under federal, state, and private oversight. Many irrigation districts exist throughout Montana, and approximately 60% of the irrigated acreage in Montana gets it water from some type of water supply organization. Some of these irrigation districts were set up to manage the daily operations of Bureau of Reclamation and state irrigation projects. Other water supply systems include water user, irrigation, and ditch or canal user associations. Although some are large, many are small with only a handful of irrigators. Their legal formalization status varies. These systems involve the sharing of operation and maintenance costs and provide a means of communication between participants, particularly in legal situations or disputes. Privately-owned organizations drawing on groundwater wells or private ditches water the remaining forty percent of the state's irrigated acres.[101]

**Irrigation Methods in Montana**

Historically, Montana farmers and ranchers and other Westerners employed a variety of methods to get irrigation water onto their fields. In contour and border flood irrigation, agriculturalists laid out their fields in narrow, 30 to 100 feet-wide strips that followed the ground contour. Between each strip was a ditch or dike. The farmer ran water through the ditch, then used canvas or steel dams to back up the water so that it spilled over and spread out across the fields. In furrow or row irrigation, farmers fed rivulets of water from the supply or feeder ditch into furrows between crop rows. In subirrigation, the farmer opened water into ditches, canals, swales, and ponds, and allowed the water to seep down and raise the groundwater, bringing the water up to the level of the crop roots. In flood irrigation, farmers cut openings into a supply ditch and let water flow in a sheet across a graded and slightly sloped field. Each method had its

---

Number GRKO-01444, Catalog Number GRKO 17823, Series #001, GRKO General Water Rights, File Unit #001.

[101] PBS&J, *Irrigation in Montana*, 9-11, 13-14; Howard, *Green Fields of Montana*, 33; U.S. Bureau of the Census, *Thirteenth Census of the United States Taken in the Year 1910,* 971.

pros and cons, and some, like furrow irrigation, were initially more labor intensive than other approaches. Even flood irrigation could prove challenging to get the water to flow across fields evenly and thoroughly. Users wasted water if they did not carefully construct the system and apply the water. Regardless of the method, farmers and ranchers took care not to over-water their fields, which led to excessive seepage and rising groundwater levels that created over-saturated fields, soggy ground, and poor crop quality. To address soggy, waterlogged land, farmers constructed drainage systems below the level of fields and ditches to intercept and collect seepage water and direct it back to streams and rivers where other irrigators reused it.[102]

By the early twenty-first century, flood and sprinkler irrigation were the two most practiced irrigation methods in Montana. Flood irrigation was particularly prominent in hay meadows and grain fields. Although nationally farmers began to use sprinkler irrigation around 1900, it did not come to Montana until 1940. Early perforated pipe systems applied water too rapidly for Montana soils, and irrigators had to move the pipes to a new location every three or four hours, a labor-intensive task. As companies fine-tuned the systems, workers only had to move them twice a day and could replace perforated pipe with sprinkler heads for a better water absorption rate. With buried main and lateral lines, sprinkler head-lines could be permanent or semi-permanent with buried main lines but portable laterals. These systems were not one-size-fits-all; irrigators had to design them specifically for each field so that the water spread evenly in a great enough quantity.[103] After World War II, some farmers began using siphon tubes to pull water from a ditch over its bank and into a field without having to cut the bank. This method was popular for row crops or with freshly cut ditches that had unstable banks. In the early 1950s,

[102] Fiege, *Irrigated Eden*, 29-31, 36-38, 129-130; "Irrigation," Bulletin 259, April 1950, Extension Service, Montana State College, Bozeman, Montana, in Montana State University Extension Service Records, 1912-1970, Montana State University Library.

[103] Howard, *Green Fields of Montana*, 96; see also "Irrigation," Bulletin 259, April 1950, Extension Service, in Montana State University Extension Service Records, 1912-1970, Montana State University Library.

Montanans began using wheel-move sprinklers to replace the more labor-intensive hand-move sprinklers. With a tractor, irrigators moved the wheels at the end of the lateral lines with the pipe functioning as an axle. In the 1960s, dealers introduced center-pivot sprinklers, by far the most common method in Montana today. This system used a well in or a buried mainline to the center of a field and an electric motor that powered pipe and sprinklers on wheels in a circular pattern around a field, taking about two full days to make one rotation around a field.[104]

From the 1940s through the 1960s, county agricultural extension agents working in the Deer Lodge Valley and elsewhere in Montana helped farmers and ranchers improve their irrigation systems. They demonstrated using dynamite to excavate irrigation ditches more rapidly and encouraged water users to install measuring devices on their headgates and diversion points to monitor water use. Agents showed farmers how to level their fields or construct contour ditches to use water more efficiently when they irrigated. Local farmers and ranchers embraced many of these innovations. Less successful were attempts to get irrigators to consolidate their ditches; agents argued that dozens of small, single-user ditches crossing the landscape resulted in inefficiency and less land under cultivation. However, many water users resisted consolidation, fearing it might threaten their water rights or reduce their ability to irrigate their land as they chose.[105]

A study by consulting firm PBS&J found shifts in how Montanans irrigated between 1998 and 2003. In both years, flood irrigation accounted for approximately two-thirds of irrigation in Montana and sprinkler irrigation for the other third. Flood irrigators practiced a

---

[104] PBS&J, *Irrigation in Montana*, 7-8; Howard, *Green Fields of Montana*, 44, 93-99, 100-101; see also annual extension reports from the late 1940s and the 1950s, and "Irrigation," Bulletin 259, April 1950, Extension Service, in Montana State University Extension Service Records, 1912-1970, Montana State University Library.

[105] See annual extension reports for Deer Lodge and Powell Counties from the 1940s and 1950s in Montana State University Extension Service Records, 1912-1970, Montana State University Library. Many of the attempts to consolidate ditches seem to have occurred south of Grant-Kohrs Ranch along Dempsey Creek and Race Track Creek.

range of techniques from flowing water down rows or furrows to controlled flooding (border or between rows) to uncontrolled flooding. Sprinkler irrigators used center pivot, wheel move, or hand move techniques. Between 1998 and 2003, however, irrigators began employing more sophisticated irrigation methods that better conserved water and labor. Thus among flood irrigators, by 2003, controlled flooding became more common than uncontrolled flooding, which was more wasteful. Among sprinkler irrigators, center pivot prevailed over wheel move, also more labor intensive and wasteful. Water conservation concerns may have driven these decisions, especially since among center pivot irrigation low-pressure systems increased and high-pressure systems decreased. Of course, these required significant financial investment by farmers and ranchers in new and improved irrigation infrastructure. Nationwide, water users irrigated more acres by sprinkler than by flood. Yet in Montana, flood irrigation still dominated. Since the most common irrigated crop in Montana was hay, a relatively low-value crop, farmers had difficulty financially justifying the expense of adopting sprinklers. Additionally, the topography of much of the state was better suited to gravity-flow flood irrigation despite the larger labor investment required.[106]

**History of Irrigation and Water Use at Grant-Kohrs Ranch**

Irrigation at Grant-Kohrs Ranch operated as a subset of the larger water system in the Deer Lodge Valley. Central to this landscape was the Clark Fork River that originated from the confluence of Warm Springs Creek and Silver Bow Creek near Anaconda at the valley's southern end. The river flowed through Deer Lodge Valley, north through Missoula, and then eventually emptied into the Columbia River in Washington.[107] The Clark Fork and its many tributaries created a lush environment that farmers and ranchers have improved through

[106] PBS&J, *Irrigation in Montana*, 7-8.

[107] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-1; State Engineer's Office, *Water Resources Survey: Powell County*, 18; Kathy Allen, et al., *Natural Resource Condition Assessment*, 171.

irrigation. Since the 1870s, settlers in Deer Lodge Valley have constructed an intricate network of private and company-owned irrigation ditches for raising crops (primarily potatoes and grains) and hay for the stock growing that was the valley's primary industry.[108] Although past mining companies diverted part of the Clark Fork River especially at its headwaters of Warm Springs Creek and Silver Bow Creek, in the Deer Lodge Valley, river water went to agricultural irrigation. Ditches formerly dug for mining purposes have since been readapted for agricultural use. Most of the river's other tributaries were small, and although flowing year round, their entire volume went for irrigation in the summer months.[109] Some of the valley's most heavily appropriated streams lay in the vicinity of Grant-Kohrs Ranch including Race Track, Modesty, Little Modesty, Dempsey, Tin Cup Joe, Peterson, Cottonwood, Reese Anderson, North Fork of Johnson Creeks and the Little Blackfoot River. District court has adjudicated and decreed water rights on many of these streams.[110]

Natural water features form an integral part of Grant-Kohrs Ranch, as they have since the site's first settlement, and provide the irrigation needed for the ranch to flourish. The Clark Fork River rushes through about three and a half river miles of Grant-Kohrs Ranch National Historic Site and roughly divides the ranch in half. On the east lie the domestic and ranch operation

---

[108] Rosenberg, *Hard Winter Endurance*, 33-35; Howard, *Green Fields of Montana*, 10; Jordan, *North American Cattle-Ranching Frontiers*, 302-303; R. L. Konizeski, R. G. McMurtrey, and Alex Brietkrietz, with a section on gravimetric survey by E. A. Cremer III, *Geology and Ground-Water Resources of the Deer Lodge Valley, Montana*, Geological Survey Water-Supply Paper 1862, prepared in cooperation with the Montana Bureau of Mines and Geology, Butte, Montana (Washington, D.C.: Government Printing Office, 1968), 11, 43-44; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 11-12, 26-27; State Engineer's Office, *Water Resources Survey: Powell County*, 14; Kathy Allen, et al., *Natural Resource Condition Assessment*, 235; U.S. Bureau of the Census, *Thirteenth Census of the United States Taken in the Year 1910*, 972-973, 977.

[109] Konizeski, et al., *Geology and Ground-Water Resources of the Deer Lodge Valley*, 42, 46; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 18; Kathy Allen, et al., *Natural Resource Condition Assessment*, 231, 235.

[110] State Engineer's Office, *Water Resources Survey: Powell County*, 18; State Engineer's Office, *Water Resources Survey: Deer Lodge County, Montana*, 13, 22-23, 30-31.

buildings and some pastures and fields. On the west are pastures and hayfields.[111] Within the boundaries of Grant-Kohrs Ranch National Historic Site are six small tributary creeks and nine natural springs, all of which enter the Clark Fork River. Spring Gulch Creek and Fred Burr Creek slic through the ranch's northern end and the North Fork of Johnson Creek and Johnson Creek through the ranch's center and near the ranch house. Cottonwood Creek, the largest of the streams, sweeps through the town of Deer Lodge and then centers the ranch's southern end. No Name Creek originates from a natural spring near the ranch house and moves through the yard fields before joining the Clark Fork. Taylor Creek edges along the ranch's southern boundary.[112] Waterways through the ranch, including Clark Fork River, Cottonwood Creek, Johnson Creek, Taylor Creek and other creeks, gulches, springs, and sloughs look much as they did at the time of the ranch's historical period of significance although the Clark Fork and Cottonwood have shifted course slightly within their floodplains.[113]

A patchwork array of irrigation ditches, lateral and supply ditches, and drainage ditches, some dating as far back as the 1860s, intersect Grant-Kohrs Ranch; since early days, ranch owners have substantially modified and enlarged these. Among the most significant ditches crossing the property are the Kohrs-Manning Ditch and the West Side Ditch, major, multi-user, nineteenth-century canals. Other smaller ditches on the property include the Kohrs Ditch (also known as "The Big Ditch"), Hartz Ditch, and Johnson Ditch.[114] The Kohrs-Manning Ditch is on the east side of the Clark Fork River and draws from the Clark Fork and Cottonwood Creek. It

---

[111] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-6, 3-7-1; Kathy Allen, et al., *Natural Resource Condition Assessment*, 171, 229.

[112] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-4, 3-5, 3-11, 3-7-1; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement,* Chapter 1; Kathy Allen, et al., *Natural Resource Condition Assessment*, 171, 229.

[113] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-18; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 9-10.

[114] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-11; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 2.

irrigates the Stuart Field, the Lower Yard Field and North Meadow. The Kohrs "Big" Ditch is on the west side of the Clark Fork River and follows the ranch's western boundary. Its water comes from the Clark Fork River and Taylor Creek, and it irrigates the Western Hay Fields. The Warren Ditch is in the northwestern corner of the ranch and derives water from Spring Gulch. It is no longer in operation. The Johnson Ditch obtains water from Johnson Creek and irrigates the Stuart Field before emptying into the Kohrs-Manning Ditch.[115] The West Side Ditch runs north along the west side of the Clark Fork River, taking water from the Clark Fork and Lost Creek and irrigating bench lands in the southwest area of Grant-Kohrs Ranch.[116] The Hartz Ditch diverts water from Taylor Creek along the southern border of the ranch and delivers it to the upper southwest field (Upper Taylor Field) of the ranch.[117]

**Early Irrigation at Grant-Kohrs Ranch**

As the original owner of Grant-Kohrs Ranch, Johnny Grant was the first to dig an irrigation system on the property. Around 1862, Grant began to cultivate hay and other crops in the fields next to his ranch house and to excavate the first irrigation ditches. Water rights records indicate that Grant established three claims in 1862, two for water from unnamed springs and one from the Clark Fork River. He used the water from these sources both to water his cattle and to irrigate field crops. Today, one of the springs and the Clark Fork waters nourish stock. The park utilizes the other right originating from spring seeps near the draft horse barn for flood irrigation. Grant likely added to and modified his irrigation system between the years of 1861 and 1866 while he owned the ranch, but it is unclear exactly the extent of this early system.[118]

---

[115] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-5-5.

[116] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-54, 2-62; McChristian, *Ranchers to Rangers*, Chapter 3.

[117] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-5, 3-6-1, 3-6-3, 4-27.

[118] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-24, 2-27, 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 43-46, GRKO Water Rights, Grant-Kohrs Ranch National Historic

In 1866, Conrad Kohrs bought Johnny Grant's outfit and began making his own improvements to the ranch's irrigation system.[119] He already had experience with irrigation; he dug his first ditch when he purchased the Race Track Ranch in 1865. This provided him with the knowledge needed to make improvements at the Grant ranch and excavate additional ditches for his own use or in partnership with other farmers and ranchers.[120] In 1866, he took out two water claims, one to Johnson Creek and the other to the North Fork of Johnson Creek. Some evidence in the state's water rights files indicates that Johnny Grant transferred the 1866 right to the North Fork of Johnson Creek to Kohrs through a document signed by the justice of the peace on August 22, 1866 as part of the sale of the ranch to Kohrs. Grant may have unofficially taken water from the North Fork of Johnson Creek without having formally filed with the county clerk for the water, a common practice in the 1800s. Kohrs then filed the official right soon after purchasing the ranch. He used these two 1866 rights to water his cattle, allowing them to drink directly from Johnson Creek. He diverted the North Fork through Johnson Ditch that Kohrs must have constructed around this time. The park continues to use both of these rights for stock watering today.[121] About 1870, Kohrs and Judge Edward Manning of Deer Lodge collaborated to improve existing irrigation ditches that dated to the Johnny Grant era. The improved system became known as the Kohrs-Manning Ditch, and the men used its water for stock watering and

---

Site Archives; Kathy Allen, et al., *Natural Resource Condition Assessment*, 79. The Grant water rights are 76G-W-162341-00 (Clark Fork River), 76G-W-162342-00 (unnamed spring), 76G-W-162343-00 (unnamed spring/seeps).

[119] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-31.

[120] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 1, Section B.

[121] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-33; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 41, 56, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. These 1866 rights are 76G-W-162340-00 (Johnson Creek), and 76G-W-216098-00 (North Fork of Johnson Creek). John Milner Associates claims the ranch's rights to Johnson Creek go back to 1874, and that Johnson Ditch was constructed in the early 1870s. However, water rights records indicate that the first right to Johnson Creek was in 1866, and so Johnson Ditch also must have been constructed prior to the 1870s. See John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-26. For the indication that the 1866 right (76G-W-216098) to the North Fork of Johnson Creek may have originally been used by Johnny Grant, see documents referencing the sale of land from John Grant to Conrad Kohrs, August 22, 1866, record for water right 76G-W-216098-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

irrigation. Although the Kohrs-Manning Ditch Company was officially formed around 1872, apparently, the company's first water right actually dated to 1868 on Cottonwood Creek.[122] Kohrs and Manning added to their ditch over the years, enlarging it in 1889, using water from the Clark Fork River at a point just south of the Kohrs home ranch, and later drawing water from Peterson Creek and Reece Anderson Creek. Most of the water from the Kohrs-Manning Ditch was sold north of the current park boundary, although Kohrs did use some of the water on his ranch. His specific right to water from the ditch came from an 1895 filing on the Clark Fork that enabled him to take the water to irrigate 216 acres.[123] In the 1870s, Kohrs continued to expand his water rights and improve his ditches, obtaining an additional right from the Clark Fork River for stock watering in 1872.[124]

Though crop irrigation predominated, Kohrs utilized appropriated waters for domestic use as well, nourishing lawns and gardens around his ranch house and supplying the home with water. Between 1868 and the mid-1880s, the ranch house landscape underwent many transformations and beautifications: design of lawns, yards, and gardens, construction of a picket fence, and cultivation of cottonwood trees.[125] Around 1880, Kohrs laid an irrigation system to

---

[122] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-32, 2-33, 4-26; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C; McChristian, *Ranchers to Rangers*, Chapter 3; Kathy Allen, et al., *Natural Resource Condition Assessment*, 79; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 2; "Grant-Kohrs Ranch National Historic Site Water Rights," 50, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. John Milner Associates speculates that the first right of the Kohrs-Manning Ditch was taken out in 1872 by Kohrs from the Clark Fork River. While Kohrs did take out a right in that year, it was under his own name, not the company's. Water rights records indicate an 1868 filing on Cottonwood Creek for Kohrs-Manning Ditch's first right. See John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 50, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This 1868 filing is water right 76G-W-091146-00.

[123] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-32, 2-33, 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 20, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Continuation of Abstract of Title in the Lands Described in the Caption Herein," May 31, 1888, Kohrs-Manning Ditch papers, copied from originals held by William (Bill) Mosier, Kohrs-Manning Ditch Company president, by Janell Bcyzkowski, January 11, 2014. Kohrs' 1895 filing is water right 76G-W-092044-00.

[124] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-32, 2-33, 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This was for right 76G-W-162339-00.

[125] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-38.

water the front (east) lawn, the flower garden, the vegetable garden, and the cottonwood trees. Water diverted from Johnson Ditch, via Johnson Creek, which flowed south and east of the ranch house before emptying into the Clark Fork River. The ditch directed water westward, through a culvert and siphon to get under the railroad tracks, and then the stream passed under the picket fence that enclosed the house's front yard. From there, water emptied into an open wooden flume about 8 inches wide and four inches deep. Along its length, the flume had holes bored, each fitted with a wooden plug. To irrigate the lawn, workers placed an exact-sized brick in the flume and removed the plugs so the water could push out through the holes. Another connected flume ran west to irrigate the lilac bushes. Additional ditch water collected in submerged half barrels so gardeners could dip buckets for hand-watering trees and flowers. Excess water then re-entered the ditch through buried wooden barrels.[126] Because of the ranch house area's low elevation, water frequently collected and saturated the yards and boggy fields. To solve this problem, Kohrs and Bielenberg installed an underground drainage system of wooden pipes and boxes. Over time, this network became quite large and complex as drain sections plugged or failed, and the men constructed new ones. The drainage system also used spring or creek water to flush waste and sewage from the privies and ranch house.[127] Around 1880, Kohrs and Bielenberg began diverting Johnson Creek into a low-lying region along the creek to form a pond each winter. In the summer, grass covered the site, but in the fall, the men pulled up the sod with a disk harrow and turn the creek into the excavated area. The resulting pond was about four feet deep, and once ice

[126] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-34, 2-43, 3-1-14, 3-1-15, 3-3-7, 3-3-8; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement,* Chapter 2; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C; Memo to the files from the superintendent dated 5/10/83, subject: discussion with Con Warren, 11/3/82, front yard irrigation HS-1, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 55, Grant-Kohrs Ranch National Historic Site Archives..

[127] Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement*, Chapter 2; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C.

solidified to about eighteen inches thick, employees cut it and stored it in the ice house for the following year.[128]

Throughout the 1880s and 1890s, Kohrs and Bielenberg continued to buy new land for irrigated cultivation and to expand the existing irrigation system at the home ranch.[129] As Grant had already done, Kohrs made use of existing waterways, whether permanent or seasonal, by digging irrigation canals to direct water into agricultural fields or to provide his cattle with drinking water.[130] In 1884, Kohrs and Bielenberg purchased the Tom Stuart homestead east of the Clark Fork between their ranch and Deer Lodge and began irrigating the Stuart land as hayfield. That year, Kohrs took out four additional water rights, two from Johnson Creek, one from the Clark Fork River, and one from an unnamed spring. Most of the water went for stock watering, but one of the rights from Johnson Creek traveled through Johnson Ditch to irrigated crops, probably in the Stuart fields. When Stuart sold his homestead to Kohrs and Bielenberg, it apparently came with no water rights as Kohrs filed for rights on April 5, 1884. However, Stuart may have been unofficially taking water from Johnson Creek without having formally filed with the county clerk, a practice that was common in the 1800s.[131] Along the ranch's western bench land, Kohrs likely constructed the Kohrs Ditch or "Big Ditch" in the 1880s. Kohrs acquired

---

[128] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-36; Interview with Con Warren, dated May 5, 1978, by Micki Farmer, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 42, Grant-Kohrs Ranch National Historic Site Archives.

[129] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-40, 2-46.

[130] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-39.

[131] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-37; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. These rights were 76G-W-162344-00 (Johnson Creek, 1884, via Johnson Ditch), 76G-W-162335-00 (Johnson Creek, 1884), 76G-W-162336-00 (Clark Fork River, 1884), and 76G-W-162338-00 (unnamed spring). For details on the transaction of land from Thomas Stuart to Conrad Kohrs, see "Indenture," April 5, 1884, record for water right 76G-W-162335-00, and "Indenture," April 5, 1884, record for water right 76G-W-162344-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

additional irrigation water from the Clark Fork River that is now pumped and directed through a pipe to the Kohrs Ditch.[132]

While Kohrs built his water networks, his neighbors also developed irrigated agriculture in the valley. In 1887, a group of men formed the West Deer Lodge Water Company, and over the next several years, they dug a ditch. In 1889, the company took out its first water right to water from the Clark Fork River. The enterprise reorganized in 1891 as the West Side Ditch Company, and their waterway became known as the West Side Ditch. It carried water from the Clark Fork and Little Modesty Creek, as well as a few smaller drainages. In 1917, the company incorporated.[133] The Hartz/Kading Ditch was probably constructed around this time as it was associated with C. J. Kading and his property.[134]

Efficient and continuous use of irrigation ditches required regular maintenance and pest control. Kohrs likely practiced typical maintenance activities on his ditches, including seasonal clearing of vegetation probably by burning.[135] After 1800, the fur trade had extirpated most beaver from the Deer Lodge Valley, but a few animals remained and soon began flourishing again. Beaver caused problems with the irrigation system and the fields at the Grant-Kohrs Ranch. Former employees recalled that by the early twentieth century they routinely had to break up beaver dams in the ditches to prevent them from flooding the fields.[136]

---

[132] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-27; "Grant-Kohrs Ranch National Historic Site Water Rights," 13-14, 22, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. These rights were 76G-W-092045-00 (Taylor Creek, 1885), and 76G-W-092041-00 (Clark Fork River, 1885). Jason Smith, Natural Resource Specialist at Grant-Kohrs Ranch NHS, disagrees with Milner Associates Cultural Landscape Report on page 4-27. He says that the point of diversion for Taylor Creek ties the water to the Hartz ditch. This report reflects Smith's claim, not the Milner report.

[133] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-45, 2-54, 4-26; State Engineer's Office, *Water Resources Survey: Powell County*, 38-39; McChristian, *Ranchers to Rangers*, Chapter 3; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-27; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 16-17, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This right is 76G-W-092043-00.

[134] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-27.

[135] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-33.

[136] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-47.

The final decades of Kohrs' ownership of the Grant-Kohrs Ranch resulted in further improvements to the ranch grounds and new attempts to conserve water. In 1890, Kohrs added a large new brick addition to the ranch house and installed a running water system. He constructed a sunken hydraulic ram in a wooden box at an unnamed spring west of the Machine Shed (HS-12) and used the ram to pump water from the spring and from a tap on Kohrs-Manning Ditch. The ram supplied water to the ranch yards and home via an underground wooden pipe system. Inside the house, cast-iron pipes carried the water to the west addition's attic and a lead-lined wooden storage tank. Water heaters and spigots delivered the water throughout the house. The system constantly moved water through the house. Excess water ran through an overflow pipe to the basement where it filled a barrel. Once a day, the barrel's valve opened, and the water flushed out the sewage line that emptied into a drainage system, then into Johnson Creek, and finally into the Clark Fork River. To hold water, Kohrs and Bielenberg also constructed three brick underground cisterns around the ranch house.[137] In 1904, Kohrs filed one of his last water claims on the North Fork of Johnson Creek to improve irrigation of the lawn and garden via Johnson Ditch.[138] Severe drought hit Deer Lodge Valley in 1919, and the spring feeding the hydraulic ram that powered the house's running water went dry. Kohrs had to dig a well in the basement and fit it with an electric pump to supply water. He abandoned the attic tank because the pump's pressure tank kept water until needed. Soon after, Kohrs ripped out the house's lead

[137] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-51, 2-55, 3-1-15, 3-3-7, 3-3-8; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement*, Chapter 2; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 2; Rosenberg, *Hard Winter Endurance*, 47-48; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 52, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Telephone Interview with Con Warren & Jim Taylor, October 14, 1981, in Informal Interview All Grant-Kohrs Ranch National Historic Site Archives; Memo to the files from the superintendent dated 5/10/83, subject: discussion with Con Warren 11/3/82, use of part of hydraulic ram line by Con, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives. The water right to the unnamed spring that ran the hydraulic ram is 76G-W-162346-00.

[138] "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 54, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. The water right is 76G-W-215969-00.

pipe and replaced it with galvanized steel pipe as water pressure from the pump was blowing out the lead plumbing. The pump itself also had problems; it was unreliable, and Kohrs had fix it or replace it almost monthly.[139]

**Irrigation at Grant-Kohrs during Conrad Warren's Ownership**

When Conrad Warren took over ranch operations in the 1930s, he utilized and improved Grant and Kohrs's irrigation system while constructing additional ditches and modern water management infrastructure. In 1931, he took out a water right from the Clark Fork River for irrigation through the Kohrs-Manning Ditch. Over the years, particularly in the 1930s, he added acreage to the ranch and flooded much of it for pasture or crops such as wheat, barley, oats, timothy, clover, native hay, wheat grass, alfalfa, mangels, and mangel-wurzel to feed his stock. He also grew several acres of potatoes, some of which he sold locally.[140]

During the late 1930s, Warren acquired the D'Alton (also sometimes spelled DeAlton or Dalton) property, with twenty of its 160 acres irrigated, and the old C. J. Kading place. Both properties lay southwest of the ranch house on the west side of the Clark Fork River. Due to the Great Depression, both properties were foreclosed and therefore came relatively cheap. Warren wanted them to increase his fields and pasturage but also for access to the West Side Ditch and its water rights and to other smaller ditches like the Hartz Ditch and its associated water rights.[141]

---

[139] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-50; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 53, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Telephone Interview with Con Warren & Jim Taylor, October 14, 1981, in Informal Interview All Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 44, Grant-Kohrs Ranch National Historic Site Archives.. The water right for the basement well is 76G-W-162347-00.

[140] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-67; Wilson, "6000 Acres and a Microscope," 45-46; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 49, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. The water right Warren took out in 1931 is 76G-W-162345-00.

[141] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-62, 4-27; McChristian, *Ranchers to Rangers*, Chapter 3; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Interview, Con Warren by Paul Gordon July 29, 1976, Acquisition of land on West Side of ranch in 1938, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 3-4, Grant-Kohrs

Another possible reason for purchasing the land was to avoid dealing with difficult neighbors. By Warren's own admission, he never got along well with D'Alton or Kading. When the D'Alton property was foreclosed in 1938, Lee Williams of ranching partnership Williams and Pauly took over the property temporarily, leasing the twenty irrigated acres to tenants who planted sugar beets. Warren claimed that these "Russian" tenants overwatered their beets and sneaked around at night turning off other users' water, which outraged Warren. He threatened the tenants and Williams who agreed to sell Warren the land. Warren always made sure no one stole water to which they were not entitled.[142] After purchasing the West Side lands, he sometimes had trouble getting his fair share of West Side Ditch water. In response, according to Conrad Warren, he took a club and went to each stockholder, threatening to whip them if he failed to get his share. No one protested.[143]

D'Alton, Kading, and other owners had excavated canals during their ownership of the west side lands, but when he purchased the property, Warren was dissatisfied with the ditches. Those on the west side were ill-planned and not contoured; they followed natural waterways that resulted in only marginal irrigation. Furthermore, as the ditch on the upper end left the river, it moved through swampy land, and in the summer time plants constantly choked off the water flow. Thus, Warren completely re-engineered the ditches, leveling and contouring the land and adding lateral or contour ditches. These followed the land's gradations, using gravity to distribute water to fields. Warren employed a grader to excavate new ditches and renovate old ones. He likely constructed the Warren Ditch, now abandoned, around this time. It took him

---

Ranch National Historic Site Archives. Warren obtained shares in water right 76G-W-092043-00, filed by the West Side Ditch Company in 1889.

[142] Interview, Con Warren by Paul Gordon July 29, 1976, Acquisition of land on West Side of ranch in 1938, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

[143] Con Warren/Jim Taylor, April 27, 1988, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

about twenty years to transform the west side area, the old Kading place, and its ditches to his liking and to evenly distribute the soils through plowing the West Side fields before planting crops. The current West Side ditch alignments replicate those visible in a 1947 aerial photograph of the ranch, although they have likely been repaired or rebuilt over time.[144]

Warren regularly maintained his ditches to rid them of weeds, undergrowth, and animal pests. One of the worst problems was cheatgrass that traveled down the irrigation ditches and spread into the fields on the east side. When fertilizer failed to kill it, Warren switched to nitrogen, and clover replaced the cheatgrass. He then sprayed the irrigation ditches with chemicals to keep the cheatgrass from coming back.[145] Sometimes Warren used a ditcher to clear vegetation from the ditches, but he seems to have preferred burning. To seasonally clean his irrigation system of weeds, Warren burned his larger ditches by putting a gas tank and pump on a wagon, then drawing the wagon along the ditch as an igniter flamed the gas being pumped out. Initially Warren and his hired hands let the fire burn, but a few times, they lost control, and fire spread to fields. After that, Warren began taking a water wagon along to spray creeping hot spots.[146] Warren had little patience with the beaver that built lodges and dams in his ditches; he blew up the dams with ditching powder or dynamite.[147]

In 1934 and 1940, Warren added rights for domestic and stock purposes. Some of Warren's water management improvements enhanced his own home, a cottage built in 1934.

---

[144] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-62, 2-63, 4-27; Interview, Con Warren by Paul Gordon July 29, 1976, Acquisition of land on West Side of ranch in 1938, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 3-4, Grant-Kohrs Ranch National Historic Site Archives.

[145] Conversation with Con Warren, 13 April 1989, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

[146] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-63, 2-65; Con Warren Says 1988 in Response to Questions, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

[147] Con Warren, Seasonal Training, May 9, 1985, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Con Warren to Bill Stalker 2-17-93, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

Shortly after constructing the house, he purchased a refrigerator for it and the cookhouse; he no longer needed to cut ice in the winter from Kohrs and Bielenberg's old ice pond along Johnson Creek.[148] That year, he also dug a well to supply water to the house. (In 1952, he added a partially submerged pump house (HS-88) to the well.)[149] In 1934, he dug another well, using some of the water for stock watering and the rest for domestic purposes.[150] In 1940, Warren claimed water from Cottonwood Creek and from the Clark Fork River, both for stock watering, taking water from Cottonwood Creek via the Kohrs-Manning Ditch, and from the Clark Fork directly.[151]

Around 1954, Warren shifted his main cattle operations from the historic Kohrs ranch buildings to a series of newer buildings east of the railroad tracks near his home. Lying on low lands, the historic ranch site experienced almost constant flooding and muddy ground whereas the east side was higher and drier.[152] Keeping the historic home ranch area well drained had been a challenge for both Grant and Kohrs, and it was a battle Warren did not want to fight continually. However, he did make some changes at the old ranch house complex, many of which ultimately damaged or obscured the historic fabric of the original ranch lawn irrigation and drainage system. In 1934, Warren abandoned the buried pipe and trough system for yard irrigation and the underground drainage system and installed a water spigot on the front of the

---

[148] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-61; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 41, Grant-Kohrs Ranch National Historic Site Archives.

[149] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-70, 3-4-3, 3-4-4; "Grant-Kohrs Ranch National Historic Site Water Rights," 12-13, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This is water right 76G-W-092030-00. The National Park Service replaced Warren's pump house with a new pump house and pressure tank in the 1990s, but left the old one standing.

[150] "Grant-Kohrs Ranch National Historic Site Water Rights," 12-13, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. These are water rights 76G-W-092029-00 (stock), and 76G-W-092031-00 (domestic).

[151] "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 25, 35, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. These are water rights 76G-W-162334-00 (Cottonwood Creek), and 76G-W-162337-00 (Clark Fork River).

[152] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-75; Conversation with Con Warren, 4/4/85, by James "Bow" O'Barr, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

house for surface watering. Later in 1950, Warren put six inches of earth fill on the front/eastern lawn of the original ranch house and seeded it with turf grass to cut down on a growing cheat grass problem. This effectively covered the nineteenth-century wood flume irrigation system that Kohrs had created for the lawn and trees and the underground drainage system to flush waste and excess water from the ranch house area.[153]

Warren constantly updated his ranch irrigation system with new technology and equipment to reduce labor and increase output. He struggled with the swampy lands along the head of his ditch on the West Side, so in 1940, he abandoned the site and installed an irrigation pump on a city lot south of Milwaukee Avenue. (Referred to earlier in the report as the Kohrs or Big Ditch.) The pump withdrew his current Clark Fork River shares, making it possible to pipe the water from the pump straight into a reconditioned ditch high enough to service his hayfields. Warren spread the water through the fields using contour ditches. This directed the flow and moved it down the slopes so that it was reused multiple times before returning to the river. This network enabled Warren to reduce his annual ditch and water expenses by half. Warren believed it was the first irrigation pump in the valley. The system worked well for about seventeen or eighteen years. Later, he moved the pump from its first location into his own property and buried 600 feet of pipe from the pump to the Kohrs Ditch to allay residents' concerns about children drowning in the ditch.[154] In the mid-1950s, Warren improved irrigation on his land east of the

[153] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-76, 3-1-15, 3-3-3, 4-28; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 9-10, 19; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement,* Chapter 2; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C; Memo to the files from the superintendent dated 5/10/83, subject: discussion with Con Warren 11/3/82, use of part of hydraulic ram line by Con, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

[154] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-72; Interview, Con Warren by Paul Gordon July 29, 1976, Acquisition of land on West Side of ranch in 1938, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Con Warren/Jim Taylor, April 27, 1988, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 4, Grant-Kohrs Ranch National Historic Site Archives..

railroad tracks. In 1954, Warren constructed a hand line irrigation system to irrigate crops in this area, diverting water he owned in the Kohrs-Manning Ditch. This involved laying over 2,300 feet of water line and the hand line irrigation system with buried pipe, standpipe risers, and hand line sprinklers to irrigate the fields. He believed that he was the first valley resident to use sprinklers.[155] Warren built two pump houses on his ranch circa 1960: a concrete pump house (HS-87) in the southwest corner of the West field to lift water from the Clark Fork six hundred feet west to the Kohrs Ditch, also known as the Kohrs Ditch or "Big Ditch" and a north pump house (HS-86) on the north end of the north field next to the Kohrs-Manning Ditch.[156]

**Irrigation in Grant-Kohrs Ranch National Historic Site**

In 1970, when the National Park Foundation acquired Grant-Kohrs Ranch, it also gained ownership of the water rights attached to the land which it purchased in fee. The park can use this water for crop irrigation, stock watering, or domestic use. Where the National Park Service holds easements, the owner of the land retains the water rights, not the agency.[157] By 1985, Grant-Kohrs Ranch NHS had acquired seven water rights. When Conrad Warren sold the last of his ranch to the National Park Service in 1988, the agency obtained additional water rights associated with shares Warren had owned in the West Side Ditch and Kohrs-Manning Ditch, as well as rights to other streams to wells, adding fourteen new water rights to National Park Service ownership. This enabled the park to expand its irrigated acreage and increase hay yields on adjacent fields. Grant-Kohrs also has rights to divert water for irrigation from Clark Fork, Johnson Creek, and Taylor Creek, and has ground water and surface water rights for domestic

[155] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-76, 2-81, 3-5-3, 4-27; Interview, Con Warren by Paul Gordon July 29, 1976, Acquisition of land on West Side of ranch in 1938, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives.

[156] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-82.

[157] U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 9.

and stock watering.[158] NPS personnel initiated an agricultural land lease program in 1989, allowing neighboring ranchers to utilize portions of park lands for hay production and grazing. The park then spent the earnings to maintain and improve the irrigation system on these and other lands.[159] In 1991, the park bought a 1942 water right from the Chicago, Milwaukee, St. Paul and Pacific Railroad Company that the railroad had historically used for a gravel pit operation. The railroad discontinued operation in 1980, and the National Park Service acquired land through which the tracks passed in 1983. It began pursuing purchase of the railroad's water right, receiving them in 1991.[160] The park filed two late water claims in 1996 on rights originally filed by Conrad Kohrs on the North Fork of Johnson Creek. In 1999, the park filed its last claim for a ground water well for stock watering. This brought the water rights held by the park to its current total of twenty-five.[161]

The irrigation system at Grant-Kohrs Ranch is an elaborate infrastructure of ditches, diversion dams, headgates, flumes, culverts, siphons, pipes, pumps, risers, and handlines, capable of irrigating approximately 782 acres of land. Ditches that criss-cross the land draw from natural creeks, streams, or springs. Many of these features are historic or replaced or repaired versions of historic features, and the park continues to use them and practice traditional irrigation techniques. The main earthen ditches have wooden or concrete head gates. As needed, the ditches pass through culverts to direct the water under roads or other bodies of water. These culverts might be concrete, metal, wood, or PVC. In other places, ditches flow through flumes

---

[158] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-99; McChristian, *Ranchers to Rangers*, Chapter 3; Kathy Allen, et al., *Natural Resource Condition Assessment*, 235-236; "Grant-Kohrs Ranch National Historic Site Water Rights," 2-3, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

[159] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-99, 2-100.

[160] "Grant-Kohrs Ranch National Historic Site Water Rights," 2-3, 9, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This is water right 76G-W-090691-00.

[161] "Grant-Kohrs Ranch National Historic Site Water Rights," 2-3, 24, 54, 56, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. The two late claims are water rights 76G-215969-00 and 76G-216098-00. The 1999 water right is 76G-W-109125-00.

over roadways or other bodies of water. The ditches frequently follow the land's natural contours and feed into smaller laterals, or secondary ditches. These laterals direct the water more precisely to where irrigators can apply it to fields or pastures. Diversion dams composed of rubber impregnated canvas or plastic poly woven tarp attached to poles are located every few hundred feet along ditches. If workers want to flood a field with water, they place the poles across the ditch with the canvas held in place at the bottom with stones or backer boards. Water rises and spills over the edges of the canvas or through vents cut with a shovel in the berm of the ditch. When not in use, these portable canvas dams are left lying alongside the ditches.[162]

One of the National Park Service's first and ongoing duties at Grant-Kohrs Ranch was to improve drainage around the ranch home complex while preserving as much as possible Kohrs' historic house and lawn watering system. Lying within the floodplain at a lower elevation than the surrounding area, the ranch house buildings were poorly drained. Johnson Creek saturated the boggy surrounding land. This problem plagued both Kohrs and Warren, and Kohrs constructed a wooden drainage system to resolve it. However, much of this system has since decayed or been obscured by Warren's later modifications. Remnants of buried pipe, collection boxes, and drainage tiles still remain, but the full extent and location of the historic lawn irrigation and drainage system is unknown. The National Park Service's goal was to install new, modern drainage tiles to reduce some of the boggy environment and standing water that posed a structural risk to the historic buildings.[163] Although the agency left the historic hydraulic ram

---

[162] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-11, 3-5-5, 3-5-6; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement*, Chapter 2; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 34-35; "Irrigation," Bulletin 259, April 1950, Extension Service, in Montana State University Extension Service Records, 1912-1970, Montana State University Library.

[163] U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 9-10, 19; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-1-1, 3-1-14, 3-1-15, 3-3-3, 3-3-7, 3-3-8, 4-28; Albright, *Grant-Kohrs Ranch National Historic Site: Cultural Resources Statement,* Chapter 1, Chapter 2; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C.

system and cisterns in place, water for the home site now came from the town of Deer Lodge rather than springs and ditches. In 1975, the National Park Service performed building foundation work on the historic structures and graded around them to improve drainage issues. Agency employees graded and filled old ranch roads throughout the area, particularly in the bottomlands, to raise their grade up to that of surrounding fields.[164] That same year, the workers installed a new drainage system for the ranch house's rear lower yard. This included new drain tiles to alleviate the regular flooding issue in the bottomlands along the Clark Fork River.[165] Proper drainage of the historic home ranch headquarters area has proved an ongoing challenge. In 1984, the park constructed a gravel drainage area around the recently stabilized granary (HS-18) to keep standing water away from the building.[166] In 2001-2002, the park restored the ranch house yard's cultural landscape that included installing a new underground watering system and planning cottonwood trees.[167]

Modern water management at the site also involves cooperation with the City of Deer Lodge. In 1958-1960, the City of Deer Lodge constructed a sewage treatment pond on seventy acres in the northwest corner of the ranch. In 1982, the city rebuilt this into four separate holding ponds with a pumphouse.[168] In 1970, the Park Service began work to hook up the ranch house to city water and sewer lines to provide sufficient water for extensive visitor use. In 1979, to meet health and fire safety requirements, the existing well and ditch system were condemned. Grant-Kohrs Ranch then connected to the City of Deer Lodge main located south of the park on Milwaukee Avenue. All drinking water for humans now comes from the City of Deer Lodge water supply. Cattle too are watered through this system, although the site also utilizes a

[164] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-88.
[165] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-89.
[166] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-93.
[167] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-103, 3-3-3.
[168] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-82, 2-85, 3-9, 4-18.

groundwater well.[169] To promote Clark Fork River water quality and to make use of available water, the National Park Service and the City of Deer Lodge entered into an agreement regarding irrigation use of the sewer treatment ponds' effluent water. In 2000, the park began watering its front fields and pastures with treated effluent from Deer Lodge's sewage lagoon. The park drilled wells to monitor potential effects to water quality as a result of the effluent irrigation project. The mainline and handline system was installed in 1999-2000 and used through 2013; it replaced and replicated Warren's original hand line system that he had installed to irrigate the fields in 1954. The effluent system irrigated nearly 100 acres of pasture east of and 25 acres west of the railroad right of way. In 2014, the City of Deer Lodge decided to discontinue the supply of effluent water because the Montana Department of Environmental Quality granted it a variance for discharge directly to the Clark Fork River while it began the construction of a new wastewater treatment facility. The effluent water temporarily irrigated the fields in place of Kohrs-Manning Ditch water. [170]

As much as possible, Grant-Kohrs Ranch irrigates its large number of fields and pastures with the same historic sources and methods. It designates irrigated lands for growing hay while irrigating others for grazing. Where it can, the ranch maintains the historic practices of flood or hand line irrigation with a few modern mainline irrigation systems that replicate historic field irrigation such the city's sewage pond effluent operation. Grant-Kohrs Ranch National Historic Site's twenty-five water rights come from a diverse array of streams, wells, and springs. Most transferred with the land purchased from Conrad Warren in the 1970s to 1988, although later the

---

[169] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-83, 2-90, 3-4-3; McChristian, *Ranchers to Rangers*, Chapter 4; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 2-3.

[170] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-102, 3-9, 3-11, 3-5-, 3-5-5, 4-27; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 16, 24; Kathy Allen, et al*., Natural Resource Condition Assessment*, 79-80.

park did acquire a few additional rights. The rights originally owned by Warren stretched back as far as the Johnny Grant era. Water originates in the Clark Fork River and its tributaries (including springs, intermittent flow through gulches, Johnson Creek, Cottonwood Creek, TayloCreek) and flows through a variety of major ditches and their laterals including the Kohrs-Manning Ditch (c.1872), Johnson Ditch (c.1860s?), the Kohrs Ditch or "Big" Ditch (c.1886?), the West Side Ditch and associated Taylor Ditches (c.1887-1889), and the Hartz Ditch (c.late 1880s-early 1890s?). A few other historic ditches are no longer in use: the Warren Ditch (c.1930s?), portions of the Salmonson Waste Ditch (date unknown), and a variety of other small abandoned ditches.[171]

The National Park Service routinely maintains, repairs, and cleans Grant Kohrs Ranch's irrigation systems with a tractor, a ditcher, and a backhoe/excavator. GRKO staff employed ditch burning in the spring until implementation of the 2002 Wildland Fire Management Plan required the use of a wildland fire burn organization. Currently, US Forest Service personnel complete the annual ditch burn through an interagency agreement facilitated by the Glacier National Park Fire Management Office. Employees have repaired ditches, culverts, and head gates, replacing them or constructing new ones as needed. While respecting traditional materials and historic features, the park must constantly balance functionality and continued use with new technologies.[172] In 1978, the park initiated a regular program to clean the ditches, streams, and Clark Fork River within the park boundaries.[173] In 1982, members of the Youth Conservation

[171] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-5-1, 3-5-2, 3-5-3, 3-5-5, 3-5-6, 3-6-1, 3-6-3, 4-24, 4-25, 4-26, 4-27. Jason Smith, Grant-Kohrs Natural Resource Specialist, commented that this appears to be on land owned by Lars Olsen purchased from Con Warren in 1979, although it is within the administrative boundary of the park. A portion of the original Salmonson Waste Ditch is still in use in the extreme southwest corner of Taylor Field. Another ditch immediately south of the Salmonson conveys water to the west fields in place of the Salmonson ditch.

[172] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-11, 3-5-5, 3-5-6; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 12, 14, 16, 18, 24-25, 33-35.

[173] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-90.

Corps cleaned trash from Johnson Creek and Kohrs-Manning Ditch.[174] In 1983, the park cleaned all of the irrigation ditches and replaced headgates, enabling irrigation of the Stuart fields for the first time in many years.[175] In 1992, the park worked with other users of the Kohrs-Manning Ditch to clean and repair the ditch and its headgates.[176] During 1994-1995, workers built temporary weirs on Johnson, North Fork of Johnson, and No Name Creeks. In 1995, workers installed a temporary log boom upstream from the Clark Fork River's Kohrs "Big Ditch" irrigation pump intake to prevent debris from damaging the pump during spring runoff. That same year, the park installed two culverts in the Big Gulch fields' irrigation ditches to improve harvesting hay.[177] In 1996, crews constructed a new jack-leg fence along Kohrs-Manning Ditch between Cottonwood and Johnson Creeks to prevent cattle from accessing the ditch and contributing to erosion. To provide drinking water for the cattle, the park installed a new livestock waterer at Johnson Creek.[178] In 1997, park staff put a temporary diversion structure in the Clark Fork River at the West Side irrigation pump to ensure sufficient water intake. A year later, park employees repaired a badly eroded concrete diversion structure at West Side Ditch and Taylor Creek using rock and soil fill. They then graded the land, reseeded it, and planted willow trees to help with bank stabilization.[179] In 2011, the park filed a permit application for work to reset and level headgates on Hartz Ditch off Taylor Creek. Over repeated freeze and thaw cycles, the headgates had lifted and unleveled themselves, and the creek had eroded the

[174] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-91.
[175] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-91.
[176] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-100.
[177] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-101.
[178] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-102.
[179] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-101.

bank on the side of one headgate so that the water flowed around it. Repairs allowed proper diversion of water through Hartz Ditch.[180]

As irrigation features and infrastructure such as flumes, headgates, and pumphouses deteriorated over the years, Grant-Kohrs abandoned, tore down, moved, or replaced some of them, in some cases leaving their deteriorated remains nearby. Faint networks of abandoned ditches and laterals mark the landscape.[181] The dates of origin for most of the ranch's irrigation structures and features, including diversion dams, pipes, headgates, culverts, pumps and flumes, are unknown. Over the years, they have likely undergone repairs and replacements with new features of similar function and appearance to ensure continuous operation. For example, in the 1990s, the National Park Service replaced most of the ranch's headgates. The park museum collection holds representative features of this historic irrigation system. Thus, while some of the features might not themselves be historic, they support the historic appearance and significance of the ranch's irrigation system.[182]

Beavers present an on-going management challenge for employees at Grant-Kohrs Ranch. Although natural to the ecosystem, the rodents can alter riparian vegetation, build lodges in waterways, and dam up irrigation ditches. They interfere with the operation of irrigation systems and with the legally mandated water flow to various lands. As beaver cut down trees to build dams and lodges, the creatures imperiled historic cottonwood stands along waterways.[183]

---

[180] "Joint Application for Proposed Work in Montana's Streams, Wetlands, Floodplains, and Other Water Bodies, SPA 124 Permit, Department of Fish, Wildlife and Parks," April 26, 2011, Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site.

[181] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-1-15, 3-1-16, 3-2-8, 3-7-6, 3-7-8, 3-8-4, 3-9-5, 4-27; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 3, Chapter 4.

[182] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-27; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 12, 14, 18, 24-25, 33-35.

[183] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-10, 3-5-5, 3-5-6; Kathy Allen, et al., *Natural Resource Condition Assessment*, 70-71; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 18.

By the 1980s, beaver had severely obstructed the free flow of drainages and ditches, particularly along Kohrs-Manning Ditch; in 1985, the park authorized the Kohrs-Manning Ditch Company to trap and remove beaver from areas within the company's right of way through the park.[184] In 1997, workers put perforated culverts or "beaver pips" through existing beaver dams to facilitate water flow in ditches.[185] Their efforts to breach beaver dams in the 1980s and 1990s were not permanently successful, especially during high water level times. Consequently, in 1999, the park received permission from the Montana Department of Fish, Wildlife, and Parks to remove the problem beaver dams with hand tools. The National Park Service also issues special use permits to live trap and relocate beaver.[186] Columbian ground squirrels are another problem at Grant-Kohrs Ranch as they burrow into ditch walls, weakening the berms and causing ditch wash-outs and flooding. The National Park Service has had varied results with keeping ground squirrel populations in check, including setting poison grain baits, but the agency now attempts to control the animals through Integrated Pest Management techniques.[187]

Continued retention, use, and maintenance of historic irrigation systems and structures serves to interpret visually the history of Grant-Kohrs Ranch. The Park Service waters the stock, the lawns and gardens, and the fields that Grant, Kohrs, and Warren irrigated with historic water rights and historic techniques. This highlights to visitors the importance of irrigation to a working ranch and demonstrates traditional agricultural skills like flood irrigation. Although over

---

[184] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-92; "Grant-Kohrs Ranch National Historic Site Water Rights," 21, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Memorandum for GRKO Division Chiefs and GRKO files, from GRKO Superintendent," August 1, 1985, and "Memorandum for GRKO files, from GRKO Superintendent," August 2, 1985, Kohrs-Manning Ditch binder, Jason Smith's office, Grant-Kohrs Ranch National Historic Site.

[185] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-101.

[186] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-102, 3-10, 3-5-5, 3-5-6; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 18, 35.

[187] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 3-5-5, 3-5-6; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 18, 35; Kathy Allen, et al., *Natural Resource Condition Assessment*, 88.

time the irrigation system may need repairs or replacements to ensure its full functionality, the park strives to use compatible materials and a sensitive approach to preserve the features' historic fabric and use. By retaining the historic connections between streams and ditches, park employees continue irrigating in the spirit and intent of the ranch's former owners.[188]

The nature of water and water utilization at Grant-Kohrs Ranch requires the National Park Service to cooperate closely with other water users, and all must share maintenance and monitor water measurements to diffuse any disagreements. The two entities with which Grant-Kohrs Ranch interacts the most are the Kohrs-Manning Ditch Company and the West Side Ditch Company. But the ranch has also needed to solve differences with other water users on other streams. For example, Grant-Kohrs Ranch is one of several users that draws from Johnson Creek and has rights senior to other irrigators. In 1992, when Harold Billquist took water out of the creek below his diversion on Cottonwood Creek and deprived the ranch of its allotted water from Johnson Creek, park staff negotiated with Billquist to end the useage.[189]

Grant-Kohrs maintains a relationship with the Montana State Prison over Taylor Creek. The stream travels through the Department of Corrections land before reaching Grant-Kohrs Ranch where the park diverts its priority water rights to irrigate hay fields. The prison does not have any water rights on the creek, but has storage rights as it impounds water from other sources in two reservoirs on Taylor Creek. The prison then uses this water to irrigate its own ranch operation. Sometimes the prison has impounded the water during Grant-Kohrs' irrigation season, preventing the ranch from getting its legally entitled water. In 1998, the National Park Service and the Montana State Prison entered into an agreement regarding Taylor Creek water.

---

[188] Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 34-35.

[189] "Grant-Kohrs Ranch National Historic Site Water Rights," 32, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

In 2009, when Taylor Creek dropped too low to irrigate the park's fields, the park contacted the prison, both sides worked through the situation, and the park stressed the importance of receiving all its appropriated water.[190]

Another challenge for the park has been the flooding of private residences related to the ditches in Taylor Field. Existing outside the park, these structures were built after irrigation was well established on Taylor Fields. Thus, under Montana law, Grant-Kohrs is not liable for damage associated with seeps, irrigation overflow, or flooding caused by acts of nature. However, the park makes considerable effort to behave as a good neighbor when problems arise. In 1998, the Montana Department of Transportation realigned Conley Lake Road and Taylor Creek, which moved the creek about fifty feet north into Grant-Kohrs Ranch National Historic Site land. This change resulted in sub-surface flooding from ground water of two private residences on the park's southeast border.[191] In February 2001, the Ray residence on Milwaukee Avenue, east of Taylor Field, flooded. Grant-Kohrs Ranch workers found that someone had removed boards from the ditch headgate near the home, allowing water to divert from Taylor Creek into a side ditch next to the house. Because the headgate was iced over, they could not replace the boards, so they blocked the water from the house with sand. Over the course of several days, the park, the Department of Transportation, and the city of Deer Lodge worked together to divert water from the house using sand and by building channels. The Rays inquired

[190] "Grant-Kohrs Ranch National Historic Site Water Rights," 22-23, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Jason Smith's notes on May 13, 2009 meeting with Montana State Prison representative Troy McQueary; Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site.

[191] "PMIS 109549, Project Title: Emergency ditch lining and monitoring wells, Date created: 8-6-04, updated 10-19-04, region reviewed 11-10-04," Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site; "Statement of Work, Groundwater Monitoring Wells, Lower Taylor Field," Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site; "Statement of Work, Irrigation Ditch Lining, Lower Taylor Field, Grant-Kohrs Ranch National Historic Site," Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site.

with the city regarding initiating a lawsuit against the park.[192] Due to its sunken location and close proximity to ditches, the residence had flooded before, as had vandalism of the headgates. Although not legally required to do so, park staff made ditch improvements. In 2004, acting as a generous community member, the park superintendent applied for funds to install emergency ditch lining and a dozen test wells along the park's southeast boundary to monitor sub-surface water movement. It subsequently lined 1,000 linear feet of the ditch with a permanent polypropylene membrane to prevent ditch seepage that raised the groundwater.[193] Despite these efforts, the low land, high groundwater levels, and porous soils continue to gather water near the Taylor Field, and heavy rainfall only exacerbates the issue. In mid-May 2005, Kathy Mitchell, who lived along the park's southeastern boundary, reported flooding in her basement due to heavy rain, flash flooding, and overflow on Taylor Field. She asked Grant-Kohrs Ranch to re-line the ditch. Park workers found standing water in the Mitchell yard, water flowing full in the ditch, and the entire Taylor Field area saturated. But there were no breaks in the ditch lining, so seepage was not the culprit. Being a good neighbor, park workers cut off the flow that returned the water to a catch ditch and waited for the land to dry out. Within a couple days, the ditch no longer held water, and though the ground had puddles, the water level in the Mitchell yard diminished substantially.[194]

---

[192] "Notes on the Flooding of Ray Residence," February 9, 2001, February 12, 2001, February 14, 2001, Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site.

[193] "PMIS 109549, Project Title: Emergency ditch lining and monitoring wells"; "Statement of Work, Groundwater Monitoring Wells, Lower Taylor Field"; "Statement of Work, Irrigation Ditch Lining, Lower Taylor Field."

[194] "Notes on Mitchell Flooding," May 16, 2005, May 17, 2005, May 18, 2005, and May 19, 2005, Taylor Ditch digital files, Grant-Kohrs Ranch National Historic Site. Jason Smith, Grant-Kohrs personnel, pointed out that the Montana Code Annotated 85-7-2212 states that irrigation districts or private person or entities owning or operating irrigation ditches are not liable for property damage from floodwaters caused by rainfall, weather, or acts of nature, nor are they liable for damage caused by water seepage that existed or began before the injured party obtained the land.

**Kohrs-Manning Ditch Company**

The Kohrs-Manning Ditch likely began as a consolidation of various early irrigation ditches first constructed by Johnny Grant. Around 1870, Conrad Kohrs and Judge Edward Manning of Deer Lodge collaborated to improve Grant's existing network for stock watering and hay irrigation. Sometime around 1872, they formally established the Kohrs-Manning Ditch Company. According to water rights records, the company actually took out its first water right, to Cottonwood Creek, in 1868.[195] Over the years, Kohrs and Manning added to the ditch, enlarging it in 1889 and obtaining water from Cottonwood Creek, Clark Fork River, and Peterson, Reece Anderson, and Johnson Creeks. The company sold or used most of the water shares north of the current Grant-Kohrs Ranch park boundary, although Conrad Kohrs did utilize some on his ranch. His specific right ditch water came from an 1895 filing on the Clark Fork River. In 1931, Conrad Warren also took out a right to Clark Fork water from the ditch.[196] Users on Kohrs-Manning Ditch in 1936 included Hans Mollenberg (125 miner's inches), Frank Christoffersen (150 miner's inches), Edward Christoffersen (150 miner's inches), W. J. Hoskyn (200 miner's inches), Lee Olson and Agnes Olson (125 miner's inches), and Conrad Warren

[195] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-32, 2-33, 4-26; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C; McChristian, *Ranchers to Rangers*, Chapter 3; Kathy Allen, et al., *Natural Resource Condition Assessment*, 79; Shapins Belt Collins, *Grant-Kohrs Ranch Cultural Landscape Report*, 2; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 50, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Continuation of Abstract of Title in the Lands Described in the Caption Herein," May 31, 1888, Kohrs-Manning Ditch papers, William (Bill) Mosier. John Milner Associates speculates that the first right of the Kohrs-Manning Ditch was taken out in 1872 by Kohrs from the Clark Fork River. While Kohrs did take out a right in that year, it was under his own name, not the company's. Water rights records indicate an 1868 filing on Cottonwood Creek for Kohrs-Manning Ditch's first right. See John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 50, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives. This 1868 filing is water right 76G-W-091146-00.

[196] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-32, 2-33, 4-26; "Grant-Kohrs Ranch National Historic Site Water Rights," 19-20, 49, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Continuation of Abstract of Title in the Lands Described in the Caption Herein," May 31, 1888, Kohrs-Manning Ditch papers, William (Bill) Mosier. The 1895 filing is water right 76G-W-092044-00, and the 1931 filing is water right 76G-W-162345-00.

(125 miner's inches).[197] Around 1950, the venture enlarged, but not did lengthen, the waterway with a backhoe.[198]

Warren apparently received his share of 125 miner's inches in exchange for allowing the right-of-way for most of the ditch to pass through his ranch. In 1948, Warren and the Kohrs-Manning Ditch Company were working on a proposed agreement to codify this right-of-way. Warren's attorney laid out edits to a draft, noting that Warren was willing to grant an easement and right of way to the company if it agreed to change the document. Warren had been using and was entitled to use, free of charge, 125 miner's inches of water from the ditch on his ranch. He would give the easement only with the understanding that the company would perform faithfully all its covenants outlined in the agreement. It would maintain and repair all existing bridges across the ditch on Warren's land, free and clear of charges to Warren. At its own expense, it would keep and maintain all existing head gates, shut-off gates, diversion gates, and all other means of diversion of Warren's 125 miner's inches. The firm would not charge or hold Warren responsible for the costs of maintenance or operation of the ditch or its extensions or any of its enlargements, improvements or repairs. At the end of each irrigating season, it would completely shut off water in the ditch at its source or where it crossed Cottonwood Creek or Warren's lands. Warren was not obligated to use his 125 miner's inches and could use them at will without notifying the company about his diversion or return of water to the ditch. Finally, the agreement did not waive Warren's right to hold the company responsible for any damages caused to his

[197] Correspondence, Kohrs & Manning Ditch Co., January 9, 1936, to Conrad Warren, signed by H. P. Mollenberg, Board of Directors, regarding water assessments on Kohrs & Manning Ditch, in Series 8, Subseries E, Folder 35, C. K. Warren Collection, Conrad K. Warren Personal Papers (1932-1993), Record Group #2, Accession Number GRKO-1338 & GRKO-1124, Catalog Number GRKO 16700, Grant-Kohrs Ranch National Historic Site Archives.

[198] Oral History Interview with Bill Mosier Sr., January 16, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, pp. 5-7; Oral History Interview with Fred Benson, January 15, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, p. 16.

property for negligent operation, maintenance, or repair by the company.[199] Technically, Warren was not a shareholder in the Kohrs-Manning Ditch Company; he merely held a right-of-way and received his water right through the easement.[200] It is unclear if Warren and Kohrs-Manning Ditch Company ever approved and signed a final version of this agreement, but the attorney's letter is proof that the parties had entered into written negotiations.

Although some of the Kohrs-Manning Ditch rights passed from Kohrs and Warren to the National Park Service, other owners hold water rights to the rest of the Kohrs-Manning Ditch Company. Apparently after it constructed the ditch around 1870, the enterprise sold most of the water north of the ranch, and the remaining flow was insufficient for the ranch's needs, although the ranch put it to use. When the National Park Service obtained the last of Conrad Warren's lands in 1988, they came with 125 miner's inches of water to the Kohrs-Manning Ditch, an addition to the six miner's inches that the National Park Service had acquired with the initial ranch purchase in 1970 through Deed No. 3. Because most of the users on Kohrs-Manning Ditch are located relatively far from the initial diversion point on the Clark Fork River and because a good portion of the six-mile ditch extends through Grant-Kohrs Ranch, the park diverts some of the ditch's water through existing water rights in exchange for the ditch right-of-way. Today, the majority of the water rights remain not with the ranch and the National Park Service but with private landowners.[201]

---

[199] Correspondence, July 3, 1948, to Mr. Shelton Williams, Attorney, Deer Lodge, from K. W. MacPherson, regarding proposed agreement for a right of way granted by the Conrad Kohrs Company to the Kohrs-Manning Ditch Company, in Series 8, Subseries E, Folder 35, C. K. Warren Collection, Conrad K. Warren Personal Papers (1932-1993), Record Group #2, Accession Number GRKO-1338 & GRKO-1124, Catalog Number GRKO 16700, Grant-Kohrs Ranch National Historic Site Archives. The claim to 125 miner's inches is water right 76G-W-092044-00.

[200] Oral History Interview with Fred Benson, January 15, 2014, p. 18.

[201] Albright, *Grant-Kohrs Ranch National Historic Site: Historic Structure Report*, Chapter 5, Section C; McChristian, *Ranchers to Rangers*, Chapter 3; U.S. Department of the Interior, National Park Service, *Statement for Management*, 7; "Grant-Kohrs Ranch National Historic Site Water Rights," 19-20, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

The Kohrs-Manning Ditch begins just south of the park's boundary at a headgate on the Clark Fork River. It runs north on the east side of the Clark Fork through the ranch's riparian zone where a diversion and flume carry it over Cottonwood Creek and Johnson Creek. The ten-foot wide, six-mile long ditch and its lateral irrigates fields on its east side (including Stuart Field and the North Meadow) during the summer months when water is running low.[202] At an earlier time, it irrigated the Front Field and North Field via a hand line that Conrad Warren installed in 1954, and until 2013, the park watered these lands using effluent from the city's sewerage ponds rather than Kohrs-Manning Ditch.[203] Pulling water from Johnson Creek and irrigating Stuart Field, Johnson Ditch ends near the Kohrs-Manning Ditch, supplementing its flow. [204] After leaving the Grant-Kohrs Ranch National Historic Site boundary, the ditch flows as far as O'Neill Creek.[205] Today, with filings dating from 1868 to 1958, the Kohrs-Manning Ditch Company holds fourteen water claims for irrigation and stock watering using water primarily from Cottonwood Creek and the Clark Fork River. The company also has the right to all high water on Cottonwood Creek, that is, the remaining water in the creek after all other users have taken their share. In some years when Cottonwood Creek is particularly high, Kohrs-Manning shareholders will use mostly creek water and only switch to the Clark Fork River when Cottonwood Creek drops substantially.[206] Unlike West Side Ditch, the company has never had a ditch rider to

---

[202] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-1-4, 3-5-5, 3-7-5; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 9-10, 48; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site: Cultural Landscape Analysis* ([Denver?]: Rocky Mountain Region, National Park Service, [1987]), 11; U.S. Department of the Interior, National Park Service, *Statement for Management*, 7.

[203] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 4-27.

[204] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-5-5.

[205] Oral History Interview with Bill Mosier, January 16, 2014, pp. 6-7.

[206] "Grant-Kohrs Ranch National Historic Site Water Rights," 20, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Fred Benson, January 15, 2014, p. 13. Kohrs-Manning Ditch Company Rights include 76G-W-091146-00 (Cottonwood Creek, 1868), 76G-W-091137-00 (Clark Fork River, 1895), 76G-W-091140-00 (Clark Fork River, 1895), 76G-W-091147-00 (North Fork of Johnson Creek/Fred Burr Creek, 1905), 76G-W-091138-00 (Clark Fork River, 1931), 76G-W-091141-00 (Clark Fork River,

monitor the ditch, adjust flows, or measure use.[207] Since at least 1982, William Mosier, Sr. has served as president of the Kohrs-Manning Ditch Company. A descendant of the Christoffersons who used the ditch in the 1930s, Mosier, Sr. took over their ranch and irrigated from the ditch starting in 1959.[208] Besides Mosier Sr., other active users on the ditch today are Fred Benson and Dave Johnson. The company currently has three shareholders, Bill Mosier Sr., Fred Benson, and Dave Johnson, and five users, including Lars Olson and Grant-Kohrs Ranch.[209] Benson started at his place on the ditch around 1960. He is the final user on the ditch.[210]

Kohrs-Manning Ditch users practiced a mix of sprinkler and flood irrigation. Around 1973, Mosier Sr. put in a sprinkler system on his hill, and it was an expensive investment. He was among the first to put in sprinklers, and a number of other people followed him. He started with a wheel line, and then later switched to a pivot. The rest of his land he flood irrigates.[211] Mosier Sr. first used canvas dams for flood irrigation but now has plastic dams that last longer. He places the dams on the smaller ditches or laterals that run through his fields.[212] Fred Benson has no sprinklers, saying that this way he saves on his power bill. Instead, he continues to flood irrigate, believing it is a good system that saves water because it all drains back into the river or

---

1931), 76G-W-162342-00 (Clark Fork River, 1931), 76G-W-091145-00 (Clark Fork River, 1931), 76G-W-091143-00 (Clark Fork River, 1958), and districts 76G-W-091144-00, 76G-W-091136-00, and 76G-W-091139-00.

[207] Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 9-10; Oral History Interview with Fred Benson, January 15, 2014, pp. 20-21.

[208] "Statement of Claim for Existing Water Rights, Irrigation District," April 25, 1982, record for water right 76G-W-91147-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 3, 6-7.

[209] Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 19-20; Oral History Interview with Fred Benson, January 15, 2014, pp. 4, 11; Notice of Intent to Award, Funding Announcement Number NPS-NOIR# P13AC00326, Kohrs-Manning Ditch Irrigation System Improvements, Recipient: Deer Lodge Valley Conservation District, Period of Performance: May 15, 2013-May 15, 2017, accessed June 13, 2016, http://www.grants.gov/web/grants/view-opportunity.html?oppId=234634.

[210] Oral History Interview with Fred Benson, January 15, 2014, pp. 3, 11.

[211] Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 16-17.

[212] Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 25-26.

soaks up into the ground.[213] Although much of Benson's irrigation water comes from the ditch, he also has an individual right to O'Neill Creek.[214]

To maintain and operate its property within Grant-Kohrs Ranch National Historic Site, the Kohrs-Manning Ditch Company has an access with the National Park Service. The company also owns and maintains a diversion dam on Cottonwood Creek and a flume over Johnson Creek, both located within the ranch boundary.[215] Complicating the company and agency partnership is the fact that no written agreement exists between the company or the National Park Service codifying the relationship of each party in terms of access and maintenance. Since the ditch is privately owned and operated, it is possible that ditch members may want to make substantial changes to the ditch or construct new headgates, flumes, or other features that could alter the ditch's historic character. The National Park Service must cooperate closely with the company to ensure the preservation of the ditch's historic features. Another difficulty for the National Park Service is ensuring proper ditch maintenance from a privately-owned company with so few members.[216]

Current users on the ditch note a relatively simple approach to keeping the Kohrs-Manning Ditch clean and operational. Bill Mosier Sr. recalled cleaning the ditch with horses and slips when he was young.[217] Although agricultural extension agents were demonstrating the use of dynamite for ditch digging and enlargement in the 1940s and 1950s, Mosier Sr. said that the Kohrs-Manning Ditch Company never used dynamite, only horses and later machinery. Users on another ditch in the area did employ dynamite, he said, and it caused "a little commotion around

---

[213] Oral History Interview with Fred Benson, January 15, 2014, pp. 9-10.

[214] Oral History Interview with Fred Benson, January 15, 2014, p. 19.

[215] U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*, 48; U.S. Department of the Interior, National Park Service, *Grant-Kohrs Ranch National Historic Site: Cultural Landscape Analysis*, 11; U.S. Department of the Interior, National Park Service, *Statement for Management*, 7.

[216] U.S. Department of the Interior, National Park Service, *Statement for Management*, 7.

[217] Oral History Interview with Bill Mosier, Sr., January 16, 2014, p. 9.

the fields" and spooked some people and horses.[218] According to Mosier, Sr., the company never burned the ditch and encountered few problems with vegetation growing in it.[219] Fred Benson stated that the purpose of paying an annual assessment on shares was to hire a contractor to clean the ditch. This usually happened in the fall, he noted, after the irrigation season was over. No one has cleaned parts of the ditch in a very long time, though Benson commented that they tried to get through a section of ditch each year, but never to the whole thing at once.[220] Sometimes headgates and flumes had to be repaired. Mosier Sr. recalled that most of the structures were originally wood, but concrete has since replaced them.[221]

The current shareholders cooperated to maintain and repair the infrastructure and the ditch itself. Since the 1970s, the company has collaborated with the National Park Service. In addition to seasonal cleaning and maintenance on Kohrs-Manning Ditch, the partners have undertaken many other more substantial projects to ensure full operation of the system. One of the company's biggest projects was channeling ditch water through a pipe under the new interstate highway around 1960.[222] The flumes have required regular repaired or replacement. In 1947, the company constructed a wooden flume to carry the ditch water over Johnson Creek. This flume later proved ineffective, and a new frame flume replaced it in 1974. Plans to replace this flume were initiated in 2013.[223] Workers repaired and replaced the Cottonwood Creek flume multiple times, and in a ditch company meeting in 2014, members discussed the need for yet another replacement. Jason Smith, Natural Resources Specialist at Grant-Kohrs, thought it had

[218] Oral History Interview with Bill Mosier, Sr., January 16, 2014, pp. 11-12.
[219] Oral History Interview with Bill Mosier, Sr., January 16, 2014, p. 12.
[220] Oral History Interview with Fred Benson, January 15, 2014, p. 15.
[221] Oral History Interview with Bill Mosier, Sr., January 16, 2014, p. 9.
[222] Oral History Interview with Fred Benson, January 15, 2014, pp. 8-9.
[223] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-75, 2-88, 3-1-4, 3-1-15, 4-27; Notice of Intent to Award, Funding Announcement Number NPS-NOIR# P13AC00326, Kohrs-Manning Ditch Irrigation System Improvements; Oral History Interview with Fred Benson, January 15, 2014, p. 5. User Fred Benson thought the flume had last been rebuilt around 1970, and Jason Smith at Grant-Kohrs said the National Park Service had drawings from 1969, so it is unclear if 1974 was indeed the date of the replacement.

last been replaced around 1975.[224] In 1982, the National Park Service rehabilitated two bridges over the ditch, giving them new decking and approach grading, and Youth Conservation Corps employees cleaned trash out of the ditch.[225] In 1985, four headgate boxes on the ditch were reconstructed.[226] That same year, due to problems with beavers, the National Park Service authorized the Kohrs-Manning Ditch Company to trap and remove problem animals from within its ditch right-of-way.[227] In 1992, the National Park Service cleaned and repaired the Kohrs-Manning Ditch and its headgates and replaced headwalls on one of the bridges crossing the ditch.[228]

On the surface, the relationship between current ditch users, Conrad Warren, and later the National Park Service appears relatively cordial. Bill Mosier Sr. noted that for most of its history, the Kohrs-Manning Ditch Company shareholders have been family members or related to family members. He felt that everyone has gotten along well and pointed out that no lawsuits concerning the ditch have occurred.[229] Benson agreed that situations on the ditch usually worked pretty smoothly, joking that "nobody every shot anybody!"[230] Mosier Sr. said things were "alright" working with Warren, a feeling Fred Benson echoed—"we didn't have any trouble with Con," he "was always pretty agreeable."[231] Mosier Sr. noted that relations with the NPS were just fine: "we've never had any trouble."[232] Benson agreed. "I have no reason to cuss at you, really," he said to Natural Resource Specialist Jason Smith.[233] Benson did mention that a few

[224] Oral History Interview with Fred Benson, January 15, 2014, pp. 5-6.
[225] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-91.
[226] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-93.
[227] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-92.
[228] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-100.
[229] Oral History Interview with Bill Mosier Sr., January 16, 2014, pp. 9-10.
[230] Oral History Interview with Fred Benson, January 15, 2014, p. 4.
[231] Oral History Interview with Bill Mosier Sr., January 16, 2014, p. 13; Oral History Interview with Fred Benson, January 15, 2014, p. 7, 17.
[232] Oral History Interview with Bill Mosier Sr., January 16, 2014, p. 13.
[233] Oral History Interview with Fred Benson, January 15, 2014, p. 7.

past park superintendents had not been very knowledgeable and that collaboration had not always worked out well. But the park did not interfere with the irrigating, and water still flowed through the ditch. A few times when the National Park Service did not want the ditch company to pull a beaver dam had caused some trouble.[234]

As Fred Benson hinted, the relationship between Grant-Kohrs Ranch National Historic Site and the Kohrs-Manning Ditch Company has not always been smooth. In the past, the park has felt that the ditch company claims far more water than it actually needs to irrigate the number of acres allotted under its water rights filings. The company has also contested the flow rate and amount of the rights Warren transferred to the National Park Service. Some of these issues did go to water court. In 1988, the Kohrs-Manning Ditch Company contested the flow rate and ownership of Conrad Warren's transfer of his ditch shares to the National Park Service, and the quarrel resulted in a water court hearing that found in favor of Warren and the National Park Service. In turn, in 1998, the National Park Service disputed the company's rights to the water in Cottonwood Creek. The company countered that old records of how much acreage could be irrigated with the water were inaccurate, and so the water court issued a ruling giving the company a modified maximum acreage limit.[235] In 2014, Kohrs-Manning Ditch Company president Bill Mosier Sr. agreed that the Grant-Kohrs Ranch gets water from the ditch due to the easement, but he was unsure how the issue stood in water court despite that the claim is filed.[236] Likewise, Fred Benson and Natural Resource Specialist Jason Smith know an agreement

[234] Oral History Interview with Fred Benson, January 15, 2014, p. 7, 20.

[235] "Grant-Kohrs Ranch National Historic Site Water Rights," 19-21, 30, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Notice of Filing of Master's Report, Water Court of the State of Montana, Case 76G-2," August 3, 1998, record for water right 76G-W-91145-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Water Court of the State of Montana," Adjudication case #76G-319, July 20, 1988, record for water right 76G-W-92044-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

[236] Oral History Interview with Bill Mosier Sr., January 16, 2014, p. 8.

regarding the ditch exists, but neither recalled a date or details associated with it. Benson was uncertain if it was a permanent right or had a time period associated with it.[237]

Additionally, conflicts have ensued between the park and the company regarding maintenance and operation of headgates and ditch banks. In 1985, an internal National Park Service memo indicated that the Kohrs-Manning Ditch Company did not approve of how the National Park Service had rebuilt the headgate to divert its six miner's inches.[238] Another 1986 memo noted that Dave Johnson, one of the Kohrs-Manning Ditch Company users, had called Grant-Kohrs Ranch staff and insisted that workers stop cutting the ditch bank to flood irrigate fields. Johnson claimed that the ranch had no legal right to do so and that it caused maintenance problems. The park superintendent agreed to only take water at the headgate and stop cutting the bank.[239]

Other problems in the 1980s involved beaver dams, which are common in the Kohrs-Manning Ditch. The company and the National Park Service have tried to work out a system of responsibility for removing dams and deterring beaver; for instance, in 1985, the park allowed the company to live trap and remove the animals. Some confusion between individuals occurred over the authorization when National Park Service staff stopped the representative from Kohrs-Manning Ditch Company from placing traps that he had just received authorization to place. The superintendent had to clear up the situation with his staff and soothe the hurt feelings of company representatives.[240] Beaver dams in Kohrs-Manning Ditch remain a problem, and the park and

---

[237] Oral History Interview with Fred Benson, January 15, 2014, p. 4, 18.

[238] "Memorandum from Project Assistant, Water Rights Branch, NPS to Chief of Water Rights Branch," September 10, 1985, Kohrs-Manning Ditch binder, Jason Smith's office, Grant-Kohrs Ranch National Historic Site.

[239] "Memorandum for GRKO files, from GRKO Superintendent," May 22, 1986, Kohrs-Manning Ditch binder, Jason Smith's office, Grant-Kohrs Ranch National Historic Site.

[240] "Grant-Kohrs Ranch National Historic Site Water Rights," 19-21, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Memorandum for GRKO Division Chiefs and GRKO files, from GRKO Superintendent," August 1, 1985, and "Memorandum for GRKO files, from GRKO Superintendent," August 2, 1985, Kohrs-Manning Ditch binder, Jason Smith's office, Grant-Kohrs Ranch National Historic Site.

ditch company must continue to negotiate details of handling the situation. In 2014, Fred Benson asserted the best way to deal with beaver dams: "I'll tell you the best guy to deal with them is dynamite. Mr. DuPont." But aware the National Park Service did not agree, he added that backhoes also work well.[241] Benson noted that disagreements with the National Park Service arose about whether to remove beaver dams or live-trap beaver, as the park desired. Although, Benson stated conspiratorially, if you talk to the game warden, he'll say "just do whatever you want with them."[242] Jason Smith, the park's Natural Resource Specialist, said he did not know of a formalized agreement, but his instructions were to keep beaver dams out of ditch in the park, and in return, the ditch company would not disturb beaver within the park.[243]

**West Side Ditch Company**

The West Side Ditch began in the late 1880s as a collaborative project between a group of ranchers on the south and west side of Kohrs' property. On November 12, 1887, the men incorporated as the West Deer Lodge Water Company and from 1887 to 1889 excavated a ditch system that drew water from the Clark Fork River and a tributary, Lost Creek. Within only two years, the system was operational with water rights claims, a main ditch and laterals, a dam, and flumes. The first water users on the ditch were James B. McMasters, Wilbur N. Aylesworth, David H. McFarland, Robert S. Kelley, Jacob E. Van Gundy, John H. Meyers, and William Williams. By 1891, the ditch became known as the West Side Ditch, supplying water for agricultural, domestic, and mining purposes to seven shareholders.[244] Each share of stock provided the user with 2.5 miner's inches of water. The enterprise established 700 shares in the

[241] Oral History Interview with Fred Benson, January 15, 2014, p. 16.
[242] Oral History Interview with Fred Benson, January 15, 2014, pp. 7, 17, quote p. 17.
[243] Oral History Interview with Fred Benson, January 15, 2014, p. 17.
[244] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-45, 2-54; State Engineer's Office, *Water Resources Survey: Powell County,* 18, 38; McChristian, *Ranchers to Rangers*, Chapter 3; "Grant-Kohrs Ranch National Historic Site Water Rights," 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Notice of Location and Appropriation of Water Right," June 28, 1889, record for water right 76G-W-92051-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

ditch, at a par value of forty dollars each, and throughout the company's history, seven ditch users actively owned all shares.[245] On May 16, 1917, the members reincorporated the company for a period of forty years and changed the corporation's name to the West Side Ditch Company. Stockholders that year were Warden of Montana State Prison Frank Conley, president (100 shares), Mrs. W. N. Aylesworth (225 shares), C. J. Kading (100 shares), William Williams (100 shares), J. H. Meyers (70 shares), the City of Deer Lodge (60 shares), and J. B. Hare (45 shares).[246] A certificate filed on January 31, 1919 allowed for assessments to be made on the capital stock. On June 8, 1957, the company extended its term of existence for another twenty years.[247]

The West Side Ditch maintains a number of water rights and services for seven users along its fourteen-mile length. The ditch's diversion point is on the Clark Fork River about a half mile south of the current Deer Lodge—Powell County line. West Side Ditch draws its eleven water claims for stock watering and irrigation from the Clark Fork River, Little Modesty Creek, and Lost Creek. In 1889, the company filed its first two water claims from the Clark Fork River, followed by four appropriations in 1900, two in 1949, and two districts.[248] In 1949, with an

---

[245] State Engineer's Office, *Water Resources Survey: Powell County,* 18, 38-39; "Grant-Kohrs Ranch National Historic Site Water Rights," 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Articles of Incorporation," May 16, 1917, Series 2, File 1, West Side Ditch Company Records, Collection: RGN12.2, GRKO Accession Number 01469, Catalog Number: GRKO 20008, Grant-Kohrs Ranch National Historic Site Archives.

[246] State Engineer's Office, *Water Resources Survey: Powell County,* 18, 38; "Grant-Kohrs Ranch National Historic Site Water Rights," 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; "Articles of Incorporation," May 16, 1917, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[247] State Engineer's Office, *Water Resources Survey: Powell County,* 18, 38.

[248] State Engineer's Office, *Water Resources Survey: Powell County,* 18, 38-39; "Grant-Kohrs Ranch National Historic Site Water Rights," 13, 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Nancy Kelley, March 9, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, pp. 4-5. Water rights held by the West Side Ditch Company include 76G-W-092047-00 (Clark Fork River, 1889), 76G-W-092052-00 (Clark Fork River, 1889), 76G-W-092049-00 (Little Modesty Creek, 1900), 76G-W-092050-00 (Little Modesty Creek, 1900), 76G-W-092054-00 (Lost Creek, 1900), 76G-W-092055-00 (Lost Creek, 1900), 76G-W-092053-00 (Clark Fork River, 1949), 76G-W-092048-00 (Clark Fork River, 1949), 76G-W-092051-00 (Clark Fork River, district), and 76G-W-092046-00 (Clark Fork River, district).

additional water claim, the company enlarged its ditch to carry a capacity of 2,600 miner's inches, an increase in 1,000 miner's inches. Elected in 1948, Conrad Warren was president of the West Side Ditch Company at the time of this enlargement, and he served until the spring of 1975.[249] In 1982, the seven shareholders of the West Side Ditch Company included Ronald Kelley (president), Frank Lovell, Melvin Reistad, Peter Beck, Charles Beck, Conrad Warren, and the City of Deer Lodge.[250]

Today, the seven owners are Rick and Nancy Cline (185 shares; Rick Cline is president of the company), the National Park Service (100 shares), George Reistad (100 shares), Richard and Darlene Forson (100 shares), William Pauley (50 shares), Ronald and Nancy Kelley (45 shares), and the City of Deer Lodge (40 shares).[251] Rick Cline has served as president and Richard Forson as vice president since 2000. First elected secretary-treasurer in 1980, Ron Kelley gradually transitioned his duties to his wife, Nancy Kelley, who was acting secretary by 2000 and soon fully took over the role.[252] She is unique, she noted, because until recently, it was considered unacceptable for women to attend ditch meetings, although now other women have joined her. No woman had ever served on the board, and she was the first woman to be

[249] "Notice of Additional Water Right Appropriation," December 7, 1949, record for water right 76G-W-92046-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Meeting Minutes," for April 6, 1948 and May 6, 1975, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[250] "List of Shareholders in the West Side Ditch Company," 1982, record for water right 76G-W-92046-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Statement of Claim for Existing Water Rights, Irrigation District," April 12, 1982, record for water right 76G-W-92046-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

[251] "Grant-Kohrs Ranch National Historic Site Water Rights," 18, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with George Reistad, March 8, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, p. 3; Oral History Interview with Nancy Kelley, March 9, 2014, p. 1.

[252] "Meeting Minutes," for April 2, 1980, February 16, 2000, and March 16, 2000, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Richard Forson, March 8, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, p. 23; Oral History Interview with Nancy Kelley, March 9, 2014, pp. 1, 9.

secretary.[253] As secretary and treasurer, Nancy Kelley takes the minutes of meetings, sends out assessment notices, collects the fees, puts the money in the checking account, and pays the bills. She felt that from a paperwork standpoint since the National Park Service became a shareholder, things had gotten more difficult with more rules to follow regarding finances and how the park paid its assessments and shares in project costs.[254] George Reistad is the first user on the ditch. His father, Melvin, bought the land in 1960, and George took over from him in 1980. Reistad served for a few years as president of the ditch company.[255] The second user, Will Pauley, owned shares and land.[256] Ron and Nancy Kelley are the third users, about halfway along the ditch's length. They bought their land from Billy Johnson around 1976. Now, the Kelleys rent out all their land to Jim Berg who irrigates the land from West Side Ditch although the Kelleys still own the shares.[257] Charlie Beck used the next turnout on the ditch to farm and to pump for irrigating his land above the ditch. He no longer owns the property. Now Rich Cline has acquired part of his land and 80 of his shares in West Side to farm and irrigate some of the land in addition to his own.[258] The Cline land and turnouts on the ditch are next. Richard Forson, the fifth user, farms some of his land and rents the rest out to Rick Cline, although he still holds the West Side Ditch shares.[259] In 1966, Forson started working on the land held by his father-in-law, Frank Lovell, who had purchased the farm in 1945. When Lovell passed away in 1983, Forson

[253] Oral History Interview with Nancy Kelley, March 9, 2014, p. 3.
[254] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 2, 9, 14.
[255] Oral History Interview with George Reistad, March 8, 2014, pp. 1, 6.
[256] Oral History Interview with Richard Forson, March 8, 2014, p. 13; Oral History Interview with Nancy Kelley, March 9, 2014, pp. 4-5.
[257] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 2, 4-5, 13; Oral History Interview with George Reistad, March 8, 2014, p. 6.
[258] Oral History Interview with George Reistad, March 8, 2014, p. 8; Oral History Interview with Nancy Kelley, March 9, 2014, pp. 4-5, 7.
[259] Oral History Interview with George Reistad, March 8, 2014, p. 6; Oral History Interview with Nancy Kelley, March 9, 2014, pp. 4-5.

took over.[260] Grant-Kohrs Ranch is the final and last user on the West Side Ditch, past the airport.[261]

Like along Kohrs-Manning Ditch, users on the West Side Ditch employ a mix of flood and sprinkler irrigation, often utilizing pumps to push the water above the ditch and grow alfalfa, barley, hay, and wheat.[262] Initially, everyone on the West Side Ditch flood irrigated because they could only get their water to land below the ditch, that is, on the east, downhill slopes. In the late 1960s or early 1970s, Charlie Beck installed pumps at his turnout and became the first West Side Ditch user to irrigate above the ditch, on its west, uphill side. Others soon followed him, installing pumps and sprinklers to irrigate above the ditch. This put more of a strain on the canal's water flow since ranchers irrigated on both sides of the ditch and tried to make their water shares stretch a bit further. Currently, most of the West Side Ditch users have sprinklers, and many have upgraded to pivots rather than hand line or wheel line systems. Only Grant-Kohrs Ranch continues primarily to flood irrigate.[263] When George Reistad took over his father's property, it was all flood irrigated. Soon after, he put in sprinklers, which he found conserved more water and covered the ground more evenly.[264] The Kelleys started out flood irrigating. Nancy Kelley learned to flood irrigate from her husband. Although it was a bit of a challenge at first to build the dams and direct the water flow, she soon got the hang of it. Most of their land is downhill, so it was relatively easy. She set the dams and changed them every few hours, letting the water slowly flow down into the next line of ditches. The Kelleys had many little ditches crisscrossing their fields, and with each field, Nancy estimated how long to irrigate and when to

[260] Oral History Interview with Richard Forson, March 8, 2014, pp. 1-2.
[261] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 4-5.
[262] Oral History Interview with George Reistad, March 8, 2014, p. 5; Oral History Interview with Nancy Kelley, March 9, 2014, p. 12.
[263] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 6; Oral History Interview with Richard Forson, March 8, 2014, pp. 3-5.
[264] Oral History Interview with George Reistad, March 8, 2014, pp. 20-21.

reset the dam so water seeped down to the next field.[265] The Kelleys put in their first sprinklers around 1980. Sometime in the late 1990s after they started leasing their land, they installed two pivots, but they still irrigate the rest of their property with hand line and wheel line sprinklers.[266] Richard Forson's irrigated fields lie below the ditch. His father-in-law, Frank Lovell, put in the first sprinklers in 1972 while using a mix of sprinkler and flood irrigation. In 1984, Forson redid the entire irrigation system and started sprinkling all of it with a mix of hand lines and wheel lines. He likes sprinklers because they cover more ground with less water. The problem with flood irrigation was that low areas would pool full of water and higher areas would be dry. The sprinklers hit everywhere evenly. The new pivot sprinklers were faster and used less water, but Forson didn't know that they were necessarily more efficient. Around 2011, Richard Forson's renter put in a pivot, primarily to save on labor. It cost a lot of money for workers to move the hand line or wheels twice a day, more than the electricity costs for pivots to do the work at a push of a button.[267]

Nancy Kelley and Richard Forson noted that most of the valley irrigators were individuals with their own rights. However, people found that as they needed more water, it made sense to form a company to afford to make a long ditch and get more water. Today, some of the West Side users like the Kelleys pull only from the West Side Ditch, while others, like the Forsons and the Clines, also use individual rights to small creeks nearby. The Forsons have a seventh priority right on Tin Cup Joe Creek that they sometimes use to irrigate, although usually they get very little water from it.[268]

---

[265] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 11-12.
[266] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 11, 13.
[267] Oral History Interview with Richard Forson, March 8, 2014, pp. 3-5.
[268] Oral History Interview with Nancy Kelley, March 9, 2014, p. 18; Oral History Interview with Richard Forson, March 8, 2014, pp. 12, 21-22.

Over the years, the West Side Ditch Company has routinely maintained and operated the ditch. Shareholders regularly meet to vote on levying assessments on stock to pay for ditch maintenance, hiring workers to clean the ditch and ditch riders to monitor water use and electing officers. The annual assessments vary depending on each year's costs for maintenance, chemicals, and repairs. If the waterway needs major work, like a flume replacement or a siphon installed, the company tries to find a government program to help with the costs, since improvements can be expensive.[269]

Part of the assessment fees pay for a summer ditch rider. This person keeps the level of the ditch just right, especially a challenge when storms can wash out the ditch if the ditch rider fails to quickly cut down the water. In the past, this employee made sure everyone took only their correct share of water, but today, pumps can more accurately dispense certain amounts of water. Though not used often, a measuring device accompanies each pump which the ditch rider checks. As well, the ditch rider records daily readings for each use on measuring spots along the ditch. The employee may adjust the water levels diverted from the river into the ditch depending on the amount of soil moisture.[270]

Since around 2000, Stan Fries has worked as the ditch rider for the West Side Ditch Company. He checks the headgate, looks for problems, and adjusts the amount of water taken in from the river. Every day, first thing in the morning, he assesses the ditch's condition. It takes him about three hours to examine the ditch from the headgate to Rick Cline's property. Cline patrols the ditch through his land, and Grant-Kohrs oversees the park stretch. Fries doesn't measure the water. Though measuring boxes exist, Fries doesn't think they have worked. The

[269] "Meeting Minutes," for September 28, 1965, May 6, 1975, April 27, 1977, August 12, 1982, May 10, 2000, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Nancy Kelley, March 9, 2014, p. 9; Oral History Interview with Richard Forson, March 8, 2014, pp. 13, 26.

[270] Oral History Interview with Richard Forson, March 8, 2014, pp. 13-14.

first year, he recorded the amount in each ditch, but he didn't change anything, and he didn't know how much each person was supposed to receive. The ranchers do that. He mostly just checks the status of the ditch.[271] Every day, he cleans out debris from behind the headgate when the water is high. Only rarely does the company have to bring in machinery to clear it out.[272] Fries does not help with maintenance, but he reports to President Rick Cline if there is a problem, and he handles it.[273] Before working for the West Side Ditch Company, Fries was a water commissioner on Dempsey Creek. He regulated the headgates and had to know how to set the headgates out of the creek based on the priority rights. If people felt like they were not receiving their share, they complained to him. He also surveyed the mountain lakes to make sure they were draining the right amount. He did this for about twenty years.[274] Formerly, he worked at the prison where the ranch manager asked him to be the water commissioner. It was an alright job, he said, although there were "ticklish spots" and sometimes he experienced a problem or harassment and had to go see the district judge, his boss. On Dempsey Creek, it was all just individual users, no ditch companies.[275] Fries "never did get shot or anything," but there were arguments, and Dempsey Creek had the reputation as being one of the most contentious systems.[276] In contrast, working on the West Side Ditch was easy; Fries felt that everyone got along, and when problems arose, he simply let Rick Cline handle them.[277]

George Reistad recalled that in the past, cleaning the ditch was challenging, and so the users did not do it often. In the middle of the summer, frequently July at the beginning of haying, the users shut off the ditch for a few weeks when the ditch weeds were particularly thick, and

[271] Oral History Interview with Stan Fries, March 8, 2014, interviewed by Janell Bcyzkowski, Public Lands History Center, Colorado State University, pp. 1-4.
[272] Oral History Interview with Stan Fries, March 8, 2014, p. 23.
[273] Oral History Interview with Stan Fries, March 8, 2014, p. 4.
[274] Oral History Interview with Stan Fries, March 8, 2014, p. 7.
[275] Oral History Interview with Stan Fries, March 8, 2014, p. 8.
[276] Oral History Interview with Stan Fries, March 8, 2014, p. 10.
[277] Oral History Interview with Stan Fries, March 8, 2014, pp. 21-22.

allowed them to just dry up.[278] Richard Forson said the company never used dynamite on the West Side Ditch, but he had seen it done on other ditches. He thought that while effective, the method was dangerous and required careful knowledge. As far as he knew, the company had always utilized a dragline and backhoe on the ditch.[279] George Reistad recalled that in 1963, the company bought a dragline to pull through the ditch and yank out weeds. He thought it was sometime around then that the company began putting chemical herbicides in the ditch to clear it of weeds and other vegetation.[280] Every spring before letting the water down, notes Reistad and fellow user Richard Forson, the company cleans the ditch out with a backhoe. In the middle of the summer, it applies the chemicals. These are particularly important in the upper part of the ditch where the grade is so low that the water flows slowly and warms up, encouraging heavier growth of weeds and aquatic vegetation that impede water flow.[281] When the company burns for weeds each spring, it usually brings a fire truck, but wildfires rarely occur.[282] Nancy Kelley used to help by calling for the fire truck when the situation appeared dangerous. But her fellow shareholders don't call her to come out much anymore because they didn't like how quickly she'd call for the fire truck, she remembered, laughing.[283] Company meeting minutes reveal regular discussions about buying and using various chemical herbicides to eliminate ditch weeds and about liability concerns should the poisons seep into creeks.[284] For this reason, the West Side

[278] Oral History Interview with George Reistad, March 8, 2014, p. 2.
[279] Oral History Interview with Richard Forson, March 8, 2014, p. 25.
[280] Oral History Interview with George Reistad, March 8, 2014, p. 2
[281] Oral History Interview with George Reistad, March 8, 2014, p. 2; Oral History Interview with Richard Forson, March 8, 2014, pp. 9-10.
[282] Oral History Interview with Richard Forson, March 8, 2014, p. 10; Oral History Interview with Nancy Kelley, March 9, 2014, p. 16.
[283] Oral History Interview with Nancy Kelley, March 9, 2014, p. 16;
[284] "Meeting Minutes," for September 13, 1985, June 8, 1987, July 26, 1988, September 1, 1988, May 10, 2000, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

Ditch Company hires a Montana Department of Agriculture licensed commercial applicator to apply herbicides.[285]

Everyone in the West Side Ditch Company and other landowners work together on seasonal maintenance and cleaning.[286] The company will sometimes hire out work like using the backhoe on the ditch in the spring, but everyone gets together to burn along the ditch's length. Prisoners burn and maintain the section that passes through Montana State Prison land even though the institution has no water share because the warden doesn't want the inmates mixing with other people and believes the work teaches the inmates useful firefighting skills. Everyone, including airport workers, maintain the ditch portion that passes through airport property. The airport has a problem with birds, so it likes to keep down the grass and weeds that will grow high along the canal. Airport personnel are happy to help burn it even though they take no ditch water. The airport also contributes a water truck for firefighting.[287] Grant-Kohrs Ranch does not participate in burning but helps in other ways, such as sending a crew to pick up trash from the ditch origin and bringing the water down the ditch each spring. It takes the water about three days to travel to the canals because irrigators periodically turn it into creeks to let it run clear overnight. Once the ditch is open, Stan Fries, the ditch rider, will clean the siphons of debris before raising the water level.[288] Richard Forson noted that for the most part, relationships are good between the people or institutions whose land the ditch passes through but have no right to its water. Sometimes they dislike having the ditch there, but it existed before them. Most people

[285] Oral History Interview with George Reistad, March 8, 2014, pp. 2-3; Oral History Interview with Richard Forson, March 8, 2014, pp. 9-10.

[286] Oral History Interview with George Reistad, March 8, 2014, pp. 17-18; Oral History Interview with Richard Forson, March 8, 2014, pp. 10-11.

[287] Oral History Interview with Richard Forson, March 8, 2014, pp. 10-11.

[288] Oral History Interview with Richard Forson, March 8, 2014, pp. 10-11, 22; Oral History Interview with Stan Fries, March 8, 2014, pp. 3-4, 22.

have been good about allowing the ditch company to access their properties for ditch maintenance so long as they don't leave a mess.[289]

Washouts can be a problem on the ditch.[290] Stan Fries recalled a time someone complained to the sheriff that his house was flooding because of a full ditch. The old bank was a bit washed down, so the company had to build it up again.[291] Another time, a company laying underground cable broke a hole through the Mastodon siphon during excavation. This forced the West Side Ditch Company to shut down the water for a few days to drain and fix the siphon. Everyone lost their water because the only shut off device sat right at the river. The incident occurred during the summer, not a good time for ranchers to have their water stopped.[292]

Other maintenance issues on the ditch have involved animal pests. Richard Forson and Stan Fries noted that sometimes gophers destabilized banks by digging holes and potentially causing washouts. When this happened, workers shut off the water to repair the damage.[293] Beaver dams sometime obstruct the top of the ditch. During his daily check, ditch rider Stan Fries keeps an eye out for problem dams and reports them to Rick Cline. The company tears out the dams with backhoes and sometimes brings in trappers to remove the beaver.[294]

The company occasionally makes substantial improvements or changes to the irrigation system. These included the 1949 major ditch expansion to increase its carrying capacity with new water rights.[295] The shareholders discussed building a permanent weir in the river in 1948, a new flume at Race Track Creek in 1948, and a diversion dam in 1949. In 1952, they considered

---

[289] Oral History Interview with Richard Forson, March 8, 2014, p. 11.
[290] Oral History Interview with Stan Fries, March 8, 2014, p. 3.
[291] Oral History Interview with Stan Fries, March 8, 2014, p. 5.
[292] Oral History Interview with Stan Fries, March 8, 2014, p. 6.
[293] Oral History Interview with Richard Forson, March 8, 2014, pp. 14-15; Oral History Interview with Stan Fries, March 8, 2014, p. 21.
[294] Oral History Interview with Stan Fries, March 8, 2014, p. 14; Oral History Interview with Richard Forson, March 8, 2014, pp. 14-15.
[295] "Notice of Additional Water Right Appropriation," December 7, 1949, record for water right 76G-W-92046-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office

working with the Soil Conservation Service to reengineer the ditch course to allow for the land drainage.[296] The group regularly repaired or replaced flumes as the wood deteriorated and high spring runoff in creeks sometimes washed them away. At some point, every one of the ditch flumes had to be repaired or replaced at least once. In 1948, the company constructed a new flume over Race Track Creek, repaired another flume in 1970, and in 1983 replaced the Dempsey Creek flume.[297] Over the years, it began adding siphons along the ditch, particularly in areas where they had trouble keeping flumes maintained. The siphons work longer and better as long as workers drain them in the winter to avoid freezing. The siphons have screens on the end to keep out trash, and sometimes animals will fall into the ditch and get caught in the gate at the siphon.[298] A siphon has not replaced the flume over Dempsey Creek which has been in bad shape for over a decade and needs repair.[299] One of the more significant ditch modifications came in 1985 when shareholders worked with the airport to divert the flow through a culvert and new channel underneath the end of the airport runway that had undergone expansion.[300] Currently, discussions have ensued about combining the West Side Ditch in its upper stretches where it runs alongside Whalen Ditch for about two miles. The Whalen Ditch is a private irrigation venture now used by Evan Johnson. Because of the close proximity of the two waterways, problems have occurred when they have washed into each other. In 2014, irrigators

[296] "Meeting Minutes," for August 11, 1948, March 9, 1949, July 29, 1949, August 26, 1949, February 19, 1952, April 4, 1952, and August 29, 1952, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[297] "Meeting Minutes" for October 29, 1948 and November 22, 1983, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Richard Forson, March 8, 2014, p. 8.

[298] Oral History Interview with George Reistad, March 8, 2014, pp. 17-18; Oral History Interview with Richard Forson, March 8, 2014, p. 9.

[299] "Meeting Minutes" for July 16, 2000, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Richard Forson, March 8, 2014, p. 9.

[300] "Meeting Minutes," January 15, 1985, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Richard Forson, March 8, 2014, p. 16.

were still discussing the details of combining but with little progress.[301] Another current issue for the ditch company is seepage. Users Nancy Kelley and George Reistad estimated that the ditch lost half its water to seepage. The stretch after the ditch diverts from the Clark Fork River is one of the most de-watered spots of the river. If the West Side Ditch Company can determine how to reduce seepage and conserve more water, it could keep more water in the ditch and thus give back more to the river where it needs it the most. However, it is a balancing act, Reistad notes, because the users must hold on to enough water shares to ensure the ditch will not de-water in dry years just to keep water flowing in the river.[302]

In 1988, when the National Park Service made its final land purchase from Conrad Warren, it acquired water rights from the West Side Ditch. In a separate document from the land transfer, Warren sold the National Park Service the one hundred shares of stock he owned in the West Side Ditch Company. Grant-Kohrs Ranch uses water from the Clark Fork via the West Side Ditch to irrigate Taylor Field, Little Gulch, Big Gulch, and the West Fields.[303]

Some disagreements between users on the West Side Ditch have arisen regarding water use and everyone getting their fair share. Park Natural Resource Specialist Jason Smith noted that he had heard that Conrad Warren occasionally had trouble getting his West Side ditch water when Charlie Beck was president.[304] George Reistad recalled that sometimes when Warren was haying, he did not want West Side Ditch water and would just let it run down the creek. If it was a dry time and everyone was a bit short, Charlie Beck, the ditch tender and president, would split up the water among irrigators upstream and just give some to Warren when he needed it. Beck

[301] Oral History Interview with Fred Benson, January 15, 2014, p. 22; Oral History Interview with George Reistad, March 8, 2014, pp. 14-15.

[302] Oral History Interview with Nancy Kelley, March 9, 2014, p. 3, 21; Oral History Interview with George Reistad, March 8, 2014, pp. 15-16.

[303] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-99; McChristian, *Ranchers to Rangers*, Chapter 3; "Grant-Kohrs Ranch National Historic Site Water Rights," 16, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

[304] Oral History Interview with Fred Benson, January 15, 2014, p. 21.

did not want to see the water wasted. Reistad was unsure if a formal agreement existed between Warren and Beck for this practice when Beck was president.[305] Reistad said that overall the system works well and everyone gets their water. If the canal has less water, everyone cuts back on their share. Once in a while, "a little squabble" breaks out. If a shortage occurs, the president or the ditch tender will come by and ask people to cut back. Depending on the year and the season, ranchers sometimes have short or excess water. It can be difficult in dry years when people may have too little water, but it usually lasts only for a few days. The company tries to keep things fair.[306]

Nancy Kelley had a somewhat different perspective, believing that a bit of inequity existed in who got shares. She recalled that Conrad Warren always got what he wanted. He received his water, even down at the end. She grew up next door to him, and she was afraid to trespass on his land. He was very involved in everything with the company, particularly during his time as president. Whatever the ditch company leadership said is what you did, she recalled. They were "always fair and good and everything, but" men like Warren, Charlie Beck, and Frank Lovell got their way and their full rights to water.[307] She felt that sometimes the Kelleys, as the smallest shareholders and close to the first users, were sometimes blamed if somehow enough water failed to make it all the way down to the end. She thought that other users could have gone up the river and gotten their shares out there, if they wanted.[308] When the Kelleys flood irrigated, the company had a ditch rider to allocate water. Everyone had a little wooden box that measured the water coming out of the ditch on their turnout so irrigators could ensure they received their shares. Users did not adjust their own measuring boxes; the ditch rider did to give everyone their

[305] Oral History Interview with George Reistad, March 8, 2014, p. 8.
[306] Oral History Interview with George Reistad, March 8, 2014, pp. 6-7.
[307] Oral History Interview with Nancy Kelley, March 9, 2014, p. 4.
[308] Oral History Interview with Nancy Kelley, March 9, 2014, p. 23.

water. “You didn’t do your own.” “Well, maybe at night, midnight or something,” she chuckled, saying stories circulated of people doing that. Early in the irrigation season when plenty of water flowed, everyone was happy and did not care as much about shares. Later in the year, into July, people obtained only get so many inches a day or so.[309] If complaints arose, people did whatever Con Warren or Charlie Beck said. If they said “You’re taking too much,” then Kelley would shut it down, “fine, whatever you say.” She did not know if that happened to anyone else, but she felt like it might have been a bit unfair, but they knew what they were doing.[310]

In contrast, Richard Forson believed the issue of fair water allocation originated with the early users on the ditch. As the last two users, he and Grant-Kohrs Ranch frequently had problems getting the water to which they were entitled. Some people got a bit excessive with their water use. One such abuser, he opined, was Charlie Beck who took out more water with his pumps than he was allowed and stretched the limits of the waterway. When Charlie sold his land, this resolved part of the problem.[311] On the other hand, however, Forson said that working with the National Park Service had always been really good; in general, most of the users got along well, and aside from little arguments here and there, nothing serious has erupted.[312]

Grant-Kohrs Ranch is the final user on the ditch, and so the ranch has historically diverted less than its fair share of water; sometimes it does not get any water if other users over irrigate.[313] Yet other users often do what they can to help out the ranch, such as in July 2000, when Grant-Kohrs Ranch announced that it had been without water for several days. Attendees at one of the meetings voted to ask all shareholders to voluntarily shut off their water lines to

[309] Oral History Interview with Nancy Kelley, March 9, 2014, p. 23.
[310] Oral History Interview with Nancy Kelley, March 9, 2014, p. 24.
[311] Oral History Interview with Richard Forson, March 8, 2014, p. 3.
[312] Oral History Interview with Richard Forson, March 8, 2014, p. 22-23.
[313] “Grant-Kohrs Ranch National Historic Site Water Rights,” 18, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

ensure the ranch obtained some water that summer.[314] Reistad said generosity depends on the situation, however. Though the ranch has run low on water, it sometimes has had an excess, such when other users divert less water and the extra all flows down to the ranch. He mentioned that one time Grant-Kohrs "was kinda bellyaching" at a meeting that a few days they had fallen short of water. "They thought they should have their full share all the time." Rick Cline told park staff that "there's a lot of times you've had over your share," and so they quieted down.[315] Jason Smith, Natural Resource Specialist, believes the current president, Rick Cline, works hard, and Grant-Kohrs Ranch usually gets its water.[316] Nancy Kelley noted that the park superintendent frequently comes to the ditch company meetings, but she has seen quite a few superintendents come and go over the years. The company mostly works with Jason Smith, a park employee who has been involved the longest with the West Side irrigators. Kelley thinks that he knows a lot about ranching, which has helped things run smoothly.[317]

**Historic Mining, Superfund Clean-up, and Ongoing Water Quality Concerns**

Beginning in the 1860s and lasting over a century, mining and smelting to the west and south of Deer Lodge Valley have had a profound effect on the valley's air, water, and soil quality. Degradation of the environment, including at the Grant-Kohrs Ranch site, resulted in the area's inclusion in the Environmental Protection Agency's Superfund National Priority List. Past mining activities, toxic waste in the valley, lawsuits over air and water quality, and ongoing clean-up efforts impinge upon water use and irrigation practices in Deer Lodge Valley and at Grant-Kohrs Ranch.

[314] "Meeting Minutes," July 16, 2000, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.
[315] Oral History Interview with George Reistad, March 8, 2014, p. 7.
[316] Oral History Interview with Fred Benson, January 15, 2014, p. 21.
[317] Oral History Interview with Nancy Kelley, March 9, 2014, p. 15.

In 1852, prospectors first discovered gold in southwestern Montana at Gold Creek, and James and Granville Stuart, two of the Deer Lodge Valley's early settlers and friends of Johnny Grant, established placer mines there in 1858.[318] Many small mines sprang up in the mountains around Deer Lodge Valley in the late 1850s and throughout the 1860s. These were placer mining operations, and emigrants found that it required an enormous amount of water to separate the heavier gold particles from soils in sluice boxes or through hydraulic mining where miners blasted away rock and earth with high-pressure water hoses. To maintain a steady supply of water, many miners constructed ditches to divert mountain streams to their workings.[319]

Conrad Kohrs engaged in mining from his earliest days in the Deer Lodge Valley, and it provided a side-venture to his ranching operation. Just as he acquired water rights and constructed ditches to irrigate his hay fields, Kohrs also claimed water rights and excavated canals to run profitable mines. In 1866-1867, Kohrs, and several partners formed the Rock Creek Ditch Company. The following year, the men completed a thirteen-mile long, hand-dug waterway to transport water from Rock Creek Lake to the mining communities of Pioneer, Willow, and Pikes Peak. The work was hard and expensive, requiring building wooden flumes and blasting out hard rock. Construction ran over $100,000, and in 1869, the partners had to issue scrip for water to pay for the rest of construction and a dam on Rock Creek Lake. Water sales in 1870 amounted to $72,000, enabling Kohrs to use the profits to buy more mining

[318] Fletcher, *Free Grass to Fences*, 18; State Engineer's Office, *Water Resources Survey: Powell County*, 9, 11-12, 21-22, 25-26; Brian R. Rader, *A Toxicological Evaluation of Contaminated Floodplain Soils Along the Clark Fork River, Grant-Kohrs Ranch National Historic Site, Deer Lodge, Montana* (Fort Collins, CO: Colorado State University, 1995, Master of Science in Ecology thesis), 2.

[319] Rosenberg, *Hard Winter Endurance*, 15; Conrad Kohrs and Conrad Kohrs Warren, *Conrad Kohrs: An Autobiography* (Deer Lodge, MT: Platen Press, 1977), 45-46; State Engineer's Office, *Water Resources Survey: Powell County*, 9, 11-12, 21-22, 25-26; State Engineer's Office, *Water Resources Survey: Deer Lodge County*, 14-16.

claims.[320] The early profitability of the area's placer mines soon declined, and by the 1880s and 1890s, many had played out. Only diehards like Kohrs remained.[321] Later in 1907, Kohrs consolidated his mine holdings as the Rock Creek Ditch and Mining Company, which ranchers Charles H. Williams and Peter Pauly had purchased by 1922 along with its water rights.[322]

Although the gold placers near Deer Lodge Valley resulted in some of the earliest ditches in the area, mining operations further to the south at Butte and Anaconda had a more noticeable and lasting effect on the valley and Grant-Kohrs Ranch.[323] Although prospectors first discovered placer gold near Butte in 1864, by 1875, the minerals that dominated extraction were silver and copper. In 1879, the first copper smelter opened, and almost immediately, area residents complained about the toxic smelter smoke that hung in the Butte air and caused health problems. In 1884, the Anaconda Copper Mining Company built its first smelter at the south end of Deer Lodge Valley near the town of Anaconda and centralized smelting operations for the ore coming out of Butte's mines. Anaconda sat along Warm Springs Creek, which provided water for operations, and lay in an open valley with prevailing winds that carried the smoke out over Deer Lodge Valley. To keep up with Butte's ore production, the Anaconda Company opened its third smelter, the Washoe Reduction Works, in 1902. With its four 200-foot high stacks to carry

[320] Kohrs and Warren, *Conrad Kohrs*, 46-47; Rosenberg, *Hard Winter Endurance*, 15-16; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 2, Section A.

[321] Kohrs and Warren, *Conrad Kohrs*, 53-54, 58, 68, 89, 90, 93, 97; State Engineer's Office, *Water Resources Survey: Powell County*, 22.

[322] Rosenberg, *Hard Winter Endurance*, 68-69; Albright, *Grant-Kohrs Ranch National Historic Site: Historic Resource Study*, Chapter 5, Section B; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 1-1.

[323] National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site" (Deer Lodge, MT: National Park Service, Grant-Kohrs Ranch National Historic Site, September 2007), in U.S. Department of the Interior, "Federal Restoration Plan, U.S. Department of the Interior, Part I: National Park Service, Part II: Bureau of Land Management" (Clark Fork River Operable Unit, Milltown Reservoir/Clark Fork River National Priorities List Site, September 2007), p. 2-4.

smoke out over the valley, the Washoe Smelter was one of the largest and most modern copper smelters in the world when it began production.[324]

However, as the engineers who constructed the Washoe Smelter soon discovered, pollution from the smelter caused significant damage. The roasting process necessary to separate copper from ore released sulfur and arsenic that interacted with oxygen to produce sulfur dioxide, arsenic trioxide, and other harmful chemicals released into the air. The poisonous fumes denuded landscapes of vegetation and caused animal and human health problems. In the fall of 1902, farmers and ranchers downwind in the Deer Lodge Valley complained of sick and dying livestock with sores around their mouths and noses and chickens that had stopped laying eggs. Landowners reported losses of thousands of cattle, sheep, and horses. Veterinarians determined that arsenic poisoning had caused deaths, either from animals inhaling the smoke or from eating forage on which arsenic particulates had settled. Farmers believed the Washoe Smelter smoke was the culprit, and they filed damage claims against the Anaconda Company. In 1903, the corporation paid out $330,000 in damages to farmers and ranchers and temporarily shut down the Washoe Smelter to install a new flue and smokestack system. It replaced the four 200-foot tall stacks with one 300-foot tall stack set on a hill that released the smoke 1,000 feet above the valley floor. The new 2,300-foot long flue slowed the smoke's flow and allowed toxic particulates to settle out before escaping the stack.[325]

The new system captured a substantial amount of pollutants before they escaped into the air, but many toxins still entered the atmosphere. By the fall of 1904, animals again began to

---

[324] Rader, *Toxicological Evaluation*, 2-3; Quivik, "Historical Significance of Tailings and Slag," 37-42; Timothy J. LeCain, *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet* (New Brunswick, NJ: Rutgers University Press, 2009), 25, 70.

[325] LeCain, *Mass Destruction*, 64-65, 71-72; Quivik, "Historical Significance of Tailings and Slag," 38-39, 42; Rader, *Toxicological Evaluation*, 3; Fredric L. Quivik, "Landscapes as Industrial Artifacts: Lessons from Environmental History," IA, *The Journal of the Society for Industrial Archeology* 26, no. 2 (2000): 62; LeCain, *Mass Destruction*, 25, 64-65, 70-72.

sicken and die. The Anaconda Company insisted that the smelter's state of the art system was working perfectly and dismissed accusations as groundless, refusing to make changes or pay out more damages. On behalf of the Deer Lodge Valley Farmers Association, in 1905, local resident Fred Bliss filed a suit in federal court seeking more than one million dollars in damages and an injunction against further operation of the smelter. The trial was the largest, longest, and costliest suit ever heard in equity court up to that time; it included more than 200 expert witnesses and 25,000 pages of transcribed testimony. The farmers spent $500,000 on the suit, and the Anaconda Company $3,000,000. Conrad Kohrs and John Bielenberg, leaders of the Deer Lodge Valley Farmers Association, helped raise money to pay for the lawsuit. Each side brought an army of scientists, veterinarians, engineers, and other experts to testify on its behalf. The veterinarians concluded that the animals were dying of arsenic poisoning, while Anaconda's experts claimed that a microorganism in the valley was killing the livestock. Judge William H. Hunt found the farmers' statements and findings to be inconclusive and believed that Anaconda had done its best within technological limitations to solve the problem. In 1909, Hunt decided in favor of the Anaconda Company, although he did accept that arsenic poisoning was the culprit. The court's decision meant that many farmers and ranchers living in the south end of the valley could not keep their animals alive, and these people sold their land to the company and left the region. Anaconda had claimed it could do nothing more to mitigate the smoke; if it had to shut down its smelter, the Butte mines would also close, putting hundreds of people out of work and depriving Deer Lodge Valley agriculturalists of a market for their crops and meat. Copper mining was too profitable for the operations to stop, and engineers were sure they could solve any technological problem that emerged. After all, they had built one of the country's most state-of-the-art flue and smokestack systems, and even if it did not catch all of the toxic material, it

still performed better than any other method. Even as late as the 1960s, the Anaconda smelters were still releasing a toxic mix of arsenic, heavy metals, and sulfur dioxides that even though lower than in 1903 were still harmful to plants and animals.[326]

President Theodore Roosevelt had followed the case closely and determined that evidence showed that smelter smoke was polluting the neighboring Deer Lodge National Forest to the south and southwest. In 1908, the U.S. Department of Agriculture released a report stating that smoke was damaging national forest trees within a twenty-two mile radius of the smelter. The federal Bureau of Chemistry found arsenic concentrations in forage vegetation as far as ten miles away from the smelter toxic enough to kill cattle. By 1910, overwhelming evidence proved that Deer Lodge Valley's plants and animals were suffering from the smoke. In 1911, at Roosevelt's request, the Department of Justice threatened the Anaconda Company with a federal suit if it did not eliminate smoke damage to the national forest. The corporation decided to avoid another long and expensive trial and agreed to prevent, minimize, or eliminate toxic smoke emissions. It created a three-person Anaconda Smelter Smoke Commission that decided to address the smoke problem with new electrical precipitators in the smelter complex and a replacement of the 300-foot tall stack with a new 585-foot stack. Completed in 1919, the stack was the largest freestanding masonry structure in the world and was visible from twenty miles away. Its size provided a powerful draft to carry the smoke to a greater height and further distance than before. By 1923, the newly-finished precipitators could dilute the toxic chemicals and capture nearly all the arsenic before the remaining fumes went up the new stack. With the

[326] LeCain, *Mass Destruction*, 66, 72-74, 91; Quivik, "Landscapes as Industrial Artifacts," 62-63; Quivik, "Historical Significance of Tailings and Slag," 42-43; Con Warren, Seasonal Training, May 9, 1985, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 21-22, Grant-Kohrs Ranch National Historic Site Archives.

smelter's arsenic output now reduced to a third of its previous levels, the smoke commission declared the problem solved and the arsenic levels of no further threat to the surrounding area.[327]

However, Washoe Reduction Works continued to send sulfurous smoke into the atmosphere and to harm plants and animals. By the 1920s, the Anaconda Company gave up attempts to manage its air pollution and instead initiated a series of land swaps with the federal government. Between 1921 and 1935, the corporation exchanged parcels of undamaged forest that it owned across the state for company parcels in the national forest near the Washoe Smelter and in the Deer Lodge Valley. Furthermore, ever since 1902, Anaconda had been quietly buying up farmland in the valley. Where Anaconda could not obtain title to the land, it convinced farmers to sell "smoke rights" whereby the owners agreed not to sue the company for any damages that smelter smoke might cause to their land, crops, or livestock. Despite his years of fighting against the company, even Conrad Kohrs sold smoke rights to part of his ranch land. Thus by the 1930s, Anaconda owned or had rights to large portions of forest and farmlands around the Washoe Smelter that its toxic fumes had contaminated, and the industrial giant could now pollute with abandon.[328]

Air pollution from the smelters was not the only concern for farmers and ranchers; the mines and smelters also damaged water quality. In the early years, the Butte mines simply dumped their tailings along Silver Bow Creek, a tributary of the Clark Fork River. The Butte Reduction Works built slag walls and culverts along the creek to keep mine tailings and waste from entering it and carrying toxic compounds downstream. Despite the smelter's efforts at

---

[327] LeCain, *Mass Destruction*, 91-93, 98-101; Quivik, "Historical Significance of Tailings and Slag," 44; Quivik, "Landscapes as Industrial Artifacts," 60.

[328] LeCain, *Mass Destruction*, 176-177; Quivik, "Historical Significance of Tailings and Slag," 44-45; Quivik, "Landscapes as Industrial Artifacts," 60; Con Warren, Seasonal Training, May 9, 1985, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 21-22, Grant-Kohrs Ranch National Historic Site Archives.

retention, the creek's spring snowmelt runoff during May and June was often high enough to cut into the dumps and disperse tailings more than 100 miles along the Clark Fork. Farmers downstream from Butte used Silver Bow Creek to irrigate, but the tailings in the water spoiled their crops. In 1905, farmer Hugh Magone filed a suit against the mining companies on behalf of his fellow property owners, claiming that the tailings had harmed his land. He won the case, but the court awarded damages of only a few hundred dollars. The problem proved to be ongoing. In the spring of 1908, heavy rains caused flooding along all of Deer Lodge Valley's drainages, inundating low meadows. Ranchers and farmers noticed that the flood had washed tailings downstream from the Butte and Anaconda smelters, allowing toxic compounds to settle over their meadows and render them useless for crop production. Over the last century, tailings have continued to flow into Silver Bow Creek, Warm Springs Creek, and a hundred miles down the Clark Fork River from Butte. The waste has deposited along the river and stream banks in Deer Lodge Valley, including inside Grant-Kohrs Ranch. In the century of their operations, the mines and smelters of Butte and Anaconda have discharged over 200,000,000 tons of tailings into the Clark Fork River drainage.[329]

Despite the environmental catastrophe and health hazard of mining waste in the Clark Fork River Drainage and the urgency of the Environmental Protection Agency to clean up the mess, the tailings do tell an important historical story. Historian Fredric Quivik argues that Grant-Kohrs Ranch National Historic Site has an opportunity to interpret the tailings to show how ranchers struggled not just against natural elements of severe winters or drought but also against industrial development and its environmental consequences. The park could use them to discuss the roles Conrad Kohrs, John Bielenberg, and Nick Bielenberg played in funding and

[329] Quivik, "Landscapes as Industrial Artifacts," 60-62; Quivik, "Historical Significance of Tailings and Slag," 38, 46; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-48.

testifying in the Bliss and Magone lawsuits over air and water quality. Quivik believes the stories are important to the history of places like Grant-Kohrs Ranch and demonstrate how people in the West fought over conflicting visions of resource extraction.[330]

The damage caused by the Butte and Anaconda mines and smelters has lasted well into the twentieth century. In 1955, the Anaconda Company opened the Berkeley Pit in Butte. Open-pit excavation and a new flotation system allowed for profitable mining of very low-grade ore. This meant even more waste product for every small amount of copper extracted, and the company dumped waste in enormous piles at the Opportunity tailings ponds near Anaconda's Washoe Smelter. Massive open pit mining with its gigantic tailings and smelters in full production resulted in two huge "dead zones." The first was around the Washoe Smelter, an area of dead forests, abandoned farms and ranches, black slag heaps, and miles of tailings ponds. The other was the Berkeley Pit, an immense gaping hole in the earth. In 1977, Atlantic Richfield Company (ARCO) purchased the Anaconda Company. In 1980, ARCO closed the Washoe Smelter and began tearing down the smelter complex, keeping only the 585-foot tall smelter stack for its historic significance. Over 185 million cubic yards of toxic smelter tailings and 250,000 cubic yards of metallic dust captured by the smelter precipitators also remained. This waste continued to pollute the environment as wind and water carried particulates far away. In 1982, ARCO shut down the Berkeley Pit and turned off the underground pumps that kept it from filling with water. Toxic water from hundreds of underground mine tunnels soon began to seep into the pit and fill it up. Although open-pit mining continues in Butte, the 1980s marked the end

[330] Quivik, "Historical Significance of Tailings and Slag," 46; Quivik, "Landscapes as Industrial Artifacts," 63.

of a hundred years of economic domination by the copper mining and smelting industry in Montana.[331]

**ARCO Cleanup of Grant-Kohrs Ranch National Historic Site**

When it purchased the Anaconda Company, ARCO also took on the responsibility for the environmental cleanup of Anaconda's messy legacy, a long and costly process. In 1980, the Comprehensive Environmental Response, Cleanup, and Liability Act (CERCLA) established the Superfund program, administered by the Environmental Protection Agency (EPA). The Superfund program's goal was to treat, remove, or contain hazardous materials located throughout the nation's abandoned or inactive industrial sites. In 1983, the EPA designated the area around Butte and Anaconda as a Superfund site and placed it on the National Priority List. In 1992, the EPA expanded the Superfund designation to encompass 120 miles of the Upper Clark Fork drainage as far downriver as Milltown, outside of Missoula, and including the riparian floodplain area in Grant-Kohrs Ranch National Historic Site. With the enlarged designation, Butte, Anaconda, and the Clark Fork River became the geographically largest Superfund project in the nation. It encompassed Butte's Berkeley Pit, the tailings outside of Butte and Anaconda, the Anaconda smelter sites and their adjacent lands contaminated by toxic smoke, the Milltown Dam, and 120 miles of the Clark Fork River and its tributaries, Silver Bow Creek and Warm Springs Creek. Following Superfund designation, many studies investigated the area's pollution and contamination levels, collected data, and developed mitigation plans.[332]

---

[331] LeCain, *Mass Destruction*, 104, 178, 180, 202, 225; Rader, *Toxicological Evaluation*, 4; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 2-4; Quivik, "Historical Significance of Tailings and Slag," 45; Quivik, "Landscapes as Industrial Artifacts," 60, 62.

[332] LeCain, *Mass Destruction*, 104, 202-203, 225; Quivik, "Historical Significance of Tailings and Slag," 35; Rader, *Toxicological Evaluation*, 4; McChristian, *Ranchers to Rangers*, Chapter 7; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 1-1; Kathy Allen, et al., *Natural Resource Condition Assessment*, 11-12; John Milner

Among the first sites for cleanup in the Superfund area were the Berkeley Pit and the Milltown Dam. In the Berkeley Pit, the process of treating toxic water with lime began; contractors removed its sludge to the Opportunity tailings ponds near Anaconda in order to gradually drain the pit and reduce the risk of rising groundwater contamination. At the Milltown Dam near Missoula, tailings and contaminated soils in the Clark Fork River had collected behind the dam for a century; when the dam was eventually breached, a massive earth-moving project transported these polluted sediments to the Opportunity ponds.[333]

Early remediation by ARCO near Anaconda resulted in litigation over the company's use and diversion of water owned by other users downstream. The West Side Ditch Company shareholders felt this acutely. On July 3, 1990, the EPA issued an administrative order directing ARCO to remove contaminated tailings and soil from the Mill Willow Bypass near Anaconda. This was a channel built to route Mill Creek, Willow Creek, and the high flow of Silver Bow Creek around the Warm Springs treatment ponds, which since about 1918 had impounded Silver Bow Creek water to precipitate out suspended solids. In its September 28, 1990 Record of Decision, the EPA allowed the Warm Springs ponds to remain operational until the clean-up of upstream contamination sources was completed. Thus, ARCO rerouted the waters so that it could treat the tailings and soils at the Mill Willow Bypass.[334]

The year 1990 was a bit dry, and so when hardly any water flowed through the West Side Ditch, users initially expressed little concern; but the situation did not improve. The irrigators realized that ARCO was diverting water into the Warm Spring ponds that should have flowed

---

Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-92, 3-7-4; Grant-Kohrs Ranch National Historic Site, "Disturbed Lands," accessed April 25, 2016, https://www.nps.gov/grko/learn/nature/disturbedlands.htm.

[333] LeCain, *Mass Destruction*, 202-204, 224-226.

[334] "Case No. CV-91-002-BU-PGH Plaintiff's answers to Defendant Atlantic Richfield Company's First set of Interrogatories, Requests for Production and Requests for Admission (6/15/1992)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Nancy Kelley, March 9, 2014, p. 21; Oral History Interview with Richard Forson, March 8, 2014, p. 6.

into the Clark Fork River, water to which they had a right as priority users on the Clark Fork.[335] It was the only time that George Reistad and Nancy Kelley could remember the ditch being completely shut off in the middle of summer, since usually the ditch stayed rather full.[336] The ditch was only dry for one season as ARCO decided to leave some water in the river. But the damage had already been done, and dozens of water users along the Clark Fork suffered losses. The Forsons had to sell their cattle because their hay crop failed, and they had nothing to feed the animals that winter. Charlie Beck lost his entire crop of potatoes.[337]

On December 3, 1990, shareholders in the West Side Ditch Company instituted action in the District Court of the Third Judicial District, claiming that ARCO rerouting had adversely affected their water rights to Mill Willow Bypass flow, which ultimately entered the Clark Fork River. The plaintiffs sought a declaration of its paramount rights to the waters of Mill Willow Bypass and an injunction prohibiting the defendants from diverting water of the bypass or engaging in any activity that interfered with the ditch company's Clark Fork water rights. The irrigators demanded an order requiring the release of all impounded Mill Willow Bypass waters and damages arising from crop loss sustained as a result of impoundment. The group also wanted damage payments for crop loss from lack of water.[338] In February 1991, West Side Ditch Company shareholders informally met to discuss the litigation against ARCO. They also opposed the state's Department of Fish, Wildlife, and Parks that was insisting on maintenance of satisfactory instream flows to support fish populations and ecological health. Shareholders

[335] Oral History Interview with George Reistad, March 8, 2014, p. 4; Oral History Interview with Nancy Kelley, March 9, 2014, p. 21; Oral History Interview with Richard Forson, March 8, 2014, p. 6.

[336] Oral History Interview with George Reistad, March 8, 2014, p. 4; Oral History Interview with Nancy Kelley, March 9, 2014, p. 21.

[337] Oral History Interview with Nancy Kelley, March 9, 2014, p. 7, 21; Oral History Interview with Richard Forson, March 8, 2014, p. 6; Oral History Interview with George Reistad, March 8, 2014, pp. 10-11.

[338] "Case No. CV-91-002-BU-PGH Plaintiff's answers to Defendant Atlantic Richfield Company's First set of Interrogatories, Requests for Production and Requests for Admission (6/15/1992)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with George Reistad, March 8, 2014, p. 2.

believed that with the reduction of their water rights due to ARCO's diversion, no excess runoff water would be available to ensure instream flow. As a result of the meeting, the company members present decided to contact other river water users to see if they would join in efforts against ARCO and Fish & Wildlife.[339] On May 24, 1991, the West Side Ditch Company filed a petition for injunctive relief and the ending of all impoundments of waters. On July 9, 1992, ARCO asked the court to dismiss the plaintiff's equitable and damage claims due to a lack of jurisdiction and citing the EPA's administrative order.[340] The court decided the case on December 10, 1993, dismissing the ditch company's complaint without prejudice and ordering the case transferred to the Court of Claims.[341] In 1995, water users Thomas A. Beck, Melvin R. Beck, and Robert Evans filed a separate suit. The plaintiffs challenged the U.S. District Court of Montana ruling that had dismissed without prejudice their claim against ARCO for compensatory damages of diversion of water. The plaintiffs sought to recover damages under state law for violation of the water rights, a claim over which the district court had no jurisdiction. The two cases ultimately were combined into one, and it took a decade to settle all the back-and-forth litigation in state and federal courts and through lengthy appeal and re-appeal processes. Because the federal court claimed it had no jurisdiction, the case finally wound up in the same district court where it had started.[342]

---

[339] "Meeting Minutes," February 5, 1991, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[340] "Case No. CV-91-002-BU-PGH Plaintiff's answers to Defendant Atlantic Richfield Company's First set of Interrogatories, Requests for Production and Requests for Admission (6/15/1992)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[341] "Case No. CV-91-002-BU-PGH Plaintiff's answers to Defendant Atlantic Richfield Company's First set of Interrogatories, Requests for Production and Requests for Admission (6/15/1992)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.

[342] "Case No. CV-91-002-BU-PGH Plaintiff's answers to Defendant Atlantic Richfield Company's First set of Interrogatories, Requests for Production and Requests for Admission (6/15/1992)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with George Reistad, March 8, 2014, pp. 9-10.

Ultimately, nearly twelve years later in 2001, separated groups of plaintiffs settled the case out of court through mediation.[343] The agreement awarded some monetary damages to West Side Ditch Company shareholders.[344] ARCO installed a new measuring box at the head of the West Side Ditch so the ditch company could keep track of its water. Additionally, ARCO helped the West Side Ditch with its Modesty Creek flow. In an assertion of its water rights on the creek, the West Side Ditch Company engineered the stream to flow directly into the ditch instead of naturally emptying into the Clark Fork River. However, in the winter when irrigation stopped, the creek water still flowed. Concerned about the water freezing in the unused ditch, the company erected a waste gate below the point that water entered the ditch to redirect the water back into the river. The waste gate needed repairs, and so as part of the settlement, ARCO replaced the gate and installed a measuring box.[345] Although a shareholder in the West Side Ditch, as a government entity, Grant-Kohrs Ranch did not participate in the lawsuit and thus did not share in the settlement.[346] The City of Deer Lodge had its own lawyer, and it settled separately with ARCO. As part of the agreement, the city had to leave its shares of West Side Ditch Company water in the Clark Fork River. Formerly the city had used its shares to irrigate the cemetery and then had not taken its water portion for a long time. It ultimately switched to using a right to Tin Cup Joe Creek and had little need for West Side Ditch water. Although Deer

[343] Oral History Interview with George Reistad, March 8, 2014, pp. 9-10; Oral History Interview with Richard Forson, March 8, 2014, pp. 6-7; "Case Nos. 01-35633 & 01-35706 including summaries and arguments in an appeal from an order of the district court (7/26/2001)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; "Grant-Kohrs Ranch National Historic Site Water Rights," 18, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

[344] "Case Nos. 01-35633 & 01-35706 including summaries and arguments in an appeal from an order of the district court (7/26/2001)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; "Grant-Kohrs Ranch National Historic Site Water Rights," 18, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

[345] Oral History Interview with Richard Forson, March 8, 2014, p. 7.

[346] "Case Nos. 01-35633 & 01-35706 including summaries and arguments in an appeal from an order of the district court (7/26/2001)," Series 8, File 2, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives; "Grant-Kohrs Ranch National Historic Site Water Rights," 18, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives; Oral History Interview with Richard Forson, March 8, 2014, p. 17.

Lodge's West Side Ditch water now flows in the Clark Fork River as part of the ARCO agreement, the city may recall the water if an emergency arises.[347]

West Side Ditch user Charlie Beck got the short end of the stick. He had a disagreement with the lawyer handling the suit, necessitating him hiring his own lawyer. Thus, the negotiators handled his case separately. Already in debt, Beck had a difficult time during this period. In 1990, when ARCO started taking back the water, about 250 acres of his potatoes died due to lack of water. A year or so before that, he had lost his entire potato crop to a freeze.[348] Unable to stay afloat, Beck sold his land to ARCO as part of the settlement; the company now uses the property for reclamation work. He also parted with his shares in the West Side Ditch Company, which granted ARCO 4.6 cubic feet per second in right 76G-W-092052-00 and 2.82 cubic feet per second in right 76G-W-092053-00 via quit claim deed.[349] ARCO was to leave its West Side Ditch shares in the river to help with instream flow. However, the settlement was worded such that ARCO could sell the rights to Melvin Beck, Thomas Beck, and Robert Evans as part of the separate settlement for their lawsuit. Consequently, as part of the settlement of Thomas Beck, et. al., v. ARCO, ARCO conveyed its interest in these water rights to Thomas A. Beck, Melvin R. Beck Ranch, L.L.C, and Two Bar Ranch, Limited Partnership (owned by Robert Evans). In 2009, Thomas Beck transferred his share of the rights to Melvin R. Beck Ranch and Evans' Two

[347] Oral History Interview with George Reistad, March 8, 2014, pp. 3, 10, 12-13; Oral History Interview with Richard Forson, March 8, 2014, pp. 16-17.

[348] Oral History Interview with George Reistad, March 8, 2014, pp. 8, 10-11.

[349] Oral History Interview with George Reistad, March 8, 2014, pp. 10-11; Oral History Interview with Nancy Kelley, March 9, 2014, p. 7; "DNRC Water Right Ownership Update," April 24, 2004, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Quit Claim Deed," August 5, 2004, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; correspondence from John Bloomquist, Attorney, to Patti Miller, Helena DNRC office, June 9, 2010, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Water Court Decree for Case 76G-S1," February 7, 2011, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

Bar Ranch.[350] These men do not use the shares in the ditch; instead they are detached as separate water rights to the Clark Fork River.[351]

The litigation deeply shook the West Side Ditch Company shareholders. Many struggled with the loss of irrigation water and felt hurt and angry over the long court processes that failed to achieve all they sought. Some were reluctant to talk about it and the painful experiences of coping without water and fighting a futile battle.[352] George Reistad believed that the whole litigation process would have progressed more smoothly and successfully if the West Side Ditch Company members and other Clark Fork users had remained united and negotiated together. Dividing into different parties ultimately worked in ARCO's favor and lead to less payout for damages than the users had hoped.[353] The bizarre exchange of water shares with ARCO and then with other parties resulted in ARCO claiming it does not have enough water in the river. The company is now trying to obtain more rights.[354]

The shareholders also disagreed on how far to have pursued litigation. Although the experience drew some shareholders closer together, it also revealed cracks in how members felt water should be used and apportioned. At a July 2001 shareholder meeting, a motion passed that all members share equally in ditch water losses from ARCO, recognizing that their water was distributed equally on a per-share basis. Darlene Koontz then made a motion, which Richard Forson seconded, to give the West Side Ditch Company president the authority to control water

---

[350] Oral History Interview with George Reistad, March 8, 2014, pp. 10-11; "DNRC Water Right Ownership Update," April 24, 2004, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Quit Claim Deed," August 5, 2004, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; correspondence from John Bloomquist, Attorney, to Patti Miller, Helena DNRC office, June 9, 2010, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office; "Water Court Decree for Case 76G-S1," February 7, 2011, record for water right 76G-W-92052-00, Montana Department of Natural Resources and Conservation, Water Rights Records, Bozeman Office.

[351] Oral History Interview with George Reistad, March 8, 2014, pp. 10-11.

[352] Oral History Interview with Nancy Kelley, March 9, 2014, pp. 20-21.

[353] Oral History Interview with George Reistad, March 8, 2014, p. 10.

[354] Oral History Interview with George Reistad, March 8, 2014, pp. 11, 16.

use on the ditch. If a member used more water than equitable, the president could immediately stop the individual. Ron Kelley offered an amendment that called for an uninterested person to take water measurements to prevent potential abuse of the system, but it failed for lack of a second.[355]

In 2014, Richard Forson expressed concern that even though the litigation was finally over, ARCO's remediation would continue to affect West Side Ditch irrigators. ARCO was still using the Warm Springs ponds and was gradually working its way downstream in remediation work. Forson worried about what ARCO would do on lands around the ditch and if it found contaminated sediments in the ditch that required removal and replacement. Such work could only occur when the West Side Ditch Company was not using the ditch.[356] Sometimes when floods occur, they wash down contaminated sediments that mostly trend to the east side and along the freeway. These did not affect the Forsons' land, they but did lay down silt and effluent in the river bottom, lands that farmers can only use for pasturage. ARCO is supposed to clean up these properties, but in 25 years, nothing has happened. Forson said around 2012, ARCO contractors plowed and reseeded these areas, but nothing grows.[357] Neighbors complain about the dust that arises, and when water flows or it rains, the water cuts into the dirt and erodes it, and there's nothing to stop it.[358] Forson has seen some problems but most exist further upstream. He's a bit cynical about how long the cleanup process has taken. He feels like they've studied everything so thoroughly that now "they have a study to study what they've studied" and that they "must've counted every weed, every blade of grass, every gopher hole."[359] ARCO had

[355] "Meeting Minutes," February 5, 1991, Series 2, File 1, West Side Ditch Company Records, Grant-Kohrs Ranch National Historic Site Archives.
[356] Oral History Interview with Richard Forson, March 8, 2014, p. 17.
[357] Oral History Interview with Richard Forson, March 8, 2014, p. 18.
[358] Oral History Interview with Richard Forson, March 8, 2014, pp. 18-19.
[359] Oral History Interview with Richard Forson, March 8, 2014, p. 19.

initiated the studies, but after the lawsuit, the state started restudying everything as neither party would accept the other party's study. Everything is done over again multiple times, he opined.[360]

Despite its absence from the 1990s lawsuits between the West Side Ditch Company users and ARCO, Grant-Kohrs Ranch National Historic Site has been involved in addressing how Butte and Anaconda mining pollution affects the area's water quality and environment. Ranch staff have been particularly concerned about the streamside tailings along the Upper Clark Fork River as it flows through Deer Lodge Valley and the park. Because it contains three and a half miles of river contaminated by toxins, Grant-Kohrs Ranch has been part of the Superfund site's Clark Fork River Operable Unit since 1992. Through erosion and flooding, poisonous heavy metals and tailings have washed down the Clark Fork drainage and deposited in floodplain soils and along the riverbanks. Known as "slickens," the particularly heavy depositions are areas of such high contamination and toxicity that they are devoid of vegetation. The slickens soils contain high accumulations of heavy metals including arsenic, cadmium, copper, lead, and zinc in quantities far above acceptable levels. Within Grant-Kohrs Ranch National Historic Site, slickens deposits account for eight acres of the riparian floodplain zone. However, scientists estimate that smaller concentrations of tailings contamination spreads over as much as 122 acres of the 127 acre floodplain within the ranch site.[361]

Studies in the 1980s and 1990s examined the extent of tailings damage to Grant-Kohrs land and indicated the work required to mitigate the problem. In 1980, the National Park Service

---

[360] Oral History Interview with Richard Forson, March 8, 2014, p. 20.

[361] Quivik, "Landscapes as Industrial Artifacts," 62; Rader, *Toxicological Evaluation*, iii, 4; Trista Thornberry-Ehrlich, *Grant-Kohrs Ranch National Historic Site: Geologic Resource Evaluation Report, Natural Resource Report NPS/NRPC/GRD/NRR—2007/004* (Denver: U.S. Dept. of the Interior, National Park Service, Geologic Resources Division, Natural Resource Program Center, 2007), 4; Kathy Allen, et al., *Natural Resource Condition Assessment*, 11-12, 52-53, 247; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-4; Grant-Kohrs Ranch National Historic Site, "Disturbed Lands"; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," pp. 1-1, 2-3, 2-4, 2-5; McChristian, *Ranchers to Rangers*, Chapter 7; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-92, 3-7-3, 3-7-4.

established five test plots on the Clark Fork River's west bank within the park's boundary to monitor vegetation growth on the "slickens" soils. Tests revealed that the soils were dead and non-productive.[362] In 1984, Peter Rice and Gary Ray of the University of Montana issued a report entitled "Floral and Faunal Survey and Toxic Metal Contamination Study," which revealed that the river's floodplain within the ranch contained high concentrations of copper, arsenic, and cadmium, with high levels of the pollutants present in soils and vegetation. The report identified levels of metal concentrations in the soils and vegetation of one to two orders of magnitude higher than in nearby areas unaffected by pollutants.[363] In 1985, Grant-Kohrs Ranch and the Montana Fish, Wildlife, and Parks Department found that above the park, where lime was added to the river to treat pollutants, the waterway contained 500 fish to the mile, while below the park where the river was untreated, it only produced thirty-one fish to the mile.[364] In the 1990s, the Streamside Tailings and Revegetation Studies (STARS) Project headed by Schaefer and Associates and Montana State University found that additions of limestone, hydrated lime, and ferric sulfate and phosphogypsum tilled into the soils have helped reduce toxicity and erosion.[365]

Mining waste at Grant-Kohrs Ranch National Historic Site has resulted in vegetation damage and loss of plant communities, potential toxicity to livestock, and land degradation. The concentrations of heavy metals there are above acceptable levels and high enough to cause phytotoxic responses in plants. Particularly through floods and erosion, the release and re-release of contaminants into the watershed continues, and this prevents the germination and growth of riparian plants. There are many environmental hazards associated with the contaminated areas,

---

[362] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-92.

[363] McChristian, *Ranchers to Rangers*, Chapter 7; U.S. Department of the Interior, National Park Service, *Statement for Management*, 9; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-92.

[364] McChristian, *Ranchers to Rangers*, Chapter 7.

[365] Rader, *Toxicological Evaluation*, 103.

including accelerated bank and channel migration, floodplain destabilization, health hazards to land and aquatic life, degraded water quality, and low agricultural productivity. Major floods in 1980, 1982, and 1997 have increased river velocity, flooding, and channel movement, which has exposed tailings along the banks, deposited new tailings, and eroded the river channel. The soil toxicity in "slickens" areas likely has brought population declines among animal species as a result of food chain contamination, loss of prey, and loss of riparian habitat. Natural recovery of riparian soils and floodplain sediments along the Clark Fork could take hundreds of years due to the persistence of trace metal contamination.[366]

Reclamation efforts in the Clark Fork Basin and at Grant-Kohrs Ranch National Historic Site face daunting challenges. During the heavy years of mining activity in the upper Clark Fork Basin, pollution caused riparian vegetation to disappear. This made seasonal flooding more severe as flooding and erosion carried mine tailings downstream and left them along the floodplain. The area's largest recorded flood occurred in 1908 and left a one-foot thick layer of tailings along the river in Deer Lodge Valley. Deposits from this flood event and earlier floods left the "slickens" that are visible throughout the valley.[367] Many ranchers worried that the 1908 flood tailings that inundated their hay meadows caused low crop yields and perhaps poisoned the cattle that later consumed the hay.[368] Conrad Warren remembered that in the early twentieth century the Clark Fork River clearly showed the effects of upstream copper mining. The water appeared coffee colored, lacked fish, and left yellow slime on the willows. Ranchers irrigated with the river water, and wherever they turned the water onto their fields, the grain turned yellow

[366] McChristian, *Ranchers to Rangers*, Chapter 7; U.S. Department of the Interior, National Park Service, *Statement for Management*, 9; Rader, *Toxicological Evaluation*, 4, 102; Thornberry-Ehrlich, *Geologic Resource Evaluation Report*, 5; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-3; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," pp. 1-4, 2-5.

[367] Thornberry-Ehrlich, *Geologic Resource Evaluation Report*, 10; Kathy Allen, et al., *Natural Resource Condition Assessment*, 11-12; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-4.

[368] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-48.

before it turned green; clearly the leeching chemicals hurt crop yields. Some ranchers revamped and recontoured their ditches, filling in the old ones. But for years, the grass along the old ditches remained yellow. Along the river, the floodplain soils were yellow-colored, and nothing would grow on them. The bones of many dead animals littered the riparian area, turning green from the copper sulfate.[369] Water user Fred Benson recalled that the Clark Fork used to look copper-colored. He had been told that every year the railroad shops dumped their used oil into the river when the water was high. Since the river already was a strange color, the shops apparently thought no one would notice if oil joined the mix.[370] In the 1930s and 1940s, some of the ranchers and irrigation companies closed their Clark Fork River diversions and instead used Cottonwood Creek or other streams for irrigation.[371] This was true for users on the Kohrs-Manning Ditch near Grant-Kohrs Ranch. Dave Johnson recalled that in the 1930s and 1940s, the river ran red from the tailings at Anaconda. On particularly bad days, irrigators shut off the river diversion and just used Cottonwood Creek, especially the high water that was cleaner.[372] President Bill Mosier noted that they also diverted clean water from Freeze Out Creek. He and other shareholders had few problems with pollution on their lands, but some users up the valley did.[373] Warren addressed some of the contamination on his land with support from the federal government's Agricultural Conservation Program, a cost-share program to increase conservation, prevent soil destruction, and restore soil fertility. From 1940 through 1958, Warren began

[369] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-57; Con Warren, Seasonal Training, May 9, 1985, in Informal Interview All, Grant-Kohrs Ranch National Historic Site Archives; Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 21-22, Grant-Kohrs Ranch National Historic Site Archives.

[370] Oral History Interview with Fred Benson, January 15, 2014, pp. 12-13.

[371] Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980, p. 21-22, Grant-Kohrs Ranch National Historic Site Archives.

[372] Oral History Interview with Fred Benson, January 15, 2014, p. 12; Oral History Interview with Bill Mosier, January 16, 2014, p. 11.

[373] Oral History Interview with Bill Mosier, January 16, 2014, p. 11.

implementing soil conservation and reclamation practices in the bottomland meadows along Clark Fork that had been damaged by Anaconda mine tailings.[374]

By the time of Grant-Kohr's inclusion in the Superfund designation, tailings along the Clark Fork River floodplain within park boundaries had formed one-foot thick deposits on terraces as high as six feet above the river. Floodplain sediments contained heavy metals at 1,800 times normal. Mine tailings lay throughout the floodplain with the highest concentrations in buried material as deep as four feet. The volume of hazardous materials still located upstream, which high water and floods continue to redistribute, complicates reclamation efforts.[375]

The National Park Service has taken proactive measures to monitor water quality, mitigate the tailing contamination, and protect animal and human health. In the 1990s, the agency installed a number of groundwater monitoring wells at Grant-Kohrs to gather data on water quality. The park's 2005 annual report stated that installing monitoring wells and lining irrigation ditches was a major priority in the ongoing process to mitigate contamination from tailings and mine waste. In 1985, workers fenced off the Clark Fork River within the park boundary to keep livestock from drinking the water and foraging on contaminated vegetation along the river's banks. Increased concerns about vegetation until soils could be remediated motivated staff to fence the park's entire 127-acre riparian area in 1994.[376]

In the 2000s, work began to develop EPA-approved remediation and mitigation efforts on the Upper Clark Fork drainage and the riparian zone within Grant-Kohrs. In 2000, the Department of the Interior initiated site studies and in 2002 released its "Injury Report." Later

---

[374] John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-73.

[375] Rader, *Toxicological Evaluation*, 102-103; Thornberry-Ehrlich, *Geologic Resource Evaluation Report*, 5; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-3.

[376] McChristian, *Ranchers to Rangers*, Chapter 7; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 2-3; Thornberry-Ehrlich, *Geologic Resource Evaluation Report*, 4-5; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, pp. 2-92, 2-101, 3-7-3; Rader, *Toxicological Evaluation*, 104.

that year, the EPA proposed a plan for Clark Fork River cleanup that included stabilizing streambanks, removing the most contaminated areas, and treating other areas. In 2004, the EPA released a Record of Decision for the Clark Fork River Operable Unit to determine remediation efforts and goals and the roles of involved parties. The National Park Service then issued a Federal Restoration Plan in 2007 that describes in detail the EPA's selected remedy measures for restoration of damaged natural resources at Grant-Kohrs Ranch.[377]

The 2004 Record of Decision and the 2007 Federal Restoration Plan included specifics about remedies and standards for cleaning up Grant-Kohrs and for restoring the landscape and vegetation of the riparian area to its state prior to mining contamination. To reduce erosion, the documents called for stabilizing streambanks with vegetation using a natural look, removing slickens areas, and backfilling with uncontaminated soils. The EPA held responsibility to treat contaminated soils and vegetation in place rather than removing them and to monitor remediated soils for ten years to evaluate the vegetation. If the areas did not grow back naturally, crews were to attempt revegetation, and if this failed, then they should excavate and remove the soils. The plans recommended that workers leave alone undisturbed areas of healthy, mature vegetation, even if affected by low levels of contamination. During remediation, they should protect and, if necessary, fence lands undergoing treatment to prevent livestock access and allow growth and establishment of new vegetation. Once vegetation took hold, the National Park Service could utilize the land for agriculture and livestock forage.[378]

---

[377] Grant-Kohrs Ranch National Historic Site, "Disturbed Lands"; John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 3-7-4; U.S. Environmental Protection Agency, "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site. Record of Decision" (Helena, MT: U.S. Environmental Protection Agency Region 8, April 2004); National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 1-1.

[378] U.S. Environmental Protection Agency, "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site, Record of Decision," pp. 2, 108, 2-110, 2-111, 2-121, 2-122, 2-123; [378] National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration

Grant-Kohrs personnel has had to consider how the ranch's irrigation practices might inadvertently contribute to further contamination of water sources, fields, and crops and compromise animal and human safety. Crops suffer damage through absorption of polluted water or sediments, and contaminated water and vegetation harm animals. Since many of the ranch's irrigation ditches draw water from the Clark Fork River, they carry some of the river's toxins, both in elevated dissolved concentrations and as suspended sediment. When workers apply irrigation water to historically irrigated fields, these poisonous heavy metals spread onto the fields, degrading crops and either killing the vegetation or making it potentially toxic to animals that later consume the hay. Contamination in irrigation water and in fields also poses a human health hazard to workers whose duties involve maintaining the irrigation systems and cultivating hay. A 2003 Human Health Risk Assessment conducted by the National Park Service at Grant-Kohrs found potentially unacceptable levels of arsenic and cadmium in ditch sediments that could pose risks to workers. Data on toxicity to livestock in polluted riparian areas is limited, but based on a small study of six animals at Grant-Kohrs Ranch, the EPA cautiously states that cattle may be at risk for elevated arsenic and copper levels in contaminated soils.[379] The EPA recommended further sampling and assessment of irrigation ditches, which it completed in October 2014. Based on the samples, the agency recommended no additional remediation of the irrigation ditches. Although the EPA did not believe that most historically irrigated lands exceeded action levels for arsenic, it said crews should revisit these areas and take soil samples to confirm that levels do not exceed those deemed acceptable for the land's designated use. Remediation could include removal of contaminated soils and reconstruction of ditch walls, on-

---

Plan for Grant-Kohrs Ranch National Historic Site," pp. 3-1, 3-3, 4-4; Kathy Allen, et al., *Natural Resource Condition Assessment*, 11-12.

[379] U.S. Environmental Protection Agency, "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site, Record of Decision," pp. 1-4, 2-3, 2-23, 2-26, 2-27, 2-41, 2-87, 2-160, 3-37, 3-38, 3-49.

site treatment of soils, abandonment of specific sections of ditches through grading and backfilling, or construction of new ditches to replace active ditches.[380] According to the Federal Restoration Plan, the ultimate goals are remediation efforts that result in "allowing the NPS to achieve full, unencumbered use of the irrigation ditches with historic practices and methods." Subsequently, in October 2016, the parties added the First Amendment to the plan that deleted this directive, but it highlighted the historic significance of the ranch's irrigation system.[381]

In 2008, the U.S. Department of Justice (acting on behalf of the Department of the Interior and the Environmental Protection Agency), the State of Montana, and the Atlantic Richfield Company signed a Consent Decree beginning implementation of site cleanup and restoration. The document included the National Park Service's 2007 Federal Restoration Plan as an attachment. The consent decree stated that ARCO had agreed to pay $187 million toward financing the cleanup of 120 miles of the Clark Fork River and other areas in southwestern Montana. Of this amount, the decree allocated $3.35 million-- $3 million to Grant-Kohrs Ranch and the remaining for BLM lands--to compensate for natural resource damage at Grant-Kohrs Ranch National Historic Site. The settlement brought to an end the lengthy litigation process, and the involved parties could now turn their attention to finalizing settlements and completing cleanup procedures as outlined in the 2004 Record of Decision and the 2007 Federal Restoration Plan.[382] ARCO had obtained water rights in the basin that it could use for remediation efforts and

[380] U.S. Environmental Protection Agency, "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site, Record of Decision," pp. 2-87, 2-119, 2-120, 3-96; National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 3-3, 4-4; email correspondence, Jeff Johnson, Grant-Kohrs Ranch National Historic Site, to Janet Ore, March 3, 2017.

[381] National Park Service, Grant-Kohrs Ranch National Historic Site, "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site," p. 4-4; email correspondence between Jeff Johnson, Grant-Kohrs Ranch National Historic Site, and Janet Ore, March 7, 2017.

[382] U.S. Environmental Protection Agency and United States Department of Justice, "Atlantic Richfield Company agrees to pay $187M for Montana Superfund Cleanup," Butte, Montana, February 7, 2008, EPA Newsroom Press Release, accessed April 25, 2016,

that should be sufficient for the project. It has the option of obtaining additional irrigation water as needed through the state's irrigation well permitting. The EPA pledged to work with the state water authorities and with water users to ensure legal compliance with existing water rights, which it had failed to do with West Side Ditch Company in the 1990s.[383]

**Conclusion**

The history of irrigation and water use at Grant-Kohrs Ranch National Historic Site and the surrounding Deer Lodge Valley of Montana is a rich and variegated tale of many individuals and companies building and changing water systems and infrastructure for over a century. Park personnel interpret the story of how Conrad Kohrs and Conrad Warren irrigated at the ranch, and they have faithfully sought to preserve existing ditches and irrigation systems to give visitors a glimpse of how ranchers practiced irrigation in Montana's western mountain valleys.

However, the story of irrigation extends beyond the ranch and its owners. Because the ditches of both the Kohrs-Manning Ditch Company and the West Side Ditch Company flow through park land and because the Park Service is a user or shareholder on these ditches, the story of the ranch's irrigation is one of cooperation, partnership, and ironing out differences between water users and companies that include Conrad Kohrs, or Conrad Warren, and now the National Park Service. Common in such local partnerships, the daily workings of irrigation operations and water sharing often rely on verbal agreements and passed-down traditions. Archival research into forgotten legal documents provides some clues about these arrangements such as the right-of-way agreement for the Kohrs-Manning Ditch through Grant-Kohrs Ranch. Much of the rich detail about the reality of water use can only come from interviews with

---

https://yosemite.epa.gov/opa/admpress.nsf/e51aa292bac25b0b85257359003d925f/ce166abd9b8e9a76852573e8005c762b!OpenDocument; Grant-Kohrs Ranch National Historic Site, "Disturbed Lands."; email correspondence between Jeff Johnson, Grant-Kohrs Ranch National Historic Site, and Janet Ore, March 7, 2017.

[383] U.S. Environmental Protection Agency, "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site, Record of Decision," pp. 3-80, 3-119, 3-127.

irrigators themselves. It is important to record and remember these details; in a legal area as litigious as water rights, it is essential to have as much documentation as possible should a disagreement arise.

The inglorious story of the environmental degradation from mining activity near Anaconda and Butte is an important part of the ranch's history. ARCO's remedial efforts to clean up contaminated water and soils began in the 1980s, but the struggle against industrial effluent goes back much further. Conrad Kohrs, Conrad Warren, and members of the Kohrs-Manning and West Side Ditches long fought against the pollution of the Anaconda Company. In the early 1900s, Conrad Kohrs and John Bielenberg participated in lawsuits against the Anaconda Company for damage to air and water quality from the smelters. In the 1930s and 1940s, Conrad Warren and other Deer Lodge Valley irrigators could readily see the strange colors of water and soil in the watersheds and the crops dead from toxic water. They tried to adjust their farming and water sources to avoid the worst of the destruction. As restoration efforts now attempt to rectify the historic damage within Grant-Kohrs Ranch National Historic Site itself, park staff can interpret this story. Like the owners of Grant-Kohrs, ranchers and irrigators in the Deer Lodge Valley fought not just against harsh winters, dry summers, flash flooding, and fickle eastern cattle markets. They also fought against big industry, standing up to mining companies with very different ideas of natural resource extraction and little concern for how their decisions affected surrounding agriculturalists or the health of the landscape. Although a romantic mystique may accompany the West's ranching empire, a more nuanced story exposes the relationship between the landscape and humans, the progress of modernity and industry, and the necessity to transition from environmental exploitation to resource stewardship. This is perhaps the deeper and more multi-faceted history of irrigation and water use at Grant-Kohrs Ranch National Historic Site.

# Appendix: Water Rights for Grant-Kohrs Ranch National Historic Site, Kohrs-Manning Ditch Company, and West Side Ditch Company

## Grant-Kohrs Ranch Water Rights[384]

| Water System Name | Originator | Priority Date | Source | Use | Flow Rate (Gal. Per Min.) | Montana Water Right No. |
|---|---|---|---|---|---|---|
| Direct flow | Johnny Grant | Dec. 31, 1862 | Clark Fork River | Stock | 30 (6.7 acft/yr) | 76G-W-162341-00 |
| Direct flow | Johnny Grant | Dec. 31, 1862 | Unnamed spring, tributary of Clark Fork River | Stock | 10 (.8 ac-ft/yr) | 76G-W-162342-00 |
| Seeps | Johnny Grant | Dec. 31, 1862 | Unnamed spring by Draft Horse Barn | Irrigation | 11.22 (18 ac-ft/yr; irrigates 9 acres) | 76G-W-162343-00 |
| Direct flow | Conrad Kohrs & John Bielenberg | Dec. 31, 1866 | Johnson Creek | Stock | 30 (6.7 ac-ft/yr) | 76G-W-162340-00 |
| Johnson Ditch | Conrad Kohrs & John Bielenberg | Aug. 22, 1866 | North Fork of Johnson Creek | Stock | 30 gal/animal/day (3.02 ac-ft/yr) | 76G-W-216098-00 |
| Direct | Conrad Kohrs & John Bielenberg | Dec. 31, 1872 | Clark Fork River | Stock | 30 (6.7 ac-ft/yr) | 76G-W-162339-00 |
| Johnson Ditch | Conrad Kohrs & John Bielenberg | April 5, 1884 | Johnson Creek | Irrigation | 224.4 (42 ac-ft/yr; irrigates 28 acres) | 76G-W-162344-00 |
| Direct | Conrad Kohrs & John Bielenberg | April 5, 1884 | Johnson Creek | Stock | 30 (6.7 ac-ft/yr) | 76G-W-162335-00 |
| Direct | Conrad Kohrs & John Bielenberg | April 5, 1884 | Clark Fork River | Stock | 30 (6.7 ac-ft/yr) | 76G-W-162336-00 |
| Direct | Conrad Kohrs & John Bielenberg | April 5, 1884 | Unnamed spring, tributary of Clark Fork River | Stock | 10 (.08 ac-ft/yr; 30 gal/animal/day) | 76G-W-162338-00 |
| Kohrs Ditch? | Conrad Kohrs & John Bielenberg | July 10, 1885 | Taylor Creek | Irrigation | 390.46 (90 ac-ft/yr; irrigates 23 acres) | 76G-W-092045-00 |
| Pump | Conrad Kohrs & John Bielenberg | April 15, 1885 | Clark Fork River | Irrigation | 5,185 (1,105 ac-ft/yr; irrigates 305 acres) | 76G-W-092041-00 |
| West Side Ditch | C. J. Kading & partners | July 11, 1889 | Clark Fork River | Irrigation | 2,926.18 (550 ac-ft/yr; irrigates 172 acres) | 76G-W-092043-00 |
| Hydraulic Ram/Pump | Conrad Kohrs & John Bielenberg | Dec. 31,1890 | Unnamed spring, tributary of Clark Fork River | Domestic (Ranch House) | 15 (2.5 ac-ft/yr) | 76G-W-162346-00 |
| Kohrs-Manning Ditch | Conrad Kohrs & John Bielenberg | Sept. 1, 1895 | Clark Fork River | Irrigation | 1,404.74 (650 ac-ft/yr; irrigates 216 acres) | 76G-W-092044-00 |

[384] Based on 2003 temporary preliminary decree. Table compiled from John Milner Associates, *Grant-Kohrs Ranch National Historic Site*, p. 2-116 and "Grant-Kohrs Ranch National Historic Site Water Rights," 4, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

| | | | | | | |
|---|---|---|---|---|---|---|
| Johnson Ditch | Conrad Kohrs & John Bielenberg | Dec. 31, 1904 | North Fork of Johnson Creek | Commercial (Lawn and garden) | 4.5 (4.2 ac-ft/yr; irrigates 2 acres) | 76G-W-215969-00 |
| Well | Conrad Kohrs & John Bielenberg | Dec. 31, 1919 | Ground Water | Domestic (Ranch House?) | 15 (1.5 ac-ft/yr) | 76G-W-162347-00 |
| Kohrs-Manning Ditch | Conrad Warren | Dec. 15, 1931 | Clark Fork River | Irrigation | 67.32 (36 ac-ft/yr; irrigates 24 acres) | 76G-W-162345-00 |
| Well | Conrad Warren | July 1, 1934 | Ground Water | Stock | 25 (30 gal/animal/day) | 76G-W-092029-00 |
| Well | Conrad Warren | July 1, 1934 | Ground Water | Domestic (Warren residence) | 25 (2 ac-ft/yr; irrigates 3 acres) | 76G-W-092030-00 |
| Well | Conrad Warren | July 1, 1934 | Ground Water | Domestic | 25 (2 ac-ft/yr; irrigates 3 acres) | 76G-W-092031-00 |
| Direct/Kohrs-Manning Ditch | Conrad Warren | Aug. 5, 1940 | Cottonwood Creek | Stock | 10 (.8 ac-ft/yr) | 76G-W-162334-00 |
| Direct | Conrad Warren | Aug. 5, 1940 | Clark Fork River | Stock | 30 (6.7 ac-ft/yr) | 76G-W-162337-00 |
| Pump | Railroad / NPS | Jan. 1, 1942 | Clark Fork River | Commercial (Railroad gravel pit) | 50 (81 ac-ft/yr) | 76G-W-090691-00 |
| Well | NPS | Sept. 13, 1999 | Ground Water | Stock | 6 (1.29 ac-ft/yr) | 76G-W-109125-00 |
| | | | | | | |
| **Other Water Systems** | **Originator** | **Priority Date** | **Source** | **Use** | | **Montana Water Right No.** |
| Hartz Ditch | C. J. Kading & partners (?) | ca. 1890s (?) | Lost Creek | Irrigation | | N/A |
| Kohrs "Big" Ditch | Conrad Kohrs & John Bielenberg | Late 19th c. (?) | Clark Fork River | Irrigation | | N/A |
| Salmonsen Waste Ditch | C. J. Kading & partners (?) | ca. 1890s (?) | Taylor Creek | Irrigation | | N/A |
| Taylor Ditch | C. J. Kading & partners (?) | ca. 1880s (?) | Taylor Creek | Irrigation | | N/A |
| Effluent standpipe / hand line system | City of Deer Lodge / NPS | 1999 | Sewage Lagoons | Irrigation | | N/A |

## Kohrs-Manning Ditch Company Water Rights[385]

| Owner of Right | Priority Date | Source | Use | Rate (cfs) | Max. Vol. (af/yr) | Montana Water Right # |
|---|---|---|---|---|---|---|
| Kohrs-Manning | 1868 | Cottonwood Creek | Irrigation | 8 | 2560 | 76G-W-091146-00 |
| Kohrs-Manning | 1895 | Clark Fork River | Stock | | | 76G-W-091137-00 |
| Kohrs-Manning | 1895 | Clark Fork River | Irrigation | 15 | 5400 | 76G-W-091140-00 |
| NPS | 1895 | Clark Fork River | Irrigation | 3.13 | 650 | 76G-W-092044-00 |
| Kohrs-Manning | 1905 | North Fork of Johnson Creek (Fred Burr Creek) | Irrigation | 8 | 2880 | 76G-W-091147-00 |
| Kohrs-Manning | 1931 | Clark Fork River | Stock | | | 76G-W-091138-00 |
| Kohrs-Manning | 1931 | Clark Fork River | Irrigation | 25 | 9000 | 76G-W-091141-00 |
| Kohrs-Manning | 1931 | Clark Fork River | Irrigation | 40 | 6300 | 76G-W-091142-00 |
| NPS | 1931 | Clark Fork River | Irrigation | .15 | 36 | 76G-W-162345-00 |
| Kohrs-Manning | 1931 | Cottonwood Creek | Irrigation | 40 | 9919.5 | 76G-W-091145-00 |
| Kohrs-Manning | 1958 | Clark Fork River | Irrigation | 44.23 | 6300 | 76G-W-091143-00 |
| Kohrs-Manning | | Cottonwood Creek | Irrigation | | | 76G-W-091144-00 |
| Kohrs-Manning | | Clark Fork River | Stock | | | 76G-W-091136-00 |
| Kohrs-Manning | | Clark Fork River | Irrigation | | | 76G-W-091139-00 |

## West Side Ditch Company Water Rights[386]

| Owner of Right | Priority Date | Source | Use | Rate (cfs) | Max. Vol. (af/yr) | Montana Water Right # |
|---|---|---|---|---|---|---|
| West Side | June 28, 1889 | Clark Fork River | Stock | 30 gal./day per animal | | 76G-W-092047-00 |
| West Side | June 28, 1889 | Clark Fork River | Irrigation | 40 | 18,164.28 | 76G-W-092052-00 |
| NPS | July 11, 1889 | Clark Fork River | Irrigation | 6.52 | 500 | 76G-W-092043-00 |
| West Side | 1900 | Little Modesty Creek | Stock | 30 gal./day per animal | | 76G-W-092049-00 |
| West Side | 1900 | Little Modesty Creek | Irrigation | 5 | 2300 | 76G-W-092050-00 |
| West Side | 1900 | Lost Creek | Stock | 30 gal/day per animal | | 76G-W-092054-00 |
| West Side | 1900 | Lost Creek | Irrigation | 22.63 | 10,100 | 76G-W-092055-00 |
| West Side | 1949 | Clark Fork River | Irrigation | 25 | 11,352.68 | 76G-W-092053-00 |
| West Side | 1949 | Clark Fork River | Stock | 30 gal./day per animal | | 76G-W-092048-00 |
| West Side | | Clark Fork River | Irrigation | | | 76G-W-092051-00 (district) |
| West Side | | Clark Fork River | Stock | | | 76G-W-092046-00 (district) |

[385] Based on 2003 temporary preliminary decree. Table compiled from "Grant-Kohrs Ranch National Historic Site Water Rights," 20, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

[386] Based on 2003 temporary preliminary decree. Table compiled from "Grant-Kohrs Ranch National Historic Site Water Rights," 13, GRKO Water Rights, Grant-Kohrs Ranch National Historic Site Archives.

# Appendix: Oral History Summary

**Oral History Interview with Fred Benson (and Jason Smith)**
Date: January 15, 2014
Interviewer: Janell Byczkowski
Location: Deer Lodge, Montana
Transcribed by Hannah Braun, Public Lands History Center, December 11, 2015
Edited by Hannah Braun, Public Lands History Center, December 14, 2015

Abstract: Janell Byczkowski and Jason Smith (the Natural Resource Specialist from Grant-Kohrs) met with rancher Fred Benson, a user on the Kohrs-Manning Ditch, on January 15, 2015. Benson talks about his involvement with the Kohrs-Manning Ditch and how he uses the water to flood irrigate his land for hay to feed his cattle. He talks about how the ditch operates, its history, and the rebuilding of some of its infrastructure and changes in infrastructure relative to later developments like the coming of the interstate highway. Benson also talks about the relationship between ditch users and the National Park Service at Grant-Kohrs and what it was like to work with Con Warren in relation to the ditch. He discusses how the ditch company hires a contractor to clean out the ditch and how they handle pests, particularly beavers. He also briefly mentions adjudication and litigation along the ditch.

**Oral History interview with Richard Forson (and Darlene Forson)**
Date: March 8, 2014
Interviewer: Janell Byczkowski
Location: Richard Forson's house, Deer Lodge, Montana
Transcribed by Janell Byczkowski, Public Lands History Center, March 26, 2014
Edited by Hannah Braun, Public Lands History Center, December 10, 2015

Abstract: Janell Byczkowski interviews Richard and Darlene Forson about their experiences with the West Side Ditch Company. Richard talks about how he came to be involved with the company and own land along the ditch. He talks about the switch from flood irrigation to sprinklers, which uses less water, and about how they gradually switched from hand- and wheel-line sprinklers to pivots, which save the time needed to reset them by hand. Richard also discusses at length what happened with the ARCO (Atlantic Richfield Company) lawsuit, the changes that came as a result of that, and ongoing studies and clean-up of mine waste contaminants (the Superfund project) from Clark Fork throughout the valley, of which ARCO was part. Richard talks about other changes to the ditch, including the switch from flumes to a number of siphons. He discusses the work of the ditch rider to maintain the ditch and regularly check and adjust the flows and how users had pumps that took out only their allotted share of water. Richard talks about working with other ditch owners to maintain the ditch, make repairs (using government cost-share programs), and clear out weeds with chemicals or burning. He talks about the relationship with government and commercial entities along the ditch, including the prison, the airport, the City of Deer Lodge (which used to use ditch water for the cemetery) and Grant-Kohrs Ranch. He discusses some of the changes the airport made to the ditch's course and their help with controlling weeds and how Grant-Kohrs Ranch sends someone up each

spring to help clear the ditch and bring the water down. Richard, who is vice president of the West Side Ditch Company, also discusses briefly how meetings operate and how the users come to decisions. He also relates what he knows about the formation of the company and its evolution.

**Transcript of Oral History interview with Stan Fries (and Theresa Fries)**
Date: March 8, 2014
Interviewer: Janell Byczkowski
Location: Fries house, Deer Lodge, Montana
Transcribed by Janell Byczkowski, Public Lands History Center, April 10, 2014
Edited by Hannah Braun, Public Lands History Center, December 10, 2015

Abstract: Janell Byczkowski interviews Stan Fries along with his wife, Theresa. Stan is the ditch rider for the West Side Ditch Company. Prior to working for the West Side, Stan worked at the prison in Deer Lodge and then became water commissioner, or ditch rider, for the individual users along Dempsey Creek. He talks about his work on Dempsey Creek and how it was more complicated and more tense at times than working on the West Side. Fries talks at some length about the kinds of tasks a ditch rider does, particularly patrolling the ditch daily during the summer to keep it clean and report any maintenance issues to Rick Cline, president of the West Side Ditch Company. He talks about some of the problems along the ditch, such as with holes in the siphons, clogs of debris in the ditch or the siphons, gopher holes damaging the ditch, and other issues. He also talks about troubles with flooding and rains and how he has to adjust the ditch accordingly when there is extra water. He does not deal with too many people directly; most of his contact is with Rick Cline. Unlike many of the other people involved with the ditch, Fries does not farm or ranch, and so does not irrigate or hold water rights.

**Transcript of Oral History interview with Nancy Kelley**
Date: March 9, 2014
Interviewer: Janell Byczkowski
Location: Nancy Kelley's house, Deer Lodge, Montana
Transcribed by Janell Byczkowski, Public Lands History Center, April 24, 2014
Edited by Hannah Braun, Public Lands History Center, December 9, 2015

Abstract: Janell Byczkowski talks to Nancy Kelley, secretary of the West Side Ditch Company. She shares about her and her husband's long history with the ditch and with the other users. She talks about how she was the first woman to hold a position with the ditch company. She talks about how she learned how to flood irrigate before she and her husband switched to sprinklers, how they raised cows and then sheep, and that they now lease their land out to another rancher to farm it. Kelley talks about the changes since the Park Service purchased the Kohrs-Warren ranch and the extra paperwork she has to go through as secretary and treasurer for the ditch company. She talks about some of the disagreements among the ditch users, how the ditch riders measured out shares, how some people always got more than their share, and how anything Con Warren or Charlie Beck said was law. Kelley mentions how other irrigators get water from creeks in the area rather than from the river as part of the ditch company and how these users operate their

own individual ditches and dams. She talks about how thankful she is that the minutes and records for the West Side Ditch Company are now safely stored at Grant-Kohrs Ranch. She also briefly mentions the lawsuit with ARCO and what it was like when the ditch ran dry.

**Transcript of Oral History interview with Bill Mosier, Sr.**
Date: January 16, 2014
Interviewer: Janell Byczkowski
Location: Bill Mosier's house, Deer Lodge, Montana
Transcribed by Janell Byczkowski, Public Lands History Center, January 23, 2014
Edited by Hannah Braun, Public Lands History Center, December 9, 2015

Abstract: Janell Byczkowski interviews rancher Bill Mosier Sr. in his home in Deer Lodge, Montana. Mosier has with him a variety of papers and a map related to Kohrs-Manning Ditch. Mosier speaks about his family and other families' history along Kohrs-Manning Ditch and how they used water from the ditch to irrigate hay for their cows. He talks about how the ditch was enlarged prior to 1950 and how he has served as president of the ditch company. He talks about how they used to use horses to clear out the ditch and now they use machinery. He also mentions his use of sprinkler and flood irrigation.

**Transcript of Oral History interview with George Reistad**
Date: March 8, 2014
Interviewer: Janell Byczkowski
Location: George Reistad's house, Deer Lodge, Montana
Transcribed by Janell Byczkowski, Public Lands History Center, March 18, 2014
Edited by Hannah Braun, Public Lands History Center, December 9, 2015

Abstract: Janell Byczkowski interviews rancher and ditch owner George Reistad about his involvement with West Side Ditch. Reistad speaks about cleaning and improvements along the ditch, including the building of flumes and siphons and discusses the other ditch owners. He talks at some length about the lawsuit with ARCO (Atlantic Richfield Company). George also talked about the crops, especially hay, that he grows and irrigates with sprinklers from West Side Ditch. He also discusses adjudication of water rights and the efforts of the Salish-Kootenai Indians to obtain water rights. He talks about the potential combining of Whalen Ditch and West Side Ditch. He also mentions the relationship between Grant-Kohrs Ranch National Historic Site and other owners of West Side Ditch.

# Annotated Bibliography

Primary & Archival Sources

C. K. Warren Collection. Conrad K. Warren Personal Papers (1932-1993). Record Group #2. Accession Number GRKO-1338 & GRKO-1124. Catalog Number GRKO 16700. Grant-Kohrs Ranch National Historic Site Archives.
This collection consists of personal papers belonging to Conrad K. Warren, which include information and original documents related to his ranching operation, irrigation, and water rights.

Conrad Warren Interview with Rex Myers, Deer Lodge, Montana, August 1980. 14 cassettes. Transcribed by Bobbie Blake. Grant-Kohrs Ranch National Historic Site Archives.
This oral history interview of Conrad Warren, which spanned several days and 14 cassette tapes, is mostly transcribed and includes Warren's reminiscences about Grant-Kohrs Ranch. Much of the information he shares is about Conrad Kohrs and the ranch during the Kohrs-Bielenberg era, but he also does discuss some of his own practices and experiences at the ranch.

GRKO Water Rights. RGN12. Accession Number GRKO-01444. Catalog Number GRKO 17823. Grant-Kohrs Ranch National Historic Site Archives.
This collection includes details on water rights at Grant-Kohrs Ranch National Historic Site, including copies of original water rights forms and claims. It also includes a booklet from 2003 discussing details of the site's water use and including briefing statements on each of the rights held by the site.

Informal Interview All. Grant-Kohrs Ranch National Historic Site Archives.
This typed document includes a variety of notes from interviews and conversations between park staff members and Conrad Warren or individuals who worked at the ranch or knew Warren or Conrad Kohrs. The notes date from the 1970s into the 2000s, and concern the history of the Kohrs family, ranch operations, details about artifacts, and the home furnishings, irrigation, Warren's tenure at the ranch, and a variety of other topics.

Kohrs, Hon. Conrad. "A Veteran's Experience in the Western Cattle Trade." *The Breeder's Gazette* (December 18, 1912): 1328-1329, 1399.
In this article, Conrad Kohrs reminisces about how he got into the Montana cattle trade, his breeding and raising practices, and his views that shorthorns and blooded stock were better than Texas cattle and that cattle raising on valley pastures with winter hay feed was a more successful model than open range ranching.

Kohrs, Conrad, and Conrad Kohrs Warren. *Conrad Kohrs: An Autobiography*. Deer Lodge, MT: Platen Press, 1977.
Conrad Kohrs' autobiography, compiled by his grandson, Conrad Kohrs Warren, covers Kohrs' life and business ventures from his childhood until about 1915. In addition to detail about his cattle operations, Kohrs discusses his investments in gold mining and

the various ditches, including Rock Creek Ditch Company, which he and his partners dug to supply the mines with water.

Kohrs-Manning Ditch binder. Jason Smith's office, Grant-Kohrs Ranch National Historic Site.
This binder contains a variety of memoranda, correspondence, and other documents related to Kohrs-Manning Ditch. Of particular interest are those documents that detail the relationship between Kohrs-Manning Ditch Company and the National Park Service regarding maintenance, improvements, and monitoring of the ditch.

Kohrs-Manning Ditch papers. Copied from originals held by William (Bill) Mosier, Kohrs-Manning Ditch Company president, by Janell Bcyzkowski, January 11, 2014.
Public Lands History Center Research Associate Janell Bcyzkowski took copies of these documents, which include a variety of legal papers and statements related to Kohrs-Manning Ditch and its water rights, while interviewing Kohrs-Manning Ditch Company's president, William "Bill" Mosier, on January 11, 2014. The originals remain with Mr. Mosier.

Montana Department of Natural Resources and Conservation. Water Rights Records. Bozeman Office.
This office contains water rights records for claims filed in Basin 76G, where Grant-Kohrs Ranch is located. Records on file include those rights owned by Grant-Kohrs Ranch as well as those owned by Kohrs-Manning Ditch Company and West Side Ditch Company.

Montana State University Extension Service Records, 1912-1970. Accession 00021. Montana State University Library, Merrill G. Burlingame Special Collections.
This collection includes annual reports of the Montana State University agricultural extension for Deer Lodge and Powell Counties, as well as annual irrigation reports. They provide a good background on the kinds of projects extension agents were helping farmers with, including constructing better ditch systems, improving irrigation efficiency, and consolidating ditches systems.

Oral History Interviews with Fred Benson (1-15-14), Richard Forson (3-8-14), Stan Fries (3-8-14), Nancy Kelley (3-9-14), Bill Mosier (1-16-14), and George Reistad (3-8-14). Interviewed and transcribed by Janell Bcyzkowski. Public Lands History Center, Colorado State University.
These six oral histories were recorded and transcribed as part of the research for this report and are part of the project deliverables. The interviews were conducted with current users along the Kohrs-Manning Ditch and West Side Ditch, and include some officers of both companies. These interviews offer a view into contemporary management of the ditches and relations with the National Park Service and other water users.

Taylor Ditch digital files. Grant-Kohrs Ranch National Historic Site.
This digital file folder includes notes, applications, and scopes of work related to Taylor Creek, the Taylor Ditch system, and the Taylor Fields. Specifically, it includes staff notes

on meetings with the Montana State Prison regarding water flow in Taylor Creek; notes on flooding of residences on the park's southeast border due to ditch overflow; and applications and scopes of work for projects to install monitoring wells and ditch liner to prevent future flood incidents.

U.S. Bureau of the Census. *Thirteenth Census of the United States Taken in the Year 1910. Vol. VI, Agriculture 1909 and 1910, Reports by States, with Statistics for Counties: Alabama-Montana.* Washington, D.C.: Government Printing Office, 1913. Accessed June 7, 2016, https://www.census.gov/prod/www/decennial.html.
This volume of the 1910 U.S. Census examines agriculture in the state of Montana, with extensive tabular data on farm demographics, animals, and crops for the state as a whole and by county. It also includes a section on irrigation with tabular data on size, extent, and use of irrigation water for the state as a whole and by county.

West Side Ditch Company Records. Collection: RGN12.2. GRKO Accession Number 01469. Catalog Number: GRKO 20008. Grant-Kohrs Ranch National Historic Site Archives.
This collection includes a large number of water rights documents, meeting notes, legal and court documents, and other materials related to the West Side Ditch Company and its history and operation.

Wilson, Charles Morrow. "6000 Acres and a Microscope." *Scribner's Magazine* (September 1937): 42-48, 69.
This article briefly traces the history of the Kohrs Ranch and focuses on Conrad Warren and his operation of the ranch. It provides an overview of Warren's ranching and farming practices, including his cattle operation, his horses, feed crops, and use of irrigation to combat low rainfall and dust storms and produce a reliable grass crop for his livestock.

Secondary Sources

Albright, John, with Peter Snell and Paul Gorton. *Grant-Kohrs Ranch National Historic Site: Historic Resource Study, Cultural Resources Statement, and Historic Structure Report*. Denver: Denver Service Center, Historic Preservation Division, National Park Service, U.S. Dept. of the Interior, October 1979. Accessed April 11, 2016. https://www.nps.gov/parkhistory/online_books/grko/hrs/index.htm.
This document includes a Historic Resource Study, which is an in-depth history of the ranch and the Kohrs and Warren eras, a Cultural Resources Statement, which summarizes the site's resources, and a Historic Structure Report that describes fifty-five of the site's historic buildings and structures and unnumbered resources such as fences and water/irrigation structures. The Historic Structure Report includes a section on the ranch's water resources and structures, including the front lawn watering system, the drainage system, the hydraulic ram that delivered water to the ranch house, and Kohrs-Manning Ditch.

Allen, Kathy, Sarah Gardner, Kevin Benck, Andy Nadeu, Lonnie Meinke, Thomas Walker, Mike Komp, Keaton Miles, Barry Drazkowski. *Grant-Kohrs Ranch National Historic Site: Natural Resource Condition Assessment. Natural Resource Report NPS/GRKO/NRR—*

*2015/1071*. Prepared by GeoSpatial Services, Saint Mary's University of Minnesota, Winona, Minnesota, for U.S. Dept. of the Interior, National Park Service. Fort Collins, CO: U.S. Dept. of the Interior, National Park Service, Natural Resource Stewardship and Science, 2015.
This scientific document describes and provides condition assessments for natural resources within Grant-Kohrs Ranch National Historic Site, including grazing, the riparian area, pastures and hayfields, birds, aquatic organisms, air quality, water quality, soundscapes, viewscapes, hydrology, and soils. It includes information on water quality and hydrology in the park related to irrigation and Superfund cleanup.

Dunbar, Robert G. "The Search for a Stable Water Right in Montana." *Agricultural History* 28, no. 4 (October 1954): 138-149.
This article explores the tension between the Riparian Doctrine and Prior Appropriation in Montana water rights. Dunbar explains how the state began using a hybrid of the two systems and then switched to prior appropriation. The article explores how the state has historically dealt with recording and adjudicating water rights and many citizens' opposition to creating a state-run water rights system like that in Colorado and Wyoming.

Fiege, Mark. *Irrigated Eden: The Making of an Agricultural Landscape in the American West*. Seattle: University of Washington Press, 1999.
This book focuses on irrigation and agriculture in southern Idaho, but contains many sections that are applicable to irrigation in Deer Lodge Valley and at Grant-Kohrs Ranch. Relevant sections include how farmers dealt with draining water-logged lowlands; the harm caused to irrigation ditches by beavers, muskrats, and ground squirrels and methods for eradicating them; and the work of clearing ditches of aquatic plants and vegetation. Also useful are sections prior appropriation; the communal and cooperative nature of early irrigation and ditch construction among farmers and neighbors; different irrigation methods; and the popularity of planting alfalfa for its use as livestock feed.

Fletcher, Robert H. *Free Grass to Fences: The Montana Cattle Range Story*. New York: University Publishers Incorporated, 1960.
This book provides an overview of the cattle industry in Montana, beginning with cattle trading in the mountain valleys of western Montana, including Deer Lodge Valley, in the 1850s. The book references the early career of Conrad Kohrs and his contributions to the industry. The discussion of the post-1890s ranching industry focuses on major statewide and national developments and on the Montana Stockgrowers Association.

Grant-Kohrs Ranch National Historic Site. "Disturbed Lands." Accessed April 25, 2016. https://www.nps.gov/grko/learn/nature/disturbedlands.htm.
This webpage provides a brief overview of Grant-Kohrs Ranch National Historic Site's inclusion in the Clark Fork River Operable Unit and the process of examining injury to the site's natural resources, including the 2008 Consent Decree whereby Atlantic Richfield Company agreed to pay for Superfund cleanup activities. The webpage includes links to the EPA's 2004 Clark Fork River Record of Decision, the 2008 Consent Decree, and EPA's press release about the 2008 Consent Decree.

Howard, Stanley W. *Green Fields of Montana: A Brief History of Irrigation*. Manhattan, KS: Sunflower University Press, 1992.
This book provides an overview of irrigation in Montana, discussing the major eras, the federal irrigation projects undertaken by the Bureau of Reclamation, and water law.

John Milner Associates, Inc., Rivanna Archaeological Consulting, and Susan Maxman & Partners Architects. *Grant-Kohrs Ranch National Historic Site, Deer Lodge, Montana: Cultural Landscape Report, Part One, Landscape History, Existing Conditions, and Analysis and Evaluation*. Deer Lodge, MT: National Park Service, Grant-Kohrs Ranch National Historic Site, 2004.
This extensive cultural landscape report of Grant-Kohrs Ranch details the history of the site, the landscape, and the buildings and structures, and provides dates of construction and modification for nearly every structural and landscape change, along with evaluations and assessments. The document goes into depth about irrigation and water features and systems on the ranch, and includes details about water rights, ditch construction, and modifications to the irrigation system. It is the most thorough document to date pertaining to irrigation and water features at the ranch.

Jordan, Terry G. *North American Cattle-Ranching Frontiers: Origins, Diffusion, and Differentiation*. Albuquerque: University of New Mexico Press, 1993.
This book discusses the North American cattle industry and how it was shaped by livestock raising practices that came from the Old World. It traces the development of three specific cattle traditions in North America: the Californian, the Texan, and the Midwestern. The last chapter addresses ranching in the northern Rockies, including southwestern Montana, describing the Midwestern ranching practices like winter feeding, hay production, and seasonal pasturing that characterized operations including that of Grant-Kohrs Ranch in the 1860s-1880s.

Konizeski, R. L., R. G. McMurtrey, and Alex Brietkrietz, with a section on gravimetric survey by E. A. Cremer III. *Geology and Ground-Water Resources of the Deer Lodge Valley, Montana*. Geological Survey Water-Supply Paper 1862. Prepared in cooperation with the Montana Bureau of Mines and Geology, Butte, Montana. Washington, D.C.: Government Printing Office, 1968.
Although full of technical data on geologic formations and ground-water, this document includes some general information on irrigation with tributaries of the Clark Fork and on mining use of water and discharge of tailings.

LeCain, Timothy J. *Mass Destruction: The Men and Giant Mines that Wired America and Scarred the Planet*. New Brunswick, NJ: Rutgers University Press, 2009.
This book uses the copper mines at Bingham, Utah and Butte and Anaconda, Montana to examine the environmental consequences of large-scale mining and faith in technological progress. Most of the book is not directly applicable to Grant-Kohrs Ranch, but it does discuss the turn of the century lawsuits in Deer Lodge Valley over Washoe smelter smoke pollution and the 1983 Superfund designation and on-going environmental consequences of toxic waste in the Clark Fork River watershed.

McChristian, Douglas C. *Ranchers to Rangers: An Administrative History of Grant-Kohrs Ranch National Historic Site*. Rocky Mountain Cluster, National Park Service, July 1997. https://www.nps.gov/grko/learn/management/upload/Administrative-History-full-version.pdf.
This administrative history of Grant-Kohrs Ranch National Historic Site includes a lengthy introduction of the history of the ranch from its establishment by Johnny Grant through Conrad Warren's ownership. It then discusses National Park Service management of the site, through land acquisition, cultural resources, and interpretation. A chapter on natural resource management mentions the Superfund designation and clean up. There are only a few references to water rights and irrigation at the site.

Notice of Intent to Award. Funding Announcement Number NPS-NOIR# P13AC00326. Kohrs-Manning Ditch Irrigation System Improvements. Recipient: Deer Lodge Valley Conservation District. Period of Performance: May 15, 2013-May 15, 2017. Accessed June 13, 2016, http://www.grants.gov/web/grants/view-opportunity.html?oppId=234634.
This contract notice is for construction of a new flume for Kohrs-Manning Ditch over Johnson Creek to replace an older, deteriorating flume. The flume, although part of the ditch system owned by Kohrs-Manning Ditch Company, is located on National Park Service land within Grant-Kohrs Ranch National Historic Site.

PBS&J. *Irrigation in Montana: A Preliminary Inventory of Infrastructure Condition*. Prepared for Montana DNRC, Conservation & Resource Development Division, Helena, Montana. Missoula, MT: PBS&J, January 2009.
This inventory and assessment of the irrigation infrastructure and systems in the state of Montana is designed to help the Montana Department of Natural Resources and Conservation manage its systems. The report includes a summary of irrigation in Montana, a detailed analysis and condition summary of each of the state's Bureau of Reclamation projects and State Water Projects, and an inventory of the state's irrigation infrastructure conducted through mail survey and on-site evaluation, resulting in a summary of condition and restoration needs. Most of the document is not applicable to Grant-Kohrs Ranch, but the overview of irrigation in the state provides a good context.

Pisani, Donald J. *To Reclaim a Divided West: Water, Law and Public Policy, 1848-1902.* Albuquerque: University of New Mexico Press, 1992.
This book provides an overview to water and irrigation history in the West during the second half of the nineteenth century, ending with the Reclamation Act of 1902. Although most of the book's examples and case studies are taken from California, Wyoming, Colorado, and Arizona, it covers many broad themes, issues, and developments that affected irrigation nationally. The book provides a context for irrigation in Montana, particularly the ways in which Deer Lodge Valley deviated from the norm in terms of large-scale irrigation projects after the turn of the century.

Rader, Brian R. *A Toxicological Evaluation of Contaminated Floodplain Soils Along the Clark Fork River, Grant-Kohrs Ranch National Historic Site, Deer Lodge, Montana*. Fort Collins, CO: Colorado State University, 1995. Master of Science in Ecology thesis.

This thesis discusses the toxicity of soils in the Clark Fork River floodplain through Grant-Kohrs Ranch due to mining activity upstream. Although much of the data is very scientific, it provides a useful overview of the ranch's inclusion in the Superfund site and implications of heavy metal toxicity and "slickens" areas within the park.

Rosenberg, Anna Fay. *Hard Winter Endurance: Conrad Kohrs' Cattle Raising Operation, 1887-1900*. Bozeman: University of Montana, 1996. Master of Arts in History thesis.
This thesis provides an overview of Conrad Kohrs' cattle raising operation, focusing on his adaptations to the industry and the environment, and how this helped him survive the 1886-1887 winter and continue to build his cattle empire through the turn of the century.

Shapins Belt Collins. *Grant-Kohrs Ranch Cultural Landscape Report, Part Two: Treatment Recommendations. Pasture/Hay Fields Component Landscape, Upland Pastures Component Landscape. Final 100% Draft*. Submitted Under Contract to National Park Service, Intermountain Region. Boulder, CO: Shapins Belt Collins (formerly Shapins Associates), February 2009.
This document builds upon the John Milner Associates Cultural Landscape Report, Part 1 by offering treatment recommendations for preserving, rehabilitating, and restoring the pasture/hayfield and upland pasture areas at Grant-Kohrs Ranch. It includes recommended treatments for the irrigation system and related water structures.

Sherow, James E. "'The Fellow Who Can Talk the Loudest and Has the Best Shotgun Gets the Water': Water Regulation and the Montana State Engineer's Office, 1889-1964." *Montana: The Magazine of Western History* 54, no. 1 (Spring 2004): 56-69.
This article discusses the position of the state engineer during its fifty-year history in Montana, and the controversies over greater state control and oversight of water rights and uses. Although not directly applicable to Grant-Kohrs Ranch, the article provides background context on irrigation and water use in the state.

Shovers, Brian. "Diversions, Ditches, & District Courts: Montana's Struggle to Allocate Water." *Montana: The Magazine of Western History* 55, no. 1 (Spring 2005): 2-15.
This article discusses the controversies over water rights and adjudication in Montana, and the state's failure to adopt a truly centralized state-run system of managing water rights. Although not directly applicable to Grant-Kohrs Ranch, the article provides background context on irrigation and water use in the state.

State Engineer's Office. *Water Resources Survey: Deer Lodge County, Montana. Part I: History of Land and Water Use on Irrigated Areas. Part II: Maps Showing Irrigated Areas in Colors Designating the Sources of Supply*. Helena, MT: State Engineer's Office, 1955.
This is a detailed survey of water use in Deer Lodge County in the Clark Fork and Missouri River drainages. This document is a useful companion to the survey for Powell County, as it covers the Clark Fork and some of the upstream drainages that affect water further downstream at Grant-Kohrs Ranch and mentions some of the mining areas in the county where Conrad Kohrs conducted operations. The document includes detailed survey maps of the drainages, showing creeks, streams, ditches, laterals, irrigated lands,

and other features. One of the maps shows the initial diversion point for West Side Ditch at Clark Fork River and Little Modesty Creek.

State Engineer's Office. *Water Resources Survey: Powell County, Montana. Part I: History of Land and Water Use on Irrigated Areas. Part II: Maps Showing Irrigated Areas in Colors Designating the Sources of Supply*. Helena, MT: State Engineer's Office, 1959.
This is a detailed survey of water use in Powell County in the Clark Fork River drainage. It discusses early settlement, ranching, and agriculture in the county, as well as mining areas, including places where Conrad Kohrs conducted operations. The document discusses West Side Ditch Company and Kohrs-Manning Ditch. The document includes detailed survey maps of the drainages, showing creeks, streams, ditches, laterals, irrigated lands, and other features within the county. As a compendium, the plat survey forms used to compile the data for the report are useful in that they show the landowners who hold water rights in the county, including appropriations, quantity, and use. Conrad Warren was among those surveyed.

Quivik, Fredric L. "Landscapes as Industrial Artifacts: Lessons from Environmental History." *IA. The Journal of the Society for Industrial Archeology* 26, no. 2 (2000): 55-64.
In this article, historian Frederic Quivik elucidates the ways in which industrial archeology and environmental history can inform and complement each other. He uses as a case study the copper mining industry around Butte and Anaconda, Montana and perceptions about the historical significance of smelter works, slag piles, and mine tailings. He notes that Grant-Kohrs Ranch is part of a Superfund site, but argues that the mine tailings within the site could be preserved and interpreted for the light they shed on rancher and farmer interactions with mining and smelting companies and lawsuits in at the turn of the nineteenth century over mine waste contamination in Deer Lodge Valley.

Quivik, Fredric L. "The Historical Significance of Tailings and Slag: Industrial Waste as Cultural Resource." *IA. The Journal of the Society for Industrial Archeology* 33, no. 2 (2007): 35-52.
In this article, Quivik uses the Butte-Anaconda National Historic Landmark District and the Clark Fork Superfund site as a case study to argue that mining, milling, and smelting waste dumps and tailings are important features of mining landscapes and their history. He argues that industrial wastes can have national significance and should be preserved for the historic story they tell. He discusses at length the pollution of Deer Lodge Valley from these waste products, and in particular the early twentieth century lawsuits filed by farmers and the government against the Anaconda Company for arsenic and sulfur poisoning of livestock and vegetation in the valley.

Thornberry-Ehrlich, Trista. *Grant-Kohrs Ranch National Historic Site: Geologic Resource Evaluation Report. Natural Resource Report NPS/NRPC/GRD/NRR—2007/004*. Denver: U.S. Dept. of the Interior, National Park Service, Geologic Resources Division, Natural Resource Program Center, 2007.
This document provides a general overview to the geology at Grant-Kohrs Ranch and water resources. It is particularly useful for its examination of mine waste contamination along the Clark Fork River and efforts to monitor contamination at the site.

U.S. Department of the Interior, National Park Service, Grant-Kohrs Ranch National Historic Site. "Part I: National Park Service Federal Restoration Plan for Grant-Kohrs Ranch National Historic Site." Deer Lodge, MT: National Park Service, Grant-Kohrs Ranch National Historic Site, September 2007. In U.S. Department of the Interior. "Federal Restoration Plan, U.S. Department of the Interior. Part I: National Park Service. Part II: Bureau of Land Management." Clark Fork River Operable Unit, Milltown Reservoir/Clark Fork River National Priorities List Site, September 2007.
This document lays out how the National Park Service will implement the EPA's 2004 Record of Decision regarding the Selected Remedy for the Clark Fork River Operable Unit. It discusses the approach to be used in the riparian area to remove or treat in situ contaminated soils, as well as a plan for dealing with contaminated plants on the berms of irrigation ditches.

U.S. Department of the Interior, National Park Service. *Grant-Kohrs Ranch National Historic Site: Cultural Landscape Analysis*. [Denver?]: Rocky Mountain Region, National Park Service, [1987].
This document discusses historic land use at the ranch as well as current land ownership and management practices, particularly in terms of vegetation, water, and viewscapes. It also evaluates the overall ranch area, including surrounding lands, for its significance according to National Register of Historic Places criteria. It makes recommendations for future land management and preservation of the viewscape from the ranch into neighboring property. It is supplemented by many site and land use maps.

U.S. Department of the Interior, National Park Service. *Grant-Kohrs Ranch National Historic Site, Montana: General Management Plan*. [s.l.]: U.S. Department of the Interior, National Park Service, 1980.
This document lays out a brief history of the ranch and its acquisition by the National Park Service, discusses land and resource management of the site, particularly in terms of the historic structures, collections, and grounds, lays out a plan for interpretive strategy, and lays out a plan for development of visitor facilities, administration/maintenance, and housing, as well as future planning document needs and land acquisition intentions. It is supplemented with land use maps and a historic base map.

U.S. Department of the Interior, National Park Service. *Statement for Management: Grant-Kohrs Ranch National Historic Site*. [Denver?]: Rocky Mountain Region, National Park Service, 1990.
This document covers the legislative and management background of Grant-Kohrs Ranch National Historic Site, going into particular depth about the rights-of-way through the park, ownership and acquisition of land parcels, trends in land use, and visitor use, and lists additional objectives and issues related to land management and facilities. The document also mentions the ranch's inclusion in the Silver Bow Creek Superfund site, and toxicity implications for land management. It is supplemented with locale and land use maps.

U.S. Environmental Protection Agency and United States Department of Justice. "Atlantic Richfield Company agrees to pay $187M for Montana Superfund Cleanup." Butte,

Montana, February 7, 2008. EPA Newsroom Press Release. Accessed April 25, 2016. https://yosemite.epa.gov/opa/admpress.nsf/e51aa292bac25b0b85257359003d925f/ce166abd9b8e9a76852573e8005c762b!OpenDocument.
This press release notes that the Atlantic Richfield Company has agreed to pay for cleanup along the Clark Fork River and provides details about the amount of funding to go to which projects, including $3.35 million for restoration at Grant-Kohrs Ranch National Historic Site.

U.S. Environmental Protection Agency. "Clark Fork River Operable Unit of the Milltown Reservoir/Clark Fork River Superfund Site. Record of Decision." Part 1: Declaration. Part 2: Decision Summary. Part 3: Responsiveness Summary. Part 4: Acronyms and Abbreviations, and References. Appendices A-F. Helena, MT: U.S. Environmental Protection Agency Region 8, April 2004.
This document, in four parts, lays out the Selected Remedy for the Clark Fork River Operable Unit out of three alternatives that were analyzed under a proposed plan. The document lays out remedies and remediation standards for the Operable Unit, including particular needs and standards for Grant-Kohrs Ranch National Historic Site. It also includes the EPA's responses to comments on the earlier proposed plan for remediation. The document contains useful information for the EPA's plan to work with Atlantic Richfield Company for excavation, streambank stabilization, revegetation, monitoring, and remediation efforts along the Clark Fork River floodplain and riparian area, including its stretch through Grant-Kohrs Ranch. The document also reveals how irrigation ditches drawing from Clark Fork are contaminated and have spread contamination on irrigated fields and pastures. The document recommends further sampling of ditches and irrigated lands, and proposes remedy options depending upon the results of sampling findings.

Worster, Donald. *Rivers of Empire: Water, Aridity, and the Growth of the American West*. New York: Pantheon Books, 1985.
This book provides an excellent overview and critique of irrigation from the earliest times up to the 1980s. Although highly theoretical in terms of its examination of the shift from democratic, private enterprise to more total, imperial control of water resources through federal management, it provides a good context for Western irrigation and the shifts and trends in irrigation history within the nation. Worster uses California, Colorado, and the Southwest for many of his case studies and examples, but these help to establish a context for irrigation in Montana and how it differed and was similar.