

THE SOUTH PARK WATER TRANSFERS: THE GEOGRAPHY OF RESOURCE  
EXPROPRIATION IN COLORADO, 1859-1994

by

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## ABSTRACT

This thesis examines the agricultural-to-municipal water transfer process and the transformation of South Park, a high intermontane basin located west of the Denver metropolitan area in the Rocky Mountains of Colorado. The formal appropriation and exchange of water in this area began in 1859 with the arrival of miners and the first diversions of water into sluice boxes. In the 1860s, ranchers claimed water on a more permanent and extensive basis, using it to irrigate bottomlands to produce hay and other fodder crops. This study discusses the evolution of ranching in South Park from the 1860s to the present, with special attention to the delicately balanced system that had to be worked out in such a harsh environment.

More centrally, the thesis outlines the legal and administrative system that developed in the state of Colorado to govern the use and the exchange of water; and it focuses upon the South Park water transfers and the consequent retirement of ranch lands, from the 1890s to the 1990s. Without the critical components of water and productive haylands, year-round ranching could not exist in this marginal land. Beginning in the 1890s, the cities at the foot of the Colorado Front Range began to assess the water resources of the high basin and contemplate acquisitions of key water rights to supply the needs of the growing urban core. In the century that followed, water rights were sold voluntarily by South Park ranchers, by their heirs,

and by speculators, to Denver, Colorado Springs, and later the suburban municipalities of Aurora and Thornton.

The transfer of water to urban hands tipped the balance - economically, ecologically, and politically. What was relinquished was not simply control of water, but also control the semi-arid region's most vital resource and control of the area of origin's future. This thesis addresses these issues through use of archival materials (largely government records) and through the use of maps, photographic materials, newspapers, diaries, and other historical sources. Interviews and field work were also conducted, and information is presented in visual, tabular, and written form.

As economic development and population expansion in arid and semi-arid areas continue, pressure on water resources is increasing. More and more, cities are turning to agricultural water rights and rural communities to obtain their supplies. In this context, it is important to better understand the expropriation process, and that is precisely what this thesis seeks to do.

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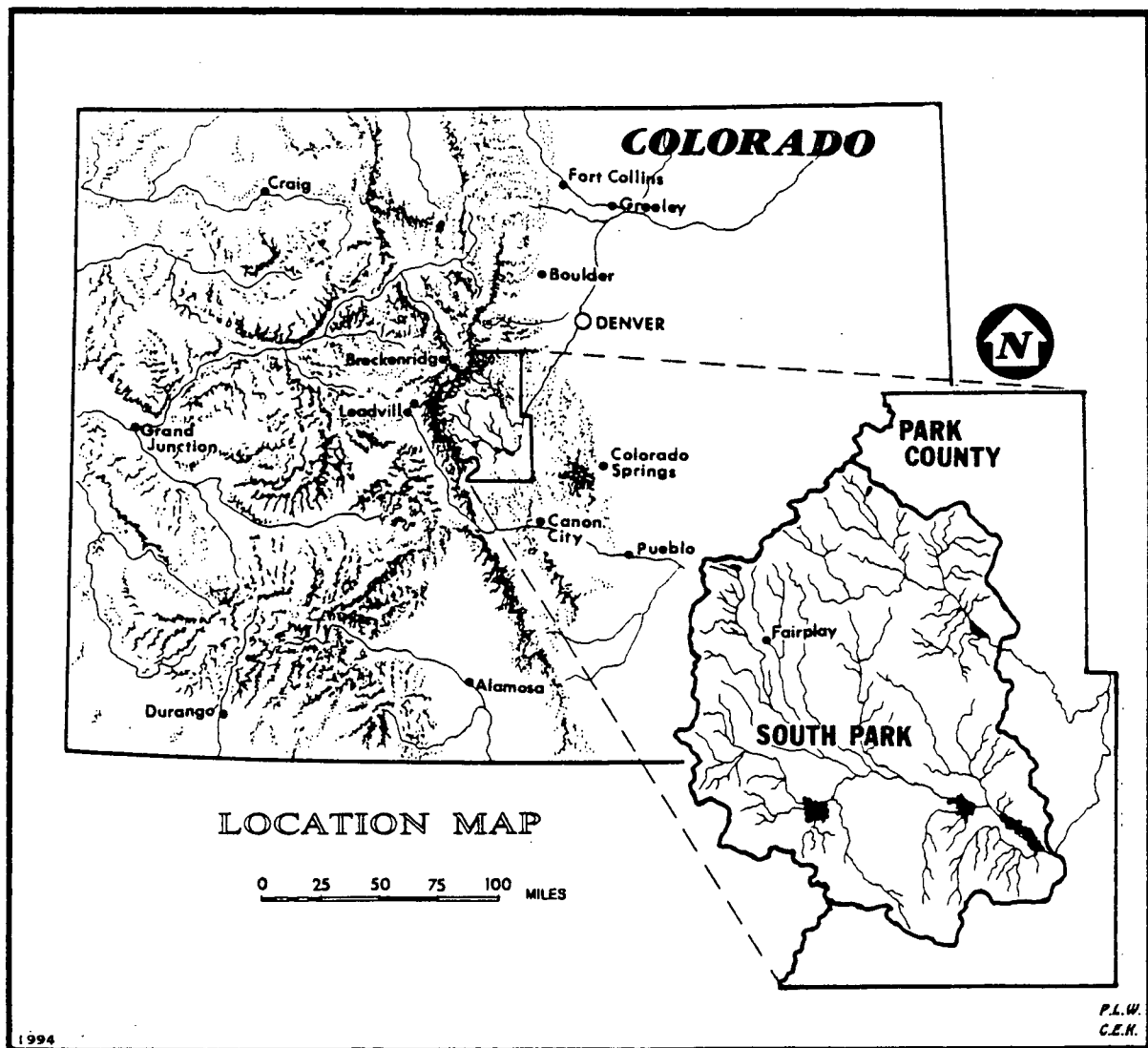
## CHAPTER ONE

### INTRODUCTION:

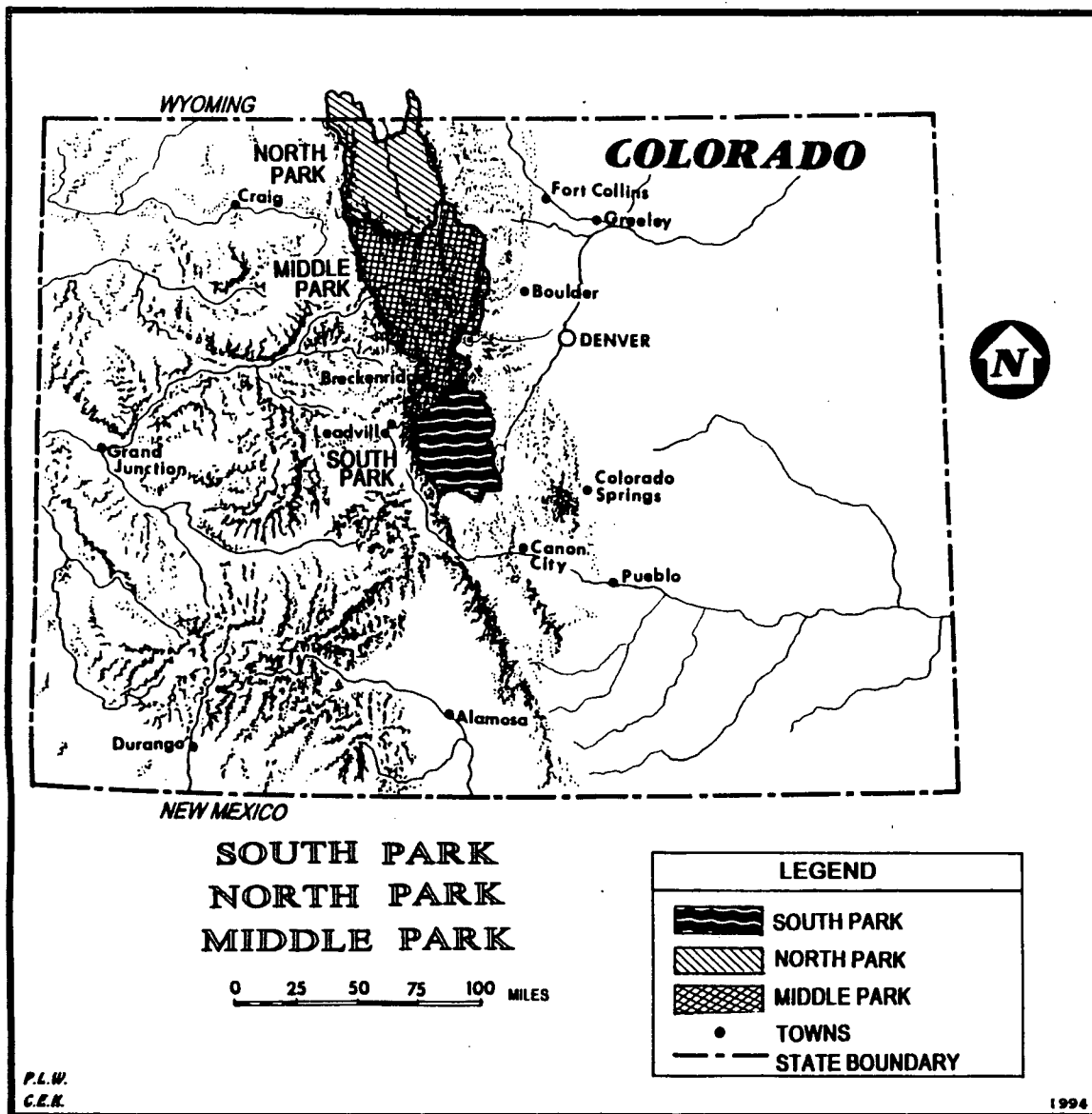
#### THE SOUTH PARK WATER TRANSFERS

This is a study in historical geography, blending land and life, past and present, to understand changing patterns of control over natural resources. It has often been said that water flows in the direction of money and power. Such is the case in South Park, a high, windswept basin in the Rocky Mountains of Colorado (Figures 1-1 to 1-3). Water resources were first appropriated and put to local use by miners and ranchers in the middle of the nineteenth century. Today, as the twentieth century draws to a close, few water rights remain in local hands. Most of South Park's water has been removed from use in the mountains, and the rights are now owned and used by cities located approximately 100 miles downstream.

How has this shift in control over natural resources been accomplished? This study attempts to address this question by tracing the acquisition and transfer of agricultural water rights in South Park from 1859 to the present. When I began this research, it was with the intention of conducting a study that addressed three aspects of the South Park water transfers. I intended to reconstruct the changing pattern of irrigation in South Park, starting with the expansion of the system of ditches and following through to the agricultural-to-municipal water transfers of the twentieth century. Second, I planned to deal



**Figure 1-1. Map: Location Map.** Note: Sources and credits for all maps and line drawings in this thesis are contained in Appendix A.



**Figure 1-2.** Map: South Park, North Park, Middle Park. The term "park" refers to an intermontane basin. Typically, a mountain park is surrounded by mountains. In the interior, the relatively flat surface is broken by ridges and other features. Colorado has three parks: South Park, North Park, and Middle Park. All contain the headwaters of some of the state's major rivers, the South Platte, North Platte, and the Colorado rivers respectively. Chapter three contains some further elaboration on the term "park" - its meaning and its origins.



**Figure 1-3.** South Park from Georgia Pass, 1983.

in depth with the impact of water transfers on the area of origin. Third, I wanted to grapple with some of the theoretical issues surrounding shifting power relations, as control of resources passed from rural to urban hands.

It soon became clear that sorting out the simple geography of changing water use was a gargantuan task. Records were inconsistent, incomplete, and sometimes contradictory. Administration of water rights in a district with over 400 ditches was quite complicated as well. The transfers which were taken through the courts involved more than two dozen separate legal proceedings.

It seemed to me that before moving on to such heady matters as shifting power relations, I had to establish how much water was involved. How much acreage had come under the ditch before the transfers started removing irrigation water from use and hay meadows from production in South Park? In each of the transfers, had the sales been voluntary or not? Who was selling? Answering these and other basic questions took years of research with a wide variety of different records. Information was checked and double checked. In the end, what appears here is quite different from what I had originally intended. This work is substantially empirical. It seeks to address basic questions regarding the pattern of water resource use in South Park and the facts surrounding agricultural-to-municipal water transfers. It seeks to elucidate the water transfer process.

The transfer of South Park's water took place within the rubric of the legal doctrine of prior appropriation. Prior appropriation treated water rights as private property rights. Water could be claimed through personal labor, and once appropriated could be sold and exchanged within the boundaries of the law. It could be sold separately from the land on which it had been used. It could be transferred from one type of use to another and from one location of use to another. Profits from the sale and exchange of water rights accrued to the individuals selling those water rights.

In South Park water was first claimed by miners beginning in the late 1850s. In the 1860s ranchers established agricultural water rights, diverting the resources of local streams to grow hay in the bottomlands. A thriving ranching economy and a vibrant ranching culture took shape in the high intermontane basin.

Colorado is dry, like much of the American West. By the 1890s the cities growing on the piedmont east of the Rocky Mountains began to turn their attention to agricultural water supplies in the mountains. Continued municipal growth required a reliable water supply, and South Park was the logical place to turn. It lay at the headwaters of the South Platte River, which ran through Denver, the rapidly expanding "Queen City" of the plains. The city's engineers and consultants assessed the water resources of South Park and found hundreds of small ditches irrigating fodder crops (Figure 1-4). They recognized that



**Figure 1-4.** Irrigation Ditch, South Park, 1992.

ranches and water rights could be purchased for reasonable prices, and that water rights could be transferred through the courts for use downstream in the city. Through voluntary sales and legal transfers, in the next four decades Denver acquired some small but strategic holdings in South Park, and took less than 10% of the water decreed for irrigation in the district.

It was not until the latter half of the twentieth century that control of water resources passed dominantly to urban hands. Since 1968 municipalities along the Colorado Front Range have acquired approximately 75% of the water rights once used for irrigation in South Park. Close to 40,000 acres of haylands have been retired from production in rural Park County. South Park is no longer a vital ranching area.

Water sales have been voluntary. There is no Owens Valley style subterfuge or coercion. Still, this quiet legal process has produced profound changes in South Park - the area of origin in these water transfers. Within the rubric of the law, which views water as private property and the right to sell as bordering on the sacred, little account has been taken of the consequences of these water sales and transfers to the people of rural Park County or the area of origin more generally.

The question of the impact of the water transfers is a complex one. Change in South Park is not attributable to water sales alone. The South Park water transfers occurred in the context of modernization and consolidation in American agriculture. Fluctuating cattle prices, increasing overhead

costs, unreliable subsidies and supports, and many other factors made ranching profits small and unpredictable. The economic marginality of high country ranching created an incentive for South Park ranchers to sell their water rights. Millions of dollars could be made - far more than could be earned over many years by braving the elements, working seven days a week, and engaging in back-breaking labor (Figure 1-5).

Once water was sold, it was difficult if not impossible for a rancher to continue to operate even a marginally profitable year-round livestock operation. In South Park, which is at an elevation of 9,000 to 10,000 feet above sea level, winters are long. Winter feed is grown with irrigation water. Without irrigation water, there is no winter feed. Without winter feed, there is no wintering of livestock, no year-round ranching industry.

Without irrigation water, the land was of limited value for ranching. The sale of ranch water rights to the cities often went hand in hand with the sale of ranch lands to subdividers. This changed the landscape, the composition of the population, and the nature of the local economy. As former agricultural lands became residential areas, a new population began to make its presence felt in Park County. Many of the new people were purchasing land for second homes - some for retirement, others for weekend or seasonal recreation. The population composition of South Park changed. The ranchers and people employed in more traditional occupations were disappearing. Retirees, white and



**Figure 1-5.** Cattle in South Park, 1993.

blue collar workers, and professional people were replacing them. The newcomers were not mountain people, they were from the flatlands, the east, California, and the cities. The character of South Park was changing.

I first saw South Park in the fall of 1980. The peaks that ring the golden floor of the high basin were dusted with the first snow. They glistened in the early morning light. Isolated ranches were dotted across the park's undulating surface. Twenty miles distant the craggy peaks of the Mosquito Range, a 14,000 foot spine of mountains that separates the headwaters of the South Platte River from those of the Arkansas, were starkly outlined by pendulous black clouds. Seventy-five miles to the south, the far edge of the park was framed by the hazy profile of the Sangre de Cristo Mountains. South Park seemed vast and relatively untouched by the twentieth century urban world. In that second assessment I was mistaken. Beneath a thin veneer that combines elements of the picturesque nineteenth and twentieth century American West, lies the web of a modern water system that supplies the needs of burgeoning cities at the eastern edge of the Colorado Rockies.

The pages that follow explore the development of this system and the decline of irrigation and ranching in South Park. This chapter has briefly introduced the study. Chapter Two sets out the intellectual framework - the ideas and perspectives deemed most useful in understanding the relationship between people and water resources in the American West. It summarizes

selected aspects of a vast literature, drawing on work in a variety of fields including geography, history, and economics.

The next five chapters are largely empirical. Chapter Three introduces the reader to South Park, the place and its past. Chapter Four deals with administration of water resources in South Park and discusses the legal and bureaucratic framework within which use and exchange occur. Chapter Five describes the earliest municipal water transfers, in which a relatively small number of water rights were sold by local ranchers and their heirs to urban interests and effectively removed from use in South Park. Chapter Six continues the tale, focusing on more recent transfers that have removed most of the remaining water rights from use in the high, windswept basin. No longer does irrigation water course across the haylands of South Park. No longer do available resources support one of the most vigorous local cattle industries in the state of Colorado. Chapter Seven discusses the Upper South Platte Water Conservancy District, a local organization that tries its best to represent the headwaters community's need for continuing access to water. Formed originally to protect the water rights of local ranchers and water users, over time the organization has taken on a broader orientation, less concerned with safeguarding the rights of individual ranchers than with guaranteeing a base for future development.

Each of these five chapters centers on a different group or combination of records: historical collections in Chapter

Three; the records of the Colorado State Engineer's Office (including the state, division, and district levels) in Chapter Four; Denver Water Department records in Chapter Five; municipal, state, and court records in Chapter Six; and the records of the Upper South Platte Water Conservancy District in Chapter Seven.

The eighth and final chapter addresses the impact of the water transfers, and draws some conclusions regarding control of key resources and the implications for rural communities. Rural areas have historically been dependent on resource based industries and economies. People eke out a living in close relationship with the land. Yet, this relationship does not exist in isolation. Without the market provided by the city, there would be no resource based economy in the hinterland. However, when rural communities lose control over key resources the result can be economic devastation and social disintegration. A way of life disappears. The land itself is transformed. Such is the case in South Park.

Today South Park appears as a vast, brown expanse. Water no longer shimmers in the sunlight as it courses across tens of thousands of acres of productive hayland. The wind whips up the dust as it passes over the gravelly, sparsely vegetated surface of the high park. Many of South Park's residents are seasonal. The economic backbone today is tourism and outdoor recreation. The largest employers are the county, state, and federal governments. Most other residents work outside the boundaries

of the headwaters basin. A few diehard ranchers hang on, refusing to sell or waiting to get their asking price from the cities for their water rights. Water flows through South Park, from the mountains and the snowfields to the cities. It is drawn by gravity, but also by the cities' thirst and power. Transformed once by the application of water to the land, South Park is being transformed again through its removal. As the twentieth century comes to an end, the process of drying up South Park is nearing completion. This thesis examines that process (Figure 1-6).



**Figure 1-6.** Abandoned ranch house, South Park, 1992.

## CHAPTER TWO

### WATER AND THE WEST

#### Water and the West in Global Perspective

As we approach the twenty-first century, the spectre of water scarcity on a global scale looms large. Expanding populations, increasing imbalances between the locations of supplies and demands, contamination of fresh water resources, and the possibility of climate change - all combine to suggest a potential crisis.

In dry areas where urban populations are growing, the situation is becoming particularly acute. Cities across the globe are exceeding the limits of their water supplies, and increasingly are being forced to tap distant sources, at ever greater cost and levels of technological complexity.<sup>1</sup> In industrialized societies, conservation is becoming an economic necessity, and priorities are shifting "from meeting demand, to managing demand."<sup>2</sup> But the shift is still incomplete, both in developed and developing nations. Despite conservation measures such as xeriscaping, metering, low-flow fixtures, and limitation of the number of new building permits, many industrialized cities continue to expand their supplies. In areas where water is scarce, cities are turning increasingly to agriculture, converting irrigation water to municipal use.<sup>3</sup> In developing countries where conflict is not rationalized through water markets or mediated through well-developed legal and

administrative institutions, conflict between agriculturalists and city dwellers is more direct.

Urban demand for water is increasing and shows no signs of leveling off. On the eve of the industrial revolution, only 3% of the world's population lived in cities.<sup>4</sup> By 1920 that figure had risen to 14%, and by 1980 to 41%.<sup>5</sup> Water is a finite resource. On a global scale, agriculture claims 68% of the water withdrawn from streams for human use, industry another 25%, and 7% is used in the home.<sup>6</sup> In the dry American west, agriculture claims an estimated 75-91% of the water, although roughly 75% of the region's population is urbanized.<sup>7</sup> This pattern has prompted many scholars and policy makers to view transfer of agricultural water to municipal uses favorably, on the basis that water is being allocated to higher value uses.<sup>8</sup> Indeed this is the case in strictly economic terms, but this general analysis obscures local effects of water transfers, and their environmental, cultural, and political significance. In any event, a growing consensus that water transfers and water marketing provide solutions to problems of urban supply make it more likely that pressure will increase for urban expropriation of rural agricultural water. As Folk-Williams et al point out in their study of twenty southwestern American cities, municipalities are already the most active developers and purchasers of water in the dry west.<sup>9</sup>

Present day water wars are being fought on a regional scale, be it within a nation state (Colorado farmer vs. Colorado

city, and Arizona vs. California), or between nation states (Israel vs. Jordan and Syria). As supplies become more scarce, and disputes over water remain unresolved, water will increasingly become a source of political and economic instability. The scale of conflict will expand. According to one expert, nations may be expected to go to war over water in the future.<sup>10</sup>

Since the mid-1980s, the politics of water has increasingly penetrated the American consciousness. There has been a dramatic increase in the level of attention paid to water issues by the media. The New York Times gives regular coverage to global and western water issues. In 1991, an issue of Newsweek focused on the West, and prominently featured water problems. In the fall of 1993, a special issue of National Geographic was entitled "Water: The Power, Promise, and Turmoil of North America's Fresh Water;" Public Broadcasting (PBS) aired a related special on the subject. Pieces on water continue to be broadcast on the McNeil-Lehrer Newshour, public radio, and on national and local television newscasts. Time magazine did a cover story. At the cusp of the twentieth and twenty-first centuries, water is no longer just an issue for planners, engineers, scholars, politicians, and residents of dry areas. It has become a matter of national interest and increasingly is being recognized as an issue of global significance.

Accompanying, and in some cases preceding, this generally raised level of consciousness about water has been a

proliferation of scholarship on the subject. Historians, economists, political scientists, legal scholars, anthropologists, engineers, sociologists, environmental scientists, and geographers have all contributed to a rapidly growing and diverse literature. In the pages that follow, I review this literature particularly with regard to the American West and with an eye to understanding the dynamics and meaning of water transfers along the Colorado Front Range.

The first section focuses on the work of environmental historians and on perspectives offered by the new western history. The next section explores the contributions of geographers to understanding western water and the third focuses on the work of economists and other scholars. The concluding section brings together selected aspects of these diverse literatures. The objective in this chapter is to provide a framework for the discussion of the South Park water transfers that are the focus of this thesis.

### **Environmental History and the New Western History**

Historians are attempting to understand the significance of water in the West through meticulous empirical research and theoretical engagement. Their work is less concerned with describing, categorizing, modeling, and predicting than it is with understanding, interpreting, and exploring meaning. As such, the historians' work is perhaps closer to that of the historical geographer than is the work of other scholars.

Walter Prescott Webb was the first to note the significance of aridity in defining the American west as a region, hence in defining its history and the society that took shape.<sup>11</sup> None the less, some historians trace the existence of water resources history as a separate field to Samuel P. Hays' Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920, published in 1959.<sup>12</sup> Through a study of the emergence of multiple-use water planning on a national scale, Hays addressed the relations of bureaucracy, growth, science, and professionalism. Hays' interest in understanding political and economic change moved water history beyond self-congratulatory accounts of the construction of engineering wonders and their significance to a fundamentally rapacious society, to a critique of that society and of water development more generally.

In the 1960s and 1970s, professional historians began to produce studies of reclamation leaders,<sup>13</sup> interstate and international water conflicts,<sup>14</sup> legislation and policy development at the state and federal levels,<sup>15</sup> and irrigation.<sup>16</sup> Prior to that time, reclamation and water resources history had largely been written by journalists, policy makers, administrators, and economists.<sup>17</sup> The work emerging in history was a diverse literature focused on arid and semi-arid lands, irrigated agriculture, and engineering solutions.<sup>18</sup>

Much of the western water history produced in the 1960s, 70s and 80s focused on agriculture, examined federal reclamation projects and policies, and explored the relationship between the federal government and state and local authorities.<sup>19</sup> Other studies addressed legal aspects of water resources issues, in California and other states.<sup>20</sup> These included Robert Dunbar's Forging New Rights in Western Waters, a study of the evolution of western water law in the 19th and 20th centuries.<sup>21</sup> In this work, Dunbar elucidates the relationship between the treatment of water as private property and abusive and wasteful practices.

In the 1980s there was a profusion of historical scholarship. Much of this work focused on California, the state with the greatest agricultural consumption of water and the most rapid urban growth in the American southwest.<sup>22</sup> Studies by Abraham Hoffman and William Kahrl dealt with the Owen's Valley, tapped by Los Angeles for its municipal supply.<sup>23</sup> Kahrl and Hoffman interpreted the history of this well known water transfer differently. To Kahrl, a picture emerged of collusion between city officials, land speculators, and the federal government. Owens Valley was tantamount to willful geographical rape. To Hoffman, the situation was less clearcut. Where Kahrl saw collusion, Hoffman saw compromise and cooperation. Where Kahrl saw unified interests, Hoffman saw disparate groups drawn together by a vision. Both books made an important contribution

by shifting attention from federal irrigation projects and dam building to the role of cities in western water development.<sup>24</sup>

The most influential work was published in 1985: Donald Worster's Rivers of Empire.<sup>25</sup> On the leading edge of the new western history, Worster viewed western water development as a process of conquest entailing attempted mastery over nature and control over social life. His work, so richly written, reached audiences inside and outside university walls. Worster's history had resonance with the questions and sensitivities of the time.

Worster drew heavily on the ideas of Karl Wittfogel.<sup>26</sup> At the heart of Worster's project was the question, posed by Wittfogel in 1929: "How does a society's interaction with nature lead to its own restructuring, to its evolution from one form to another?"<sup>27</sup> To both Worster and Wittfogel, a managerial relationship with nature was associated with ever increasing levels of social organization, manifested ultimately in totalitarian forms of power. When hierarchical societies arose in close association with the control and transport of water, Wittfogel described them as hydraulic societies.

Worster argued that the American West was a modern hydraulic society, "shaped by its advanced technological mastery of water."<sup>28</sup> At the outset he made clear that his project was much larger than simply the study of water in the west, he was attempting to recast western history in light of questions of power. The hydraulic society that emerged in the twentieth

century west was, in his view, more coercive and hierarchical than earlier forms found in Asia, the Middle East, and Southern Europe. Like Wittfogel, Worster argued that as the scale and complexity of irrigation and water control increases, power shifts to elite groups.<sup>29</sup>

In Rivers of Empire, Worster identifies three historical modes of water control: the local subsistence mode, the agrarian state mode, and the capitalist state mode, each with its own techniques and apparatuses, power relations, and social relations.<sup>30</sup> The American West is an example of the capitalist state mode, in which centralized planning, control of technological expertise by elites, mobile capital, and markets combine to create a distinctive form of the hydraulic society.<sup>31</sup> Central to Worster's work is the idea that regions organize around ecological modes of production, and that the scale of environmental transformation relates directly to the extent of totalitarian tendencies within a society.

Worster was at the cutting edge of environmental history, a field that emerged from work on the conservation movement and from the grassland studies of James Malin and Walter Prescott Webb. The "new" environmental history, in Worster's words began "where Malin and Webb left off."<sup>32</sup> It was a direct response to calls for relevance on college campuses in the 1960s and 70s and to the environmental movement that began with the publication of Rachel Carson's Silent Spring in 1962.<sup>33</sup> Worster defined environmental history as the study of the "interactions of

people and nature over time, looking for trends, seeking the origins of contemporary problems, listening to the age-old dialogue of humans and the earth."<sup>34</sup>

In his first book, Dust Bowl, Worster interpreted the dust storms of the 1930s on the southern plains as one of the most devastating human-made ecological disasters in history, created by the same society - the same social practices, technologies, and economies - that produced the great depression.<sup>35</sup> In Rivers of Empire, he again focuses upon the interaction of people and nature, turning that same critical and perceptive gaze to water structures and institutions in California, and more broadly, the American West.

Intellectually, Worster is at the vanguard of a movement called the new western history. Along with Patricia Nelson Limerick and Richard White, two of the leading proponents, Worster is arguing against a Turnerian preoccupation with "frontier." He describes Turner's process conceptualization of the American West "a vaporous notion."<sup>36</sup> The West, Worster insists, should be defined geographically - as a place rather than a process. Historians need to be regionalists.

A region emerges as people try to make a living from a particular part of the earth, as they adapt themselves to its limits and possibilities. What the regional historian should first want to know is how a people or peoples acquired a place and, then, how they perceived and tried to make use of it. He [or she] will identify the survival techniques they adopted, their patterns of work and economy, and their social relationships.<sup>37</sup>

Regions derive their identity from "ecologically adapted modes of production."<sup>38</sup> He identifies two dominant modes in the West:

ranching and irrigated agriculture, both of which involve control of land and water resources.

In the history of the American West, the new western historians see conquest and continuity: conquest of nature, peoples, territories, and cultures; continuity in terms of persistent problems and issues. These include the relationship with the environment, dependence on eastern capital, tense race relations and social hierarchies, and the West's ambivalence toward the federal government. Threads of continuity, too, are noted in terms of fundamental similarities between eastern and western culture. The new western history interprets the past, not in terms of discontinuities and breaks, but as part of a national legacy.

Patricia Nelson Limerick, in her revolutionary book The Legacy of Conquest, describes the history of the American West as that of "a place undergoing conquest."<sup>39</sup> Her concept of conquest is eminently geographical: it is the division of space - defining areas, allocating resources. Limerick distinguishes two phases of conquest: drawing lines on maps and giving social and political meaning to those lines.<sup>40</sup> According to Worster, her concept of conquest has two dimensions: competition for natural resources and competition for cultural dominance.<sup>41</sup>

To Worster, the hydraulic West is the ultimate expression of conquest, incorporating both control over resources and cultural dominance. "The hydraulic society of the West," he wrote,

is increasingly a coercive, monolithic, and hierarchical system, ruled by a power elite based on the ownership of capital and expertise. Its face is reflected in every mile of the irrigation canal. One might see in that reflection the qualities of concentrated wealth, technical virtuosity, discipline, hard work, popular acquiescence, a feeling of resignation and necessity, but one cannot find in it much of what Thoreau conceived as freedom.<sup>42</sup>

To Worster's critics, principally Donald Pisani and Norris Hundley, this is the Achilles heel. They argue there is no monolith. Where Worster sees centralization, Pisani sees fragmentation and diffusion of power. Where Worster sees conspiracy, collusion, and corruption, Hundley sees alliances between interest groups that shift like quicksand.

Pisani is the most pointed in his criticism. He describes Rivers of Empire as "deeply flawed - arrogant, distorted, moralistic."<sup>43</sup> Pisani argues that the extent to which a society is controlled by power elites is more a function of how large that society is than of dependence upon irrigation.<sup>44</sup> He contends that Worster's view is pessimistic, overly critical of nineteenth century society, and fails to make necessary distinctions between east and west and between hydraulic and non-hydraulic societies.<sup>45</sup>

Norris Hundley Jr., in his recently-published The Great Thirst, marshals a lifetime of scholarship on California and the Colorado River basin to question Worster's interpretation of the west as a hydraulic society. First, based on studies of the Owens Valley Paiute - and native groups along rivers in California, New Mexico, and parts of the Great Basin - Hundley

concludes that extensive irrigation can be practiced in the relative absence of well developed social structures.<sup>46</sup> Citing the conclusions of anthropologists and other scholars, he argues persuasively that irrigation-dependent societies are as likely to be decentralized as centralized in their social, political, and economic organization.<sup>47</sup> In the next 400 pages, Hundley paints a picture of California in which monopolistic excesses and communal impulses coexist. Local, state, and federal governments, on the one hand, and private and public interests, on the other, compete in one setting and cooperate in another. Like Worster, Dunbar, and others, he is critical of a legal system that promotes and permits wasteful practices and environmental abuse.<sup>48</sup> Like Pisani, he is critical of chaotic management in which two federal, four state, and one thousand local agencies fragment water administration and control. This level of splintered authority produces inefficiency, duplication of services, and areas of neglect.<sup>49</sup> According to Hundley, the water establishment

has never been a monolith driven by a single purpose or vision, save the idea that water (and nature generally) exists to serve humankind. Rather, as this account has suggested, it has consisted of many discrete groups, both in and outside of the state, each with its own (frequently changing) agenda that has sometimes led to conflict..., at other times to foot dragging..., and on still other occasions to compromises and alliances resulting in a major undertaking.... The alliances have often been fleeting, but their frequency and composition have been such as to create in California the world's largest and most complex hydraulic system.<sup>50</sup>

As politically and intellectually appealing as Worster's arguments are, evidence appears to be on Pisani and Hundley's

side. The criticisms are not theoretical, they are empirical. Based on two decades of research on reclamation, Pisani believes that fragmentation and competition are more dominant forces in western water history than centralization.<sup>51</sup> Based on three decades of work on water law, interstate compacts, international and interstate conflicts, and the California waterscape, Norris Hundley has arrived at the same conclusion.<sup>52</sup>

Worster defended himself recently at a meeting of the Western History Association. He suggested that his critics had overdrawn his position. There was "no harsh, totalitarian power in the West." There was no conspiracy. Rather there was a "concentration of power," manifest in a persistent conquest of nature that overrode the very institutions originally intended to contain it. He reiterated that the West was defined by the relationships between nature, technology, and culture, and that for the West the relationship with water remained most important.<sup>53</sup>

The debate between Worster, Hundley, and Pisani over the question of the concentration or diffusion of power is perhaps the sharpest edge of contemporary historical scholarship on western water. But, since the publication of Rivers of Empire, historians have been writing voluminously. Works represent mature scholarship on well-known topics<sup>54</sup> and studies of local and regional water issues in different parts of the West.<sup>55</sup> Studies appeared dealing with interstate compacts,<sup>56</sup> water law,<sup>57</sup> and a variety of other topics.<sup>58</sup>

Western water history is enjoying a sort of renaissance. Representing a synthesis of environmental history and the new western history, there is a special relevance to this body of scholarship which seeks to understand our present and future in terms of the past, and attempts to grapple with environmental issues by understanding the nature of human-land relationships. Western water, too, is being used as a window to wider questions. As John Walton wrote in the preface to his 1992 study of the Owens Valley, his work was a historical and sociological study of the "changing role of the state in local society."<sup>59</sup> Power, and the penetration of the state, are increasingly the focus of historical scholarship, even if not expressed in precisely those terms.<sup>60</sup>

Increasingly, focus on twentieth century issues and problems is an accepted part of the historian's craft. Gerald Nash led the way with his powerful interpretation of the American West as an urban oasis civilization.<sup>61</sup> By drawing attention to changes in the recent past, Nash argued that the West truly emerged as a region in concert with rapidly changing technology and relationship with the federal government.<sup>62</sup> The West, while defined in the imagination by its open spaces and nineteenth century past, to Nash, is defined in reality by urban centers and the region's emergence in the twentieth century.<sup>63</sup>

Historians deftly bring together the urban with the rural, and the social with the environmental. William Robbins, in an essay exploring Bernard DeVoto's plundered province thesis,

argued for continuity in western history, for a persistent heartland-hinterland relationship in which capital investment transforms natural resources into marketable commodities.<sup>64</sup> For Robbins colonialism operates on a regional scale, as opposed to a national scale, as it did for DeVoto. Where DeVoto saw the east plundering the west, Robbins saw the "increasing hegemony of... urban power centers over much of the West."<sup>65</sup> This entailed the control of resources, territory, and capital. Robbins noted that the growth of cities in the West produced an internal restructuring that created an underclass within each city.<sup>66</sup> I would extend that argument and suggest that the growth of cities made an underclass of people in the rural hinterland as well. As Robbins points out, "isolated, with relatively small populations, and lacking significant influence in the trade and exchange relation, resource-dependent communities are by-products of industrial strategies and decisions made elsewhere."<sup>67</sup> In sum, Robbins, Worster, and other historians are advocating a theoretically informed, politically and geographically sensitive approach to the western past.<sup>68</sup>

William Cronon further develops the historians' analysis of the relationship between the urban and the rural in the American West. In his study of Chicago and its hinterland, Nature's Metropolis: Chicago and the Great West, Cronon writes, "Americans have long tended to see city and country as separate places, more isolated from each other than connected. We

carefully partition our national landscape into urban places, rural places and wilderness."<sup>69</sup> He adds, "city and country have a common history, so their stories are best told together."<sup>70</sup> Essentially Cronon is arguing that the division of space into the urban and the rural represents a false dichotomy. The two are inextricably intertwined. He notes how, when Chicago was becoming urban (industrialized and built), its hinterland was becoming rural (cultivated and settled). Each provided a market for the other's goods. The countryside provided the food and the raw materials that enabled life and economic production to go on in the city. The city provided the market for farm products, timber, and the like. The countryside provided the market for the city's finished products. City and country were mutually dependent and existed in relation to each other.

To Cronon, one of the defining features of the American western "frontier experience" involved "the expansion of a metropolitan economy into regions that had not previously been tightly bound to its markets, and the absorption of new peripheral areas into a capitalist orbit."<sup>71</sup> Most centrally this involved the commodification of nature, the designation of elements in nature as resources for human use and development for profit. No longer were trees simply trees, nor water simply water; they became "forest resources" and "water resources" respectively. In direct relation to one another, the urban and the rural were articulated.

The perspectives offered by Cronon and Robbins prove critical in understanding the development of water resources in the American West. While direct expropriation of rural water supplies by cities would not occur until the latter part of the nineteenth century and into the twentieth century, development of supplies on farms and ranches across the dry west occurred in the context of expanding regional, national, and world economies. Supplies were developed less to meet individual subsistence needs than to supply produce and meat to burgeoning towns and mining camps and incipient cities.

### Geography

Geographers have approached water from both human and physical perspectives. In human geography, the work of Gilbert F. White stands out. Like many in the field, White considers water resources at the global scale. He interprets water problems as problems of distribution and management,<sup>72</sup> and tries to draw together information from different places in order to draw comparisons and generalizations.<sup>73</sup> Most valuable is White's emphasis on human adjustment and adaptation, be it to hazards, resource scarcity, or a range of physical and environmental conditions. He sees human societies in integral relationship to the environment.

In a 1984 essay focusing on water scarcity and agriculture in the American West, White predicts that water would be taken from agriculture to be reallocated to other uses, and

acknowledged that this would have a ripple effect in economic and social terms.<sup>74</sup> But, he notes, rural population would decline with or without irrigation. He questions whether there is social justification for attempting to forestall the decline of rural communities, where water transfers lead to outmigration and a drop in net income.<sup>75</sup> White concludes by expressing the belief that change and adjustment can take place before the West reaches a water crisis.<sup>76</sup>

White's work has been influential in water resources management, particularly his 1969 Strategies of American Water Management.<sup>77</sup> In this book, White presents a historical framework for understanding water development in the United States. He describes a shift from single purpose projects, at the turn of the century, to multiple purpose projects and water planning by the middle of the twentieth century. He elaborated this view in 1977,<sup>78</sup> perceiving the country as being in the midst of another transition in which multiple purpose planning and the consequences of complex river development were being called into question. White's work draws attention to the environmental impacts of river basin development.

James Wescoat builds on Gilbert White's work in his 1984 book Integrated Water Development - a revised version of his Ph.D. dissertation. Wescoat defines integrated water development as "a process of adjustment in water use and patterns and practices that results from the search for cooperative linkages among water users."<sup>79</sup> Integrated water

development represents an alternative to competition. Building on White's range of choice conception, Wescoat seeks to identify the range of geographic conditions under which cooperation and conservation might evolve in western Colorado.<sup>80</sup>

In geography much of the work on water resources is buried in theses and dissertations<sup>81</sup> or found in more obscure regional publications.<sup>82</sup> As Gilbert White noted in a 1974 review, up to that time, geographic contributions had been "modest."<sup>83</sup> Like many nascent fields, reviews refer frequently to work in other disciplines.<sup>84</sup> Little has been published by historical geographers on the subject,<sup>85</sup> although water has been touched upon tangentially by Marshall Bowen in his work on dryland farming.<sup>86</sup> The recent publication of Robert A. Sauder's The Frontier: Water Diversion in the Growth and Destruction of Owens Valley Agriculture is an important departure.<sup>87</sup> Sauder's work represents the fruits of years of scholarship on the settlement and transformation of the Owens Valley. While water figures prominently in his book, his primary concern is with the settlement process, irrigation, and water expropriation as they relate to changes in patterns of population and economy. Sauder offers a historical treatment. His approach is concrete. He eschews political and theoretical problems and dimensions.

Geographers have also produced some useful work on water resources in Australia, which provides an excellent comparative example for scholars of the American West.<sup>88</sup> As well, a recent volume edited by Denis Cosgrove and Geoff Petts attempts to

provide a geographical perspective on the relations of technology, culture, and water resources.<sup>89</sup> Cosgrove and Petts draw material from diverse locations including the English Fenlands, the city of Venice, the Sahara Desert, Zimbabwe, and Quebec.

Contemporary concerns tend to dominate the study of water resources in geography. In a recent review of the field that appeared in Gary Gaile and Cort Willmott's Geography in America, Tobin et al identify six research components: hydrology, water quality, water management, flood hazard, groundwater resources, and law and water resources.<sup>90</sup> Of these six, two are of relevance here: the management component, including urban supply and demand, and the legal component. Studies of water resource management have focused on conservation, demand forecasting, drought management, and policy.<sup>91</sup> Work on the law and water resource issues has examined legal solutions, the impact of specific laws, the legal framework, and legal research techniques.<sup>92</sup>

In the review by Tobin et al, future research directions are outlined in terms of "theory development and model formation,"<sup>93</sup> applications, and policy recommendations. Water resources geographers are approaching these issues on a global scale, increasingly with an eye to climate change and its potential significance.

This work differs markedly from my own project, which is much closer to the historians' - less interested in methodology

and models, than in interpreting changing interactions between people and the land, and understanding their relevance to contemporary society.

Indeed the geographical literature has its significance and its application, but the historians are reaching a wider audience with their findings and ideas. They are publishing with major university presses. Their work is reaching scholars in a variety of fields, as well as the general public. The historians are eloquently addressing growing concern regarding society's relationship with the environment in a way that, sadly, geographers are not. The discipline's preoccupation with space in the 1960s, 70s, and 80s led to a turning away from human-land interactions and from environmental studies. Forays into quantification and positivism led human geographers away from writing accessible accounts of the changing interactions between people and place.

An exception here might be the Canadian literature - in particular, work by Bruce Mitchell, Frank Quinn and John C. [Chad] Day.<sup>94</sup> Faced with continental schemes to divert Canadian water to the south such as NAWAPA (the North American Water and Power Alliance) and plans to export hydropower, Canadian scholars have given more attention to transfers and diversions and their impact on the area of origin than other North American water resource geographers.<sup>95</sup> Even where diversions did not involve the replumbing of the continent and the transfer of water for use thousands of miles away, some projects were

massive in scale, and some involved trans-basin diversions. Day and Quinn's 1992 Water Diversion and Export,<sup>96</sup> describes some of these projects and examines their impact: the Long Lake and Ogoki diversions in northern Ontario, the Churchill-Nelson project in northern Manitoba, the La Grande and James Bay projects in Quebec, and the Nechako-Kemano project in British Columbia.

Canada diverts more water than any other country, but unlike most, water is diverted mainly for the purpose of generating hydropower; 96 % of Canadian diversions are for this purpose.<sup>97</sup> As the authors note though, expropriation of water has an impact on the area of origin, ecologically and socially. In Canada, the people most affected are First Nations who live in communities downstream from trans-basin diversions and large impoundments. In some cases the impact of water projects has been devastating, altering the ecology of streams that support the fisheries upon which Native communities depend.

In its concern with the area of origin, with affected populations and environments, and with changing resource utilization and its impact, the Canadian literature comes closer to the heart of this study than any other in geography. Perhaps too, there is a shared dynamic. In a water export scenario, and even to the extent that hydropower potential is developed to supply growing demand for electricity south of the border, Canadian resources are being exploited for the benefit of a population outside the area of origin. Expropriation of vital

resources and threatened relegation to the status of periphery arouse the same resentment in Canada that the threat of urban expropriation arouses is the rural west. Canadian contributions from other fields reflect similar concerns and sensitivities.<sup>98</sup>

### **Economics and Other Disciplines**

Economists have done extensive work on water resources. Cost-benefit analyses of water projects; models of supply and demand; studies of economic efficiency in water use, water transfers, and other transactions; studies of water pricing, rate structures, water markets - all draw the attention of economists.<sup>99</sup> Some illuminating work is also being done by political scientists, sociologists, anthropologists, planners, engineers, politicians, lawyers, and journalists. In sum, there is a developing literature that deals generally with water in the West, and more specifically with growing urban demand, pressures on American agriculture, and water transfers.

Economist Terry Anderson characterizes concern over water in the West as arising from population expansion in the region and scarcity of supplies.<sup>100</sup> Without the development of new supplies, the question facing western states becomes how to allocate existing ground and surface water resources. According to Anderson, contemporary institutions are not sufficiently flexible to manage demand. Institutional entrenchment and power wielded by political interest groups mitigate against prices for water being set at what Anderson and many other economists

consider reasonable levels.<sup>101</sup> In sum, there are too many political constraints on the free market.

The new resource economics focuses on the institutional environment in which decisions are made and considers three elements: private property rights, public choice, and entrepreneurship.<sup>102</sup> The economist's interest in property rights is in how legal structures affect benefits and costs. If property rights are well defined, decision making is facilitated. If property rights are enforced in society, there is some guarantee that owners can derive economic benefit from property. If property rights are highly transferable, then theoretically, efficiency and flexibility are enhanced. The economist's consideration of choice is related to efficiency, incentives, benefits, and the scale of both public and private decision making. Entrepreneurship is included because economists consider the market to be the key to the resource allocation process and because, according to the assumptions of the new resource economics, the entrepreneur is the driving force in the market.

From this vantage point, the task is to identify institutional factors that constrain the market and find ways to remove them.<sup>103</sup> In Colorado, for example, the free market economist perceives a market constrained by the judiciary because the courts acts as mediators in water disputes and transactions.<sup>104</sup> This particularly affects the transferability of water. Water rights in Colorado are initially defined in

terms of the amount diverted and transfers are based on consumptive use. Consequently, purchasers and sellers of water for transfer never know how much water they will actually obtain until the court proceedings are concluded and a decree is issued.<sup>105</sup> The element of uncertainty undermines the market. Also, by providing incentives to maximize consumptive use, the system in Colorado discourages conservation and efficiency.

Political economist Alfred Cuzan presents some interesting arguments regarding the efficacy of free market systems.<sup>106</sup> According to Cuzan, in the American West prior to 1880 water was treated as a commodity; after 1880 it was controlled politically. In other words, an economic means of appropriation and exchange gave way to a political means of appropriation and exchange.<sup>107</sup> In Cuzan's frame of reference economic means are associated with efficiency and political means with inefficiency. After the middle of the nineteenth century, when administrative systems for water were first assembled, a bureaucratic ruling class emerged in the west. This class had the power to use political means to redistribute wealth in the form of property and benefits, from the public to itself.<sup>108</sup> In essence Cuzan is advocating privatization as a means of achieving both equity and efficiency.

He views the prior appropriation doctrine as an outgrowth of Lockean natural law.<sup>109</sup> An appropriator acquires a right to common property by taking it and through labour putting it to beneficial use. In times of scarcity, appropriators take only

what is necessary, in order of priority in time. In other words, first priority is given to the appropriator whose labour put the water to economic use first; second priority is given to the appropriator whose efforts put the water to work second.

In the 1880s, legal recognition of appropriative rights led to their circumscription, which in turn allowed the organization of political means of appropriation and exchange.<sup>110</sup> Once state statutes clearly defined the appropriation of water rights as usufructuary, power tipped to the state, and judicial and administrative control expanded. To Cuzan and others aligned with the new resource economics, such a level of state intervention led to poorly developed or partial water markets.<sup>111</sup>

Cuzan identified two iron clad laws in political science: the law of political redistribution and the law of hierarchical centralization.<sup>112</sup> According to the first, the ruling class always redistributes power and wealth to itself. According to the second, the redistributive nature of politics produces centralization of power, accompanied by articulation of the social hierarchy.<sup>113</sup> Cuzan acknowledges explicitly that as bureaucratic power increases, expropriation of ever more distant water supplies takes place, and that such acquisitions are part of territorial strategies of expansion and control.<sup>114</sup>

The problem with much of the work in the new resource economics is that it assumes equity evolves in free market settings. As historian Donald Pisani argues in his

interpretation of the prior appropriation doctrine,<sup>115</sup> the doctrine was economically motivated and reflected hierarchical distinctions in western societies (pioneer v. newcomer). It was not the product of abstract legal principles of equity, and it did not produce an equitable distribution of resources. Another issue involves sustainability. Robert Costanza and Richard Norgaard both argue that the new resource economics does not deal with the issue of sustainability in an adequate way.<sup>116</sup> The new resource economics addresses short-term profitability and feasibility, not the long-term intergenerational effects of resource decisions. Ecological economics, by contrast, is attempting to place sustainability in the forefront of the debate.

Also, the scale of analysis in much work on water resources tends to obscure local effects of transfers and other substantial shifts in the control of natural resources. The disappearance of communities, landscapes, and ways of life become insignificant blips on the screen of the national or world economy. Economist Robert Young writes, "irrigation in Colorado... accounts for a relatively minor portion of employment and income.... Thus, we can expect only a negligible impact on local economies [from agricultural to municipal water transfers]."<sup>117</sup> Human adaption, environmental change, and change in the distribution of political power have no price, hence they are not included in the analysis.

In marked contrast to this is a 1987 book by F. Lee Brown and Helen M. Ingram: Water and Poverty in the Southwest.<sup>118</sup> The authors examine water and the rural poor in Arizona, New Mexico, and southern Colorado. Their study focuses upon Native American and Hispanic residents of rural agricultural areas. At the outset, Brown and Ingram say that the old saw that "water flows uphill to money" has been well studied, but its corollary - that water flows away from the poor and the powerless - has been neglected in most scholarship. The central point of Brown and Ingram's book is that the rural poor have neither benefitted from water development nor participated in the decision-making process. They are often directly affected by water sales, management decisions, and changes in water use. Water also has value within rural communities that transcends economic value. Brown and Ingram refer to this as "community value." They write: "Long caught up in the web of human relationships and social dependencies, water is closely tied to social organization."<sup>119</sup> In traditional communities water is integral to the evolution of reciprocity, coordination, and cooperation.<sup>120</sup> Judge Art Encinias, in a decision that stopped a proposed water transfer in northern New Mexico, describes the relationship between the rural population and their most vital resource:

The deep felt tradition-bound ties of northern New Mexico families to the land and water are central to the maintenance of that culture. While these questions seem, at first, far removed from the simple question of the transfer of a few acre feet of water, the evidence discloses a distinct pattern of destruction of the local

culture by development which begins with small seemingly insignificant steps.<sup>121</sup>

Recent studies of agricultural water sales to cities, particularly along the Colorado Front Range, are beginning to consider the effects of rural to urban water transfers on the area of origin.<sup>122</sup> While concluding that at the state level losses to agriculture and the economy in general would be negligible, Howe, Lazo, and Weber noted in 1990:

the incidence of the costs is always to the area of origin... transfers are to uses outside the agricultural economic area. In such cases, significant uncompensated costs are imposed on the local economy.... The results thus imply that states should not fear water transfers: transfers will not wreck basins of origin nor state economies. The results do imply, however, that transitional assistance is warranted to help those parties suffering uncompensated externalities and indirect displacement by transfers. Areas of origin warrant assistance.<sup>123</sup>

The question then becomes, how should such concerns be addressed? MacDonnell and Howe identify three possible strategies that may be employed: prohibition or severe restriction of transfers, government allocation, and compensation.<sup>124</sup> The authors came down on the side of compensation.

In a more recent paper Rice and MacDonnell propose significant legal reforms designed to facilitate the transfer process and to address more adequately third party effects.<sup>125</sup> They note that unlike the laws of some other states, Colorado law encourages permanent agricultural to municipal water transfers.<sup>126</sup> According to the authors this has a devastating effect on the area of origin, permanently removing water rights

from use and land from agricultural production. Rice and MacDonnell maintain that by encouraging temporary transfers, land could be fallowed as opposed to abandoned.<sup>127</sup> This would prevent the local tax base from being decimated. It would prevent change from being thrust too rapidly on the area of origin. Agriculture, be it crop farming or stock raising, would be able to continue on a somewhat scaled back basis. The rural area of origin would have the opportunity to make a transition economically, socially, and politically.

The literature in other disciplines, then, is oriented to examining contemporary problems and issues and to making policy suggestions. There have been studies of water politics,<sup>128</sup> planning,<sup>129</sup> policy evolution,<sup>130</sup> Native American water rights,<sup>131</sup> changes in agriculture,<sup>132</sup> and water institutions.<sup>133</sup> Journalistic treatments, such as Marc Reisner's Cadillac Desert, which spent weeks on the New York Times best seller list for non-fiction, did much to bring western water issues to the public's attention.<sup>134</sup>

Two important contributors remain: Arthur Maass, who served in Franklin Roosevelt's administration and played an instrumental role in shaping national water policy in the progressive era, and political scientist Karl Wittfogel, who more than any other scholar has sought to theorize the relations of water and power.

In a 1951 study of the Army Corps of Engineers, revealing waste on a massive scale, Maass describes the corps as "the most

powerful and most pervasive lobby in Washington... [the] aristocrats who constitute it are our highest ruling class... not only the political elite of the Army, they are the perfect flower of bureaucracy."<sup>135</sup> Clearly, he is identifying a power elite consistent with Worster's interpretation. Yet, in consonance with Pisani and Hundley's arguments, Maass sees fragmentation of power and authority, and areal divisions of governmental power.<sup>136</sup> He thus enters into the debate surrounding Wittfogel in a curious way.

Karl Wittfogel's Oriental Despotism, is perhaps the most controversial work ever written on the subject of water and power.<sup>137</sup> In it, Wittfogel develops the idea of the hydraulic civilization, a society organized around the control of water. Wittfogel distinguishes small scale agriculture, which he called hydroagriculture, from hydraulic agriculture, which emerges when a large supply of water is discovered in a dry but potentially irrigable area, and where exploitation of the water resource requires cooperation. From this point, according to Wittfogel, a hydraulic civilization takes shape. Cooperation requires the mobilization and organization of human resources and, once completed, irrigation intensifies agriculture. Gradually, managerial and administrative institutions emerge. Power is concentrated in bureaucratic elites and in the hands of despots. Functionally, the hydraulic centers incorporate the areas from which they derive their water, the territory crossed by their water works, and the areas served by these structures.

The key to actualizing hydraulic potential lies in organizing mass labour, first to construct aqueducts, canals, and diversion structures, then to engage in irrigated agriculture. Once extensive irrigation is in place, organized labour can be employed in the construction of non-hydraulic works (walls, defensive structures, roads, secular and religious edifices) as well as secondary hydraulic works (flood control structures, drainage ditches, dikes, navigation canals, and domestic water works). To Wittfogel, centralized control of resources was intimately associated with the total forms of power he saw emerging in the Asian civilizations he studied.

Unfortunately, Wittfogel's work has been judged under the dark shroud of his politics. Over a period of decades, Wittfogel had worked on substantial revisions of Marxian theory.<sup>138</sup> By the end of his life, he rejected not only the blend of Marx, Weber, and the Frankfurt School he had espoused in Oriental Despotism. He became a rabid anti-communist.

Wittfogel's politics aside, periodically scholars have given credit to his contributions. In a 1973 article in Current Anthropology,<sup>139</sup> William Mitchell argues that both Wittfogel and Julian Steward, in studies of the relationship between irrigation and centralization, were identifying important social consequences of irrigation, not necessary social consequences. Neither Steward nor Wittfogel were saying that organization and coordination must precede irrigation. They were saying that when it did, or when organization and coordination were imposed

on existing systems, a certain set of social and political consequences could occur. Mitchell suggests that rather than rejecting the hydraulic hypothesis, scholars might want to consider further what factors predispose a society to develop centrally controlled hydraulic works, and what other factors might promote political integration.<sup>140</sup>

Anthropologist Marvin Harris' Cannibals and Kings, contains a section entitled "The Hydraulic Trap."<sup>141</sup> Harris writes,

pre-industrial hydraulic agriculture recurrently led to the evolution of extremely despotic agro-managerial bureaucracies because the expansion and intensification of hydraulic agriculture - itself a consequence of reproductive pressures - was uniquely dependent on massive construction projects which, in the absence of machines, would only be carried out by antlike armies of workers.<sup>142</sup>

Harris argued that much of the criticism of Wittfogel was unwarranted. Wittfogel was not arguing that the hydraulic mode of production gave rise to the state, rather it gave rise to a particular form of power and bureaucracy within the state. Potentially this could translate into increased centralization and penetration.

What Wittfogel's theory suggests... is that when certain kinds of state-level systems of production undergo intensification, despotic forms of government may arise which can neutralize human will and intelligence for thousands of years.<sup>143</sup>

Harris goes on to suggest that capitalism emerged in northern Europe specifically because it was not a hydraulic society.<sup>144</sup> Right or wrong, Karl Wittfogel, Donald Worster, Marvin Harris, and others who engage with Wittfogel's ideas sensitize us to the dimension of power in western water resources. Whether we see

centralization or fragmentation, vision or villainy, we see power intertwined in every policy, every conflict, every transaction, and every system.

### **The Challenge of Interpretation**

My purpose is not to develop social theory or to refine conceptions such as Worster's "ecological mode of production" and "capitalist state mode," Wittfogel's "hydraulic civilization" and Worster's modified "hydraulic society" of the American West, or Gilbert White's "adjustment," or Patricia Nelson Limerick's "conquest." Nor is it to test the applicability of the new resource economics or ecological economics. Rather, my purpose here is to use such ideas to better understand the water transfer process. The challenge lies in interpreting change and understanding how South Park has been transformed over time through the changing use of its water.

The relationship between city and country is central to this study. It is a dependent, ambivalent, complex relationship - one that should not be oversimplified. Rural and urban should not be conceived in a dichotomous manner. They are symbiotic concepts or elements defined and articulated in relation to one another. In a modernizing world it may be tempting to argue that the rural no longer exists, that the reach of technology, capital, culture, and economy from the urban core is so penetrating that it has effectively erased the rural, or at

least compromised it. But to accept the hegemony of the city is to discount the significance of rural space and history. City and country are not the same, despite the homogenizing influence of modern technology. Rural space is defined by greater distances, less dense populations, dispersed patterns of settlement, and, at least historically, the dominance of resource based economies. Rural life represents an adjustment to these conditions.

This study is concerned with the impact of development on rural areas, in particular the area of origin in water transfers. The intention is that this study will become part of the growing historical and geographical literature of water in the west, concerned broadly with human-environment relations and with control of natural resources.

#### Chapter Notes

1. Postel, 1985, p. 37.
2. Postel, 1993a, p. 20.
3. Brown and Jacobson, 1987, pp. 36-37; Postel, 1989, p. 24.
4. Newland, 1980, p. 16.
5. Newland, 1980. p. 7.
6. Postel, 1984, p. 13.
7. Folk-Williams et al, 1985, p. 78.
8. Howe et al., 1990; Postel, 1991; G.F. White, 1984; R.A. Young, 1983 and 1984.
9. Folk-Williams et al, 1985. Also see El-Ashry and Gibbons, 1988.

10. Postel, 1993b, 10-18.
11. Webb, 1931 and 1951(Rpt. 1986). It should be noted that John Wesley Powell's Report on the Arid Lands preceded Webb's work and made a certain impression on the American consciousness. However, for historians, Webb's work was considered the pioneering contribution in this particular area and literature.
12. Pisani, 1988.
13. Gressley, 1968; Lee, 1972.
14. Hundley, 1963, 1966, 1972, and 1975; Pisani, 1975 and 1978.
15. Koppes, 1978.
16. Dunbar, 1944, 1948, and 1960.
17. Lee, 1988, pp. 457-458.
18. For a thorough review see Lee, 1978.
19. Pisani, 1979, 1982; Robbins, 1978 (Willamette Valley Project); Lawson, 1982 (Pick-Sloan and the Missouri River Sioux).
20. Dunbar, 1983; Langum, 1985; and Scott, 1985 (on water rights in western Canada).
21. Dunbar, 1983.
22. Hundley, 1987; and Pisani, 1984.
23. Hoffman, 1981; Kahrl, 1982.
24. See also Walton, 1992, on the Owens Valley controversy; Clements, 1979 and Sayles, 1985 on Hetch Hetchy.
25. Worster, 1985.
26. Wittfogel, 1956 and 1957.
27. From Wittfogel's 1929 article "Geopolitics, Geographical Materialism and Marxism", as quoted in Worster, 1984, p. 5.
28. Worster, 1985, p. 11.
29. Worster, 1985, pp.19-36.
30. Worster, 1985, pp. 30-60.

31. Worster, 1985, pp. 50-53.
32. Worster, 1984, p. 4.
33. See R. White, 1985 for a review of work in environmental history. In this review, he makes reference to work by historical geographers including Andrew Clark and Donald Meinig (p. 320).
34. Worster, 1992, p. 239.
35. Worster, 1979.
36. Worster, 1987, p. 141.
37. Worster, 1987, p. 149.
38. Worster, 1987, p. 149.
39. Limerick, 1987, p. 26.
40. Limerick, 1987, p. 26-28.
41. Worster et al, 1989.
42. Worster, 1985, p. 7.
43. Pisani, 1988, p. 319.
44. Pisani, 1988, pp. 321-322.
45. Pisani, 1989, pp. 261-263.
46. Hundley, 1992, pp. 20-21.
47. Also see Hundley, 1987.
48. Hundley, 1992, p. 385.
49. Hundley, 1992, pp. 390-392.
50. Hundley, 1992, pp. 407-408.
51. Pisani, 1975, 1978, 1979, 1982, 1984, 1987, 1989, and 1992.
52. Hundley, 1963, 1966, 1972, 1975, 1987, 1988, and 1992.
53. Donald Worster: remarks made as part of a panel discussion at the Western History Association meetings in Tulsa, Oklahoma, Friday, October 15, 1993, in a session titled "Western Water: Issues and Interpretations". One of the other panelists was Donald Pisani.

54. Hundley, 1988 and 1992; Pisani, 1987 and 1992; and Worster, 1992.
55. Sherow, 1990; and Tyler, 1992.
56. Littlefield, 1991.
57. Miller, 1989; and Pisani, 1987.
58. August, 1989; Smith, 1986.
59. Walton, 1992, p. xvii.
60. One western historian explicitly calls for attention to power. See Olin, 1986.
61. Nash, 1973 (rpt. 1985).
62. Also see, Nash, 1971, 1985, 1991; and Nash and Etulain, 1989.
63. For other contributions on the twentieth century west, see Malone and Etulain, 1989; and Athearn, 1986.
64. Robbins, 1986.
65. Robbins, 1986, p. 584.
66. Robbins, 1986, p. 593.
67. Robbins, 1986, p. 595.
68. Also see Malone, 1989; Nugent, 1989; Robbins, 1989.
69. Cronon, 1991, p. xvi.
70. Cronon, 1991, p. xvi.
71. Cronon, 1991, p. xviii.
72. G.F. White, 1969.
73. G.F. White, 1977.
74. White, 1984, pp. 473-474.
75. White, 1984, pp. 479-480.
76. White, 1984, pp. 483-484.
77. White, 1969.

78. White, 1977.
79. Wescoat, 1984, p. 4.
80. Also see Wescoat, 1987.
81. Jacobsen, 1989; Learned, 1948; Poulton, 1990; Quinn, 1970; Thompson 1980 and 1983. Also see M.A. theses cited in Conzen et al, 1993: Aldabbagh, 1967 (Water Importation, Washington State); Bauer, 1988 (Regional Water Development, California); Mitchell, 1960 (Water's Role in Settlement, Texas); Quinn, 1976 (Water Management and Use, Delaware Basin); Sauri-Pujol, 1990 (Water Rights Administration, New Mexico); and Williams, 1972 (Water Use, Utah).
82. Osborne, 1965; Shuler, 1940; Warkentin, 1971-1972.
83. White, 1974, p. 107.
84. In the AAG's Geographical Bibliography for American Libraries, published in 1985, the section by John L. Harper on water resources (pp. 97-102) contains 34 entries. Only one refers to a work by a geographer: Gilbert F. White's Strategies of American Water Management (G.F. White, 1969).
85. Gregor, 1952 and 1968; Nablan, 1986; Templer, 1978. Other edges of the literature in historical geography focus on hydropower and its relationship to local industry and patterns of settlement, primarily in the East; water quality; water balance; and lake levels (for specific references, refer to Conzen et al, 1993).
86. Bowen, 1989. For a more complete listing of Bowen's dryland agriculture and settlement work in Nevada, Nebraska, and other parts of the arid and semi-arid west, see Conzen et al, 1993.
87. Sauder, 1994.
88. Heathcote and Mabbutt, 1988; and Loeffler, 1970.
89. Cosgrove and Petts, 1990.
90. Tobin et al, 1989.
91. Tobin et al, 1989, pp. 119-123. Also see Wescoat, 1984 and 1985; G.F. White 1969, 1974, and 1977.
92. Tobin et al, 1989, pp. 130-132. Also see Jacobsen, 1989; Poulton, 1990; and Wescoat, 1985 and 1986. Also, in Tobin et al, 1989, see references to the work of Otis Templer in Texas.

93. Tobin et al, 1989, p. 132.
94. See Quinn, 1970, 1981, and 1987; Day and Quinn, 1992; and Mitchell, 1980, 1983, and 1984.
95. Also see Sewell, 1988, and Platt, 1987.
96. Day and Quinn, 1992.
97. Quinn, 1987, p. 389.
98. Pearse, 1984; Pearse, Bertrand, and MacLaren, 1985; Percy, 1986; Birch and MacLock, 1992; and Zilberman, 1993.
99. Gardner, 1983; Huffman, 1983; Rucker and Fishback, 1983.
100. Anderson, 1983.
101. Anderson, 1983, p. 2.
102. Anderson, 1983, pp. 3-9. What follows is a condensation of Anderson's summary of the new resource economics.
103. Gisser and Johnson, 1983; Smith, 1983.
104. Tregarthen, 1983.
105. Tregarthen, 1983, p. 127.
106. Cuzan, 1983.
107. Cuzan, 1983, p. 14.
108. Cuzan, 1983, p. 15, and pp. 29-30.
109. Cuzan, 1983, pp. 15-19.
110. Cuzan, 1983, pp. 20-21.
111. Milliken, 1983.
112. Cuzan, 1983, p. 29.
113. Cuzan, 1983, pp. 29-34.
114. Cuzan, 1983, p. 15 and pp. 33-34.
115. Pisani, 1987.
116. Costanza, 1991, and Norgaard, 1994.
117. R.A. Young, 1983, p. 37.

118. Brown and Ingram, 1987.
119. Brown and Ingram, 1987, p. 33.
120. Brown and Ingram, 1987, pp. 33-34; also see the whole chapter dealing with the community value of water (pp. 28-45).
121. As quoted in Brown and Ingram, 1987, p. 189.
122. Anderson et al, 1976; Howe et al, 1990 and 1992; Pratt, 1988; Weber, 1988 and 1989; Young, 1983 and 1984. Also see MacDonnell, 1990, and MacDonnell and Howe, 1990; Brown and Ingram, 1987 (on water and the rural west), and Oggins and Ingram, 1990 (on transfers in Arizona).
123. Howe, Lazo, and Weber, 1990, pp. 1203-1204.
124. MacDonnell and Howe, 1986. Also see MacDonnell and Howe, 1985, and MacDonnell, 1990.
125. Rice and MacDonnell, 1993.
126. Rice and MacDonnell, 1993, pp. 1-3.
127. Rice and MacDonnell, pp. 75-76.
128. Ingram, 1990.
129. Jones, 1986; Rao, 1988.
130. Foss, 1985; Munro, 1988; Reisman, 1982.
131. McCool, 1987.
132. Schaffer and Schaffer, 1984.
133. Gottlieb and Fitzsimmons, 1991.
134. Reisner, 1986. Also see Reisner and Bates, 1990.
135. Maass, 1951, p. ix.
136. Maass, 1959; and Maass and Anderson, 1978.
137. Wittfogel, 1957. What follows is a condensation of arguments made in the book. Also see Wittfogel, 1956.
138. For an interesting review of Wittfogel's evolving ideas, see Ulmen, 1975.
139. Mitchell, 1973.

140. Mitchell, 1973, p. 534. Also see Geertz, 1972. Geertz, in a comparative study, examines the relations of social structure and irrigation.
141. M. Harris, 1977, pp. 155-163.
142. Harris, 1977, p. 158.
143. Harris, 1977, p. 163.
144. Harris, 1977, pp. 167-177.

## CHAPTER THREE

### SOUTH PARK: BEGINNINGS AND TRANSFORMATIONS

When Elizabeth Link, a young woman from Kansas, came across Kenosha Pass into South Park in the summer of 1907, she saw below her a shimmering sea of water and tall, green grass. The train seemed to slice right through it as the locomotive ran along the tracks to the bustling railroad town of Como.<sup>1</sup> How different South Park appears today, and how different it appeared to early explorers, topping the mountain passes that brought them into the headwaters basin in the first half of the nineteenth century.

Zebulon Pike crossed South Park in December of 1806, on his ill-fated reconnaissance of the western and southern borderlands of the newly acquired Louisiana Purchase. It was winter when Pike first saw the high basin. He entered from the south, having followed a small tributary up from the Arkansas River. Pike surmised correctly that he had encountered the headwaters of the Platte.<sup>2</sup> Upon crossing a pass through the low scrubby Arkansas Hills which bound the park to the south, Pike and his party camped above Eleven Mile Canyon, in a place that is now beneath a large municipal reservoir.<sup>3</sup> The next day they began their ascent of the river, taking the South Fork, and leaving the park somewhere in the vicinity of Trout Creek Pass.

Pike's encounter with South Park was brief. His published account of the expedition contained little description or detail

about the area. Perhaps this was because two months after crossing the basin, Pike and his confederates were captured by the Spanish in the San Luis Valley, taken to Santa Fe, then on to Chihuahua. Pike's journals, notes, and maps were confiscated. The accounts published after his release from Spanish custody were reconstructed from memory, and South Park appears to have made little impression relative to his other experiences.

John Charles Fremont was the next government explorer to enter South Park. He too was passing through. In late June of 1844, Fremont and his party climbed into South Park from the north. From the top of the pass, Fremont could see only the constricted valley of the Platte, above what we now know as the town of Alma. He wrote, "below us was a green valley, through which ran a stream; and a short distance opposite rose snowy mountains, whose summits were formed into peaks of naked rock."<sup>4</sup> The party descended the rugged slope and camped that night in the grassy bottom. The next day the men continued down the river and into the open park, following what Fremont described as "an excellent buffalo trail." He wrote,

On our right, the bayou was bordered by a mountainous range, crested with rocky and naked peaks; and below, it had a beautiful park-like character of pretty level prairies, interspersed among low spurs, wooded openly with pine and quaking asp, contrasting well with the denser pines which swept around on the mountain sides.<sup>5</sup>

As they descended the Middle Fork of the South Platte, the party met a group of Ute women whose villages were engaged in battle with the Arapahoe. Narrowly avoiding the conflict, Fremont and

his party continued down the river on the opposite side of the ridge from the Utes and Arapahoes. Fremont's expedition camped one more night in South Park before crossing a low pass and descending Currant Creek to the Arkansas River.

If Fremont had passed the way he did the year Elizabeth Link came across Kenosha Pass by train, he too would have seen irrigation water coursing across the bottomlands of the park. The lush green he spotted in the narrow valley bottom at the headwaters of the Platte would have extended all the way down to the point where he and his party left the river, a day's march to the south. But in 1844 irrigation had not yet transformed South Park; it was still a seasonal hunting ground for the Ute, Arapahoe, and Kiowa people, and the site of summer villages.

South Park was known to the Spanish and to American and Canadian trappers, but its resources had not yet been appropriated and developed in a meaningful way by Europeans. Exploration and resource use in the context of the fur trade signalled, however, the harnessing of South Park's potential. By locating the place - mapping it, describing it, and assessing its resources - South Park was effectively being incorporated into a modernizing world and into the world economy. At the time of the Louisiana Purchase, no-one was quite sure precisely what had been acquired. Both Pike and Fremont travelled to the Rocky Mountain region to identify what resources and routes that might be used to harness the region into the rapidly expanding United States.

## South Park

The matrix for development was the land itself: in South Park's case, a high, agriculturally marginal land - a basin roughly 50 miles long and 30 miles wide. On all sides the park is bounded by mountains: to the north by the Park Range; to the west by the Mosquito Range, the Buffalo Peaks, and Kaufmann Ridge; to the south by the Arkansas Hills; and to the east by the Kenosha and Tarryall Ranges and the Puma Hills (Figure 3-1). The mountains to the north and west reach to elevations of 13,000 to 14,000 feet, while those to the east and south are one or two thousand feet lower. They drop fairly abruptly to the grassland floor of the park proper, elevation 8,500 to 10,000 feet. The park's undulating surface, a vast grassland, is broken by lightly forested ridges, most trending north to south.

The climate of South Park is harsh. The average annual temperature is slightly above 35 degrees Fahrenheit.<sup>6</sup> From November through March, mean temperatures are below freezing; and temperatures can fluctuate widely on a daily basis. Precipitation is variable. Totals are highest in the mountains (30 inches annually) and lowest in the southern and central parts of the park (under 10 inches a year).<sup>7</sup> On an annual basis, precipitation on the floor of the park ranges between 5.6 and 16.7 inches per year. The average over a 40 year period is 10.7 inches.<sup>8</sup> Precipitation is concentrated in the summer months, and is derived largely from thunderstorms that sweep violently across the park almost every afternoon. Winters are

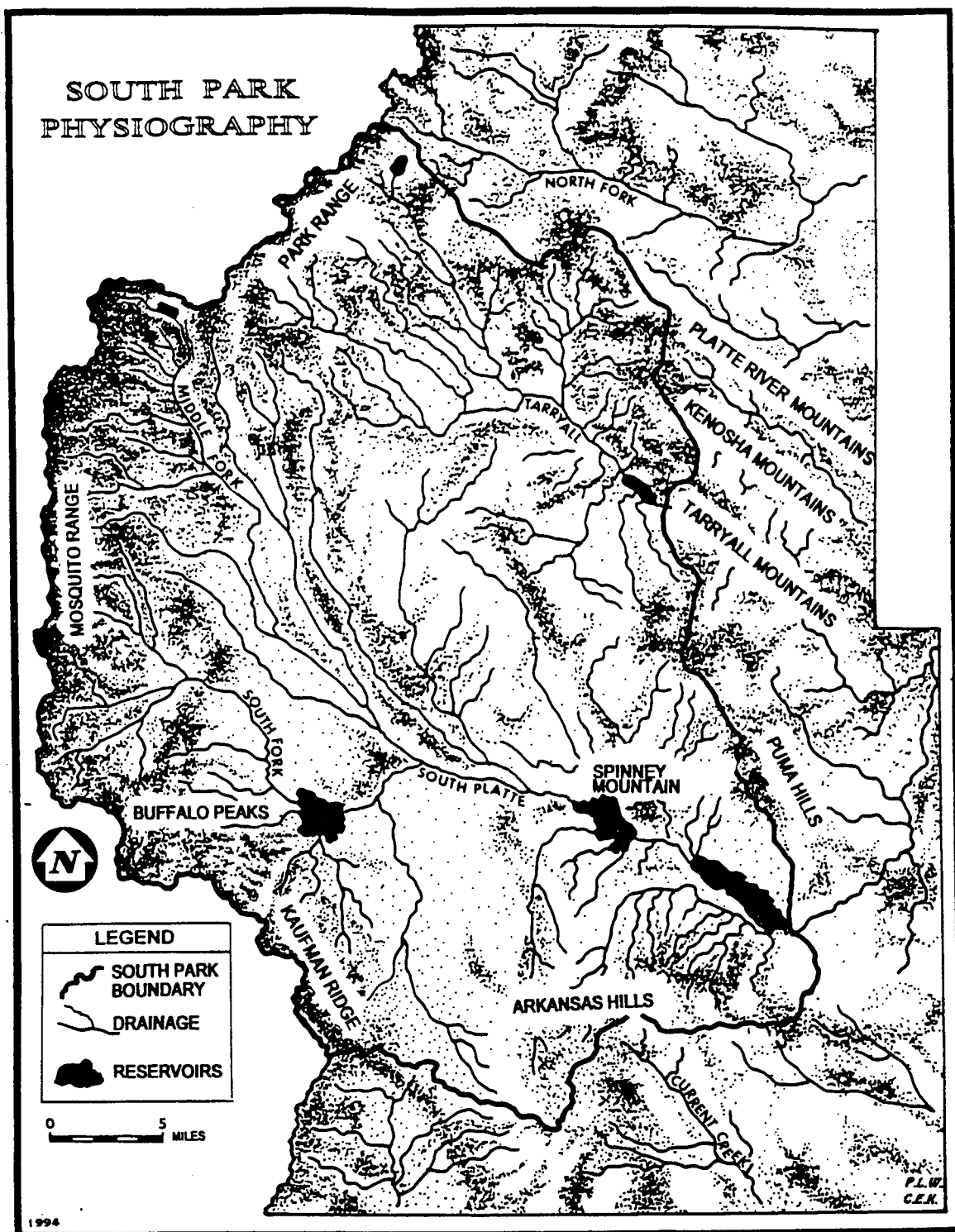


Figure 3-1. Map: South Park Physiography.

long, snow depths are variable from year to year, and ground blizzards are common, closing roads, packing drifts that linger until June, and stranding travelers and high country residents alike.

According to a study that appraised the water resources of the Upper South Platte basin in Park and adjacent Teller counties, average annual "inflow" into the basin from precipitation is 2,270,000 acre feet, based on a 30 year run of data.<sup>9</sup> An estimated 89% of that evapotranspires under the influence of heavy, desiccating winds and intense sun, or is consumed by streambank vegetation and seepage, before leaving the area. The remaining 11 %, or 240,000 acre feet, flows out of the study area.

South Park contains the headwaters of the South and Middle forks of the South Platte River. Part of the Missouri system, the river drains to the east or Atlantic side of the Continental Divide. Within the park there are two main drainages: the Tarryall and the Platte. Both streams originate in the mountains, and flow down through the gravelly bottomlands of the park, exiting through crystalline rock on the east side. Tarryall Creek joins the mainstem of the South Platte below South Park, where the river flows down through the foothills and debouches onto the Great Plains.

In a geology written fifty years ago, but still consulted widely today, J.T. Stark describes the 1400-square-mile basin's formation in the Tertiary and Quaternary periods.<sup>10</sup> The Rocky

Mountains thrust through the earth's crust 60 million years ago, and have been sculpted over the millennia by wind, water, and glaciers. Cycles of uplift and erosion created the matrix for what we see today. Glaciation carved the jagged peaks, deep valleys, and cirques of the Park and Mosquito Ranges, north and west of South Park. Bands of weak, faulted rock controlled the orientation of ridges and valleys, and melting glaciers filled the valleys with till, spreading and smoothing the cobbles across the surface, then depositing moraines on top of them as they retreated.<sup>11</sup> Water etched streams and rivulets in the till and ash, and cut canyons through hard rock.

In different parts of the park, intrusive and extrusive rocks are found, reflecting different histories. South Park is underlain by pre-Cambrian rocks, mostly metamorphosed sediments and lavas - now schist and gneiss. On the southern margins of the Park, volcanic activity created the low, rolling Arkansas Hills, Thirtynine Mile Mountain, and a number of the buttes that dot the landscape between Trout Creek Pass and Eleven Mile Reservoir. The Buffalo Peaks, just north of Trout Creek Pass, are also of volcanic origin. To all appearances the peaks were extruded through a fissure, separating Kaufmann Ridge from the geologically identical, but much higher, Mosquito Range immediately to the north. What this suggests is that the natural tilt of the Park's undulating surface was (and still is) to the south; that the natural exit for the South Platte River was also to the south; and that uplift and volcanic activity had

recently created an effective dam, diverting the river to the northeast through hard crystalline rock.

What was created by this process was a high, inhospitable land, suited to little, in the early days, but hunting, gathering, ranching, and mining. Glaciation and fluvial erosion left cobbled ground and thin topsoil in most areas, so the land in the valley bottoms was unsuited to tilling. Altitude and the short length of the growing season limited the possibility of raising most crops. The resource base consisted of water, grass, wildlife, roots, berries, and minerals.

### **Beginnings**

The first people to make use of South Park's resources were Native Americans and their ancestors: Utes, who dominated the mountains of what we now know as Colorado, and Arapahoe, Cheyenne, Kiowa, and other plains tribes, who followed the Buffalo into the high park from the east. Native occupation was seasonal. Summer villages were established and served as bases for hunting and for gathering roots, berries, and other materials. In a survey conducted in the summer of 1944 by archaeologists from the University of Denver, 40 native sites of various ages were documented in South Park.<sup>12</sup> The most common type of site was a campsite with a nearby work area. Though generally poor in artifacts, South Park sites yielded chips and points. Their diversity suggested that materials were being brought in from every direction.<sup>13</sup> Numerous signal fire rings

were found, and lookout sites were identified. Some of the campsites were quite large, covering up to six acres. All were close to water and defensible. The native pattern of seasonal use and buffalo hunting persisted into the late nineteenth century, by which time reservations were being established for the Utes and for the plains tribes.

South Park was known to the Spanish, but it was not an important site for their activities. They developed no settlements. They sent no permanent representatives, either of the church or government. They apparently called the basin "Valle Salado," referring to the salt marshes and springs in the southwestern corner of the park. Legend has it that a suit of spanish armor was found in this part of the basin, and there was possibly some mining activity in gulches near Alma.<sup>14</sup>

According to most local histories, Canadian and American trappers first found their way into the park in the eighteenth century. Etienne de Bourgmond was apparently the first, in 1724.<sup>15</sup> Others followed, mostly undocumented, after the fur trade in this region began in earnest, from 1821 on.<sup>16</sup> South Park was considered largely Rocky Mountain Fur Company territory. Most trade was conducted through Bent's Fort on the Arkansas River, but some trappers had links with Taos, and some to bases in the east such as Saint Louis. Drawn like the Spanish to the salt marshes, which attracted wildlife, the French speaking trappers are believed to have called the park "Bayou Salade," a term modified by American trappers into "Bayou

Salado," merging the French with the Spanish.<sup>17</sup> The term "park" did not come into existence until the 1840s. "Parc," in French, means game preserve and connotes open space<sup>18</sup>. Mountain men found three parks in the heart of the Colorado Rockies: North Park, Middle Park, and South Park, all large intermontane basins, abundant with game.

The beaver market collapsed in the middle of the 1840s, ending much of the activity in South Park. Some trappers, like Jim Bridger and Kit Carson, adapted their skills to guiding and brought hunting and sightseeing parties to the area. Thomas Jefferson Farnum came through in 1839, Rufus B. Sage in 1842, George Frederick Ruxton in 1847 or 1848, and Sir George Gore, a man noted for his bloody and wasteful hunting, was guided in by Jim Bridger in 1855.<sup>19</sup>

The fur trade established no permanent settlements in South Park and created no tangible ties to the American government in the east. It did however, provide the opportunity for Euro-Americans to explore the mountains, note the presence of gold, and file the information away for future reference. James Pursley, a trapper, spotted gold around the same time that Zebulon Pike crossed South Park on his way to the San Luis Valley.<sup>20</sup> A French-Canadian trapper by the name of DuChet found signs of color three decades later, as did mountain man Bill Williams in 1848.

The lure of precious metals enticed men into the mountains in the late 1850s, and the basin that had previously been

perceived as a native hunting ground and game preserve became, quite literally, a goldfield.<sup>21</sup> First, there were prospecting parties. Next there were placer claims and a rush of population 10,000 strong. Into existence sprang towns, ranches, wayside stopping places, wagon roads, and other outward signs of incorporation into the socio-economic totality that was becoming the United States.

### **Transformation**

Change came virtually overnight to South Park. The Pikes Peak rush of 1858 brought miners to the Colorado Front Range and sent them scrambling up every gulch they could find. The first parties to prospect in South Park came from the direction of Central City, one of the earliest settled areas in the state.<sup>22</sup> They found gold on the northern edges of the high basin, along small tributaries that flowed from the Park and Mosquito Ranges. Towns began to appear the next year: Tarryall, Hamilton, Fairplay, and Buckskin Joe were among the first. Their populations were largely seasonal and disproportionately male.

Census takers counted 11,610 people in South Park in the summer of 1860: 11,506 men and 104 women.<sup>23</sup> That year, South Park contained almost a third of the population present in Colorado Territory (Table 3-1), nearly double that of any other place. But population shifts rapidly in the midst of a mining rush, and people present in the district during the July enumeration, could have climbed across the rugged Mosquito Range

COLORADO POPULATION, 1860

	<u>Male</u>	<u>Female</u>	<u>Total</u>
Denver			4,749
South Park	10,519	91	10,610
Tarryall and South Park	987	13	1,000
Golden			1,014
South Clear Creek			5,966
South Platte Valley			3,714
TOTAL FOR THE TERRITORY	32,691	1,586	34,277

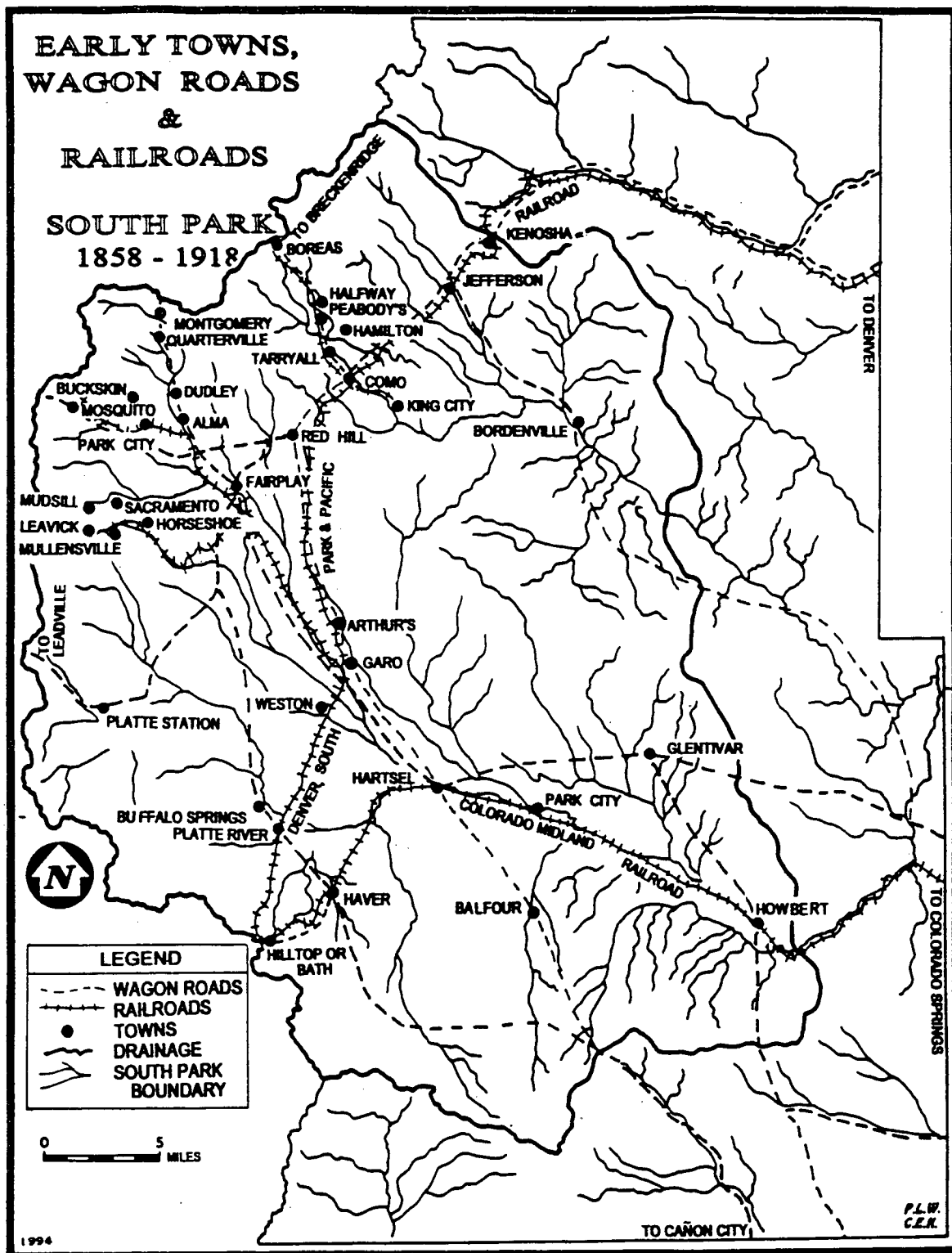
**Table 3-1.** Colorado Population, 1860. The table shows places with a population of 1,000 or more (Source: U.S. Bureau of the Census).

to California Gulch or other locations by August.<sup>24</sup> By 1870, when the census takers came through again, South Park's population had dwindled to 447 people: 317 men and 130 women.<sup>25</sup>

In 1860, most of the population was in the towns and the gulches.<sup>26</sup> The heads of only a dozen or so households identified themselves as ranchers. The vast majority of South Park's inhabitants were miners, most of them born in the United States. Some hailed from Germany, Great Britain, Ireland, and Canada. Of those claiming occupations outside mining, most identified themselves as traders, teamsters, carpenters, or saloon and boarding house keepers. There were a few butchers and drovers as well. Out of 11,610 people, seven were black.

In the absence of government, mining districts were established along lines similar to those organized in the late 1840s in California. They provided rudimentary social and political organization and defined the priority of claims to land, minerals, and water. Each district set forth procedures for staking placer and lode claims, transferring claims, and resolving disputes.<sup>27</sup> In some cases the district bylaws established procedures for filing ranch claims.<sup>28</sup> Into the mountains of central Colorado, the miners brought a system of prior appropriation that was applied to water rights: first in time, first in right. The system had been adapted in the gold fields of California, where water was scarce and miners had to devise a system of distribution that was fair. Demand for water was high in the placer camps of California and Colorado. It was needed for washing and sluicing, and later for more highly mechanized forms of extraction and reduction, including hydraulic mining.

The region moved rapidly towards incorporation within an expanding nation-state. Colorado became a territory in 1861. Park County was created at the same time - one of the original counties. Towns and mining camps dotted the park and its margins. Wagon roads threaded their way in and out of the high basin, tying its inhabitants to supply centers to the east and to mining camps to the north and west (Figure 3-2). Many of the towns were ephemeral, representing great excitement followed by disappointment or distraction. Each had a purpose. Some, like



**Figure 3-2.** Map: Early Towns, Wagon Roads, and Railroads, South Park, 1858-1918.

Tarryall, Hamilton, Alma, Buckskin Joe, and Dudley were mining towns. Others, like Mullensville and Bordenville, were ranching towns or wayside stopping places. Still others were railroad towns: Como, Howbert, and Bath, established in the late 1870s and mid-1880s. The better a town could combine purposes, the more likely it was to persist. Hartsel, still on the map today, combined ranching and transportation. Fairplay, the county seat, combined mining, government, transportation, ranching, and services.

Fred Endlich, a geologist with the Hayden Survey working in South Park the summer of 1873, described some of the remains of the gold rush,

Placer mining was formerly carried on very extensively on the South Platte River, and on all the streams tributary to it rising in the range that lies between South Park and the Arkansas River [the Mosquito Range]. In almost all the gulches we may find ruins of what were once active and thriving towns. There is still some mining going on the Platte.<sup>29</sup>

He continued, describing the Tarryall side of the park,

There has been considerable mining done along Tarryall Creek, but at present little work is in progress. One disadvantage is the scarcity of water. It is only during the spring and early summer that there is sufficient water for mining purposes... In 1860-'65 there was in Hamilton a population of about 5,000 inhabitants; today there are not more than about half a dozen families.<sup>30</sup>

The Hayden Survey was one of the Great Surveys of the American West conducted in the latter half of the nineteenth century under government auspices.<sup>31</sup> The Hayden, Wheeler, King, and Powell surveys were, to varying degrees, scientific. All sought to map significant sections of the West, assess the

region's resources, and identify transportation routes. Ferdinand Vandever Hayden had a team of geologists and topographers in South Park in the summer of 1873. His people had passed through the area in 1869, but their assessment and categorization of South Park's resources did not begin in a systematic way until the 1873 field season.

The Hayden team were interested in economic resources and development. In their work in 1873, Hayden's people identified "practicable passes"<sup>32</sup> leading deeper into the mountains (Figure 3-3). Georgia Pass had an "indifferent" wagon road. Tarryall Pass, known today as Boreas Pass, had a stage line, connecting Breckenridge with South Park. Hoosier Pass was described as torturous on the Park County side, as was 13,188 foot Mosquito Pass. Weston Pass, further south, had a "good" wagon road, and Trout Creek Pass had a stage line running over it. Regular stage service tied South Park to more settled points to the east. Coaches ran between Denver and the towns of South Park on a daily basis, and between Colorado Springs and the high country on a tri-weekly basis. Trains would not reach the park until the end of the decade.

In South Park members of the Hayden survey found mineral resources: gold, silver, and other metals. They located salt and coal reserves. In 1869, Hayden's team passed by the salt works in the southwestern corner of the park (Figure 3-4). Mining engineer and metallurgist Persifor Frazier Jr. described the process:

# ACCESS TO SOUTH PARK MOUNTAIN PASSES

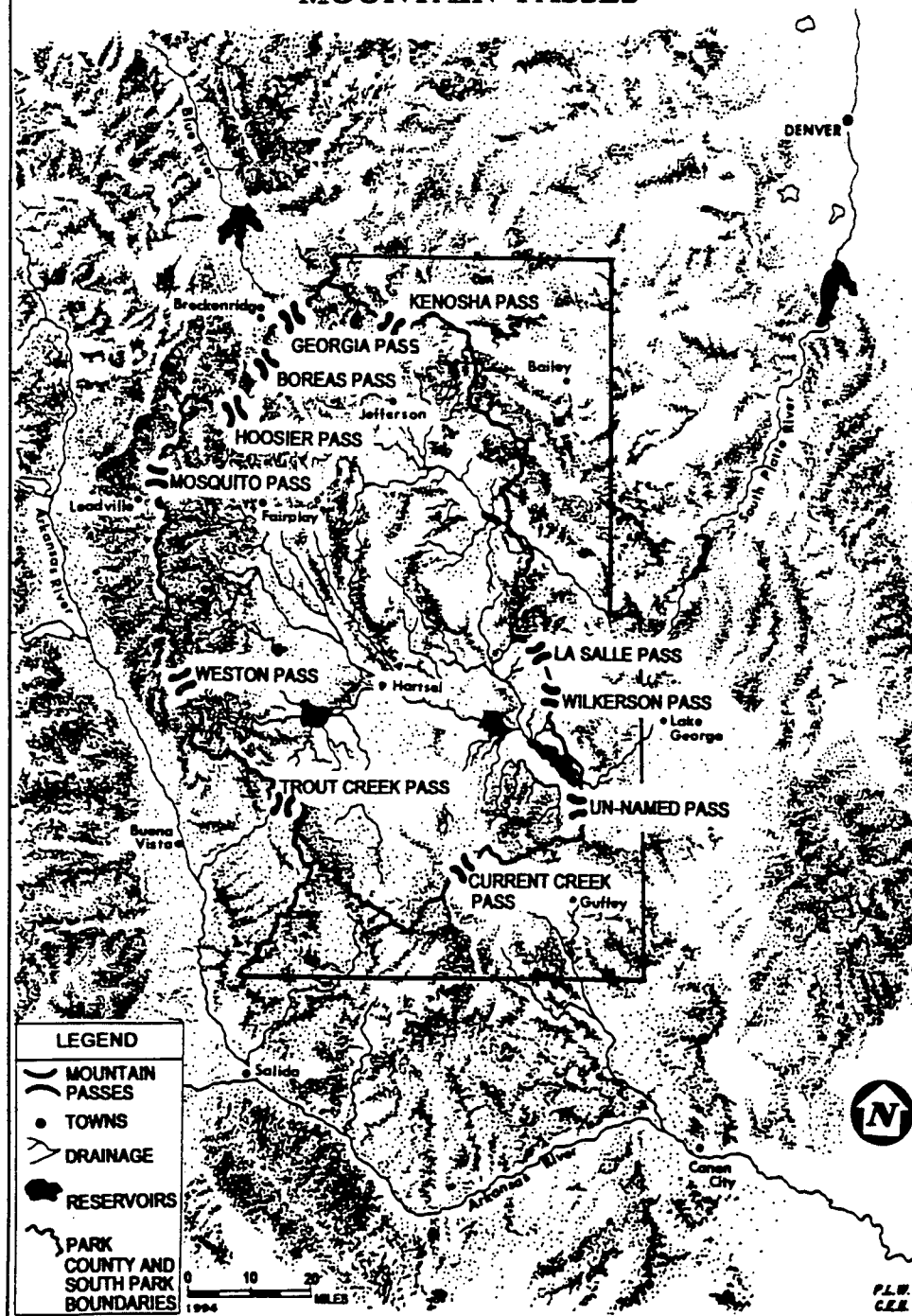


Figure 3-3. Map: Access to South Park, Mountain Passes.



**Figure 3-4.** Salt works, South Park, n.d. (Courtesy, Colorado Historical Society).

A small creek flows northward [Salt Creek], and in this creek the spring from which the salt is obtained discharges its water. It is collected in a box and conducted through a small channel to the buildings. These are two in number, the one in which the kettles are placed forming a long wing at the extremity of the other. The works belong to Rawlins and Hall, and the business of salt boiling was begun by Mr. Rawlins in a small outbuilding, yet standing, in 1861... In the long wing are one hundred and sixteen large boiling kettles and eight iron evaporating pans... The spring water is first run into kettles and heated. When the water has acquired a high temperature, it is drawn off into the first of two large evaporating pans, (eleven by twenty-eight feet), and allowed to evaporate. The sulphate of lime and other impurities are here separated from the brine, which is again drawn off into the remaining tanks. The finest grained salt is obtained from the second evaporating pan, which is eleven by nineteen feet. The six remaining pans are each five by nine feet.<sup>33</sup>

The Hayden team was sufficiently impressed that they took a sample to be analyzed in Cincinnati, finding the salt to be 99% pure. Frazier estimated that the salt works produced two tons of salt each day. Six to 14 men were employed by the operation, and Hall and Rawlins supplied ranchers, miners, and smelters.<sup>34</sup> In his own master report, Hayden noted that the South Park salt works supplied a large portion of Colorado.<sup>35</sup> He noted an exposed seam of coal at what would later become King City, but in the 1860s and 70s was known as McLaughlin's ranch or Lechner's ranch.

In their reconnaissance of South Park, members of the Hayden survey found a sparse population scattered across a vast basin. They found ghost towns like Montgomery, once bustling with 1000 people, by 1873 inhabited by only one family.<sup>36</sup> They found existing roads and potential roads. They found grass, and on this they pegged South Park's future. The mines, seemingly

so rich, had been abandoned for other possibilities. Ferdinand Hayden noted in his seventh annual report,

There is one interesting feature in connection with the mountainous districts of Colorado, which is now apparent in the valleys of the Colorado or Front Range. These grassy areas are fast being occupied by a mountain population, sparse, it is true, but a very thrifty one. The grass not only covers the valleys in the elevated regions, but grows high up on the mountainside, so that it is remarkably well adapted for dairy purposes. A large amount of the best butter and cheese is made, and the demand is greater than the supply; as yet.<sup>37</sup>

Cyrus Thomas, a member of the 1869 party, was less matter of fact in his tone,

On top of the Divide there is one of the most beautiful little grassy plains I ever saw, where a large herd of cattle or sheep could find fine pasturage.... The finest butter and milk I ever tasted was obtained in South Park. So delicious was the milk that members of our party could scarcely satisfy themselves with it.<sup>38</sup>

Henry Gannett, a member of Hayden's topographical team, observed,

Cattle and sheep do well as high as grass grows, but it is not safe to try to winter them without provision of hay above 7500 or 8000 feet. Nearly every year since the settlement of the territory stock has wintered out of doors in South, Middle, and Estes Parks....<sup>39</sup>

Cyrus Thomas, responsible for assessing Colorado's agricultural resources and potential on the 1869 expedition, was also amazed by what could be raised in the park. He noted that W.H. Berry of Fairplay took the turnip prize at the Territorial Fair that September, and added: "I mention this because these were raised on the highest part of the surface of South Park, some ten thousand feet above the level of the sea, almost at the margin of eternal snows."<sup>40</sup>

Gannett, the topographer, described the dryness of South Park:

In general the park is not well watered. Near its borders, especially its northern and western sides, there is at all seasons an abundance of good water, but throughout the whole interior part of the park water is scarce. The large streams water but a very narrow belt in their immediate neighborhoods, and the smaller streams sink in the gravelly soil.<sup>41</sup>

Despite these limitations, agriculture was possible in South Park. Irrigation was the key. Cyrus Thomas, speaking more broadly, maintained that agriculture in Colorado would not succeed without irrigation<sup>42</sup>. He was right, both in the high country and on the lower lands of the piedmont and the plains.

In a decade, South Park's population had contracted from 11,610 to 447<sup>43</sup> (Table 3-2). The remaining population lived primarily on ranches and in the towns of Fairplay, Alma, Tarryall, and Hamilton.<sup>44</sup> Indeed the park had been transformed - violently, suddenly, as change burst onto the high country landscape with vehemence. The more enduring transformation was hardly visible. U.S. control of the land and resources of South Park had become effective. The United States now had both a seasonal and year round population in South Park, and an inventory of the region's resources. The United States now had witting and unwitting representatives of the government and the expanding capitalist system installed in the mountains.

POPULATION, PARK COUNTY, COLORADO, 1860 - 1890

	<u>Total</u>	<u>Percent Change</u>	<u>Male</u>	<u>Female</u>
1860	11,610		11,506	104
1870	447	- 96.2%	317	130
1880	3,970	+ 788.1%	3,063	907
1890	3,548	- 10.6%	2,337	1,211

**Table 3-2.** Park County Population, 1860-1890 (Source: U.S. Bureau of the Census).

### The South Park System of Ranching

Ranching emerged against the backdrop of instant development. It emerged to serve the burgeoning population of the mining towns, not only in the park proper, but outside its margins, in the vicinity of present-day Leadville and Breckenridge. At first, the demand for beef in the camps was met by driving herds of cattle into the mountains from the east.<sup>45</sup> There they fetched a high price, especially after fattening for several weeks on South Park's native hay, which grew in the bottomlands adjacent to the streams. Here were the beginnings of the high country system of ranching that was to persist in South Park to the present day. It was a delicately balanced system, developed in consonance with a harsh land that initially no one thought could support a year-round cattle industry.

In a story that has since acquired the dimensions of legend, Sam Hartsel (Figure 3-5), a man who became one of the



**Figure 3-5.** Samuel Hartsel, prominent South Park rancher, n.d. Hartsel homesteaded at the confluence of the South and Middle forks of the South Platte River in 1862 (Courtesy, Colorado Historical Society).

region's leading ranchers, drove cattle into the park in the early 1860s.<sup>46</sup> Several head strayed from his herd and overwintered in the park. When Hartsel drove the rest of his cattle in the following spring, he found the strays fatter and sassier than animals driven to lower elevations. Until that time it was believed the environment of South Park was too harsh to support a year-round cattle industry. This marked the end of seasonal ranching in South Park, and the beginnings of permanent, year-round patterns of life in the high basin.

Hartsel's experiences seemed to parallel the emergence of South Park ranching. Originally, he had come to the high country as a prospector in search of gold.<sup>47</sup> He tried his fortunes at the diggings on Tarryall Creek, and like so many in the summer of 1860, met with disappointment. His attentions turned to other ways of making a living. First, he hired out as a drover, then he began his own stock business, buying cattle and oxen driven in by miners. Thin from the overland journey, the cattle could be fattened on South Park grass, then sold at a profit.

Hartsel and the other cattlemen of the early rush had no need for homesteads or other permanent structures. They were not so much stock raisers as salesmen. They needed to be mobile and rootless, to move with the market, as demand for their beef shifted from camp to camp and gulch to gulch. As the diggings played out and the Civil War drew attention back east, the nascent South Park cattle industry moved toward permanence.

Sam Hartsel moved to the southern part of the park. In the fall of 1862, he filed on his homestead, 160 acres, at the confluence of the South and Middle Forks of the South Platte River. Others ranchers established homesteads in the park in the 1860s as well: Adolph Guiraud, Benjamin Ratcliff, William Berry, Edwin Crosier, Charles Hall, Timothy and Olney Borden, and others. Some of the ranches were ephemeral, born of immediate opportunity and abandoned for the lack thereof. Those who succeeded took up land in the stream corridors. They constructed irrigation ditches, produced hay, improved their stock, and expanded their land holdings (Figure 3-6).

A piece in the Fairplay Flume, the local paper, described Sam Hartsel's ranch in 1879 as

one of the most notable places in the park. The buildings are substantially constructed and are extensive enough for a town in miniature. They are close by the Platte River and in the midst of a beautiful ranch that covers more than 4,000 acres in its area. A large part of this is already under fence and ditches. All of it will be when the indomitable will of the owner has completed all of his plans. A large ditch to cover several hundred acres of what will be the best hayland has been taken out of the Little Platte River [the South Fork], which runs on the opposite side of the valley from the house, and the water has just been turned into it. Several miles of fence have been constructed in the past year and a number of men are now employed in fencing and ditching. Mr. Hartsel's specialty is the raising of cattle, into which he has been going his full length for fifteen years. His perseverance and good judgement has met with marked success, and today he owns one of the largest, as well as one of the best graded herds in the park. As he pays taxes on a thousand head of cattle it is safe to conclude that he owns at least that number. By frequently purchasing thoroughbred bulls he has by degrees brought the grade of his herd up to high standards of excellence.<sup>48</sup>



**Figure 3-6.** Adolph Guiraud's ranch on the Middle Fork of the South Platte River, n.d. Established in the early 1860s, Guiraud's ranch had some of the oldest and largest ditches in South Park (Courtesy, Colorado Historical Society).

In two decades, South Park ranching had progressed from rootlessness to permanence, from a seasonal enterprise to a year-round industry, and from dryland grazing to irrigated agriculture. The thriving dairy industry noted in the park by the members of the Hayden Survey in 1869 was giving way to the beef cattle and sheep raising industries.

By 1889, there were 171 farms or ranches in Park County; 79.5% of them were irrigated<sup>49</sup> (Table 3-3). Approximately 24,000 acres were served by ditches, including hay meadows and pastures. An estimated 120,567 acres were contained in farms. Ranches averaged 705 acres in size. Total hay production that year was close to 20,000 tons, and there were an estimated 26,377 cattle and 28,211 sheep in the county that summer when the livestock inventory was taken.<sup>50</sup> In the span of three decades, ranching had emerged as a viable and relatively stable industry in the Colorado high country.<sup>51</sup> Less given to cycles of boom and bust than mining, ranching became the economic and social backbone of rural Park County.

South Park ranching had rigorous requirements. In such a high and severe land, it was necessary to use limited resources judiciously. The land was fragile. Cattle and sheep had to be moved from range to range.<sup>52</sup> Over time, a system of transhumance was worked out in which livestock grazed in sequence on the bottomland meadows, the dry open park, the foothills range, and the high mountain meadows (Figure 3-7). The movements were seasonal, worked out in relation to the

CHARACTERISTICS OF RANCHES IN PARK COUNTY, COLORADO, 1870 - 1890

	<u>Total Number of Ranches</u>	<u>Average Ranch Size</u>	<u>Irrigated Ranches Number</u>	<u>Percent *</u>	<u>Irrigated Acreage</u>	<u>Land in Farms Acres</u>
1870					623 **	
1880	134	670				89,771
1890	171	705	136	79.5	24,015	120,567

\* = Irrigated ranches as a percent of all ranches  
 \*\* = Includes all improved acreage

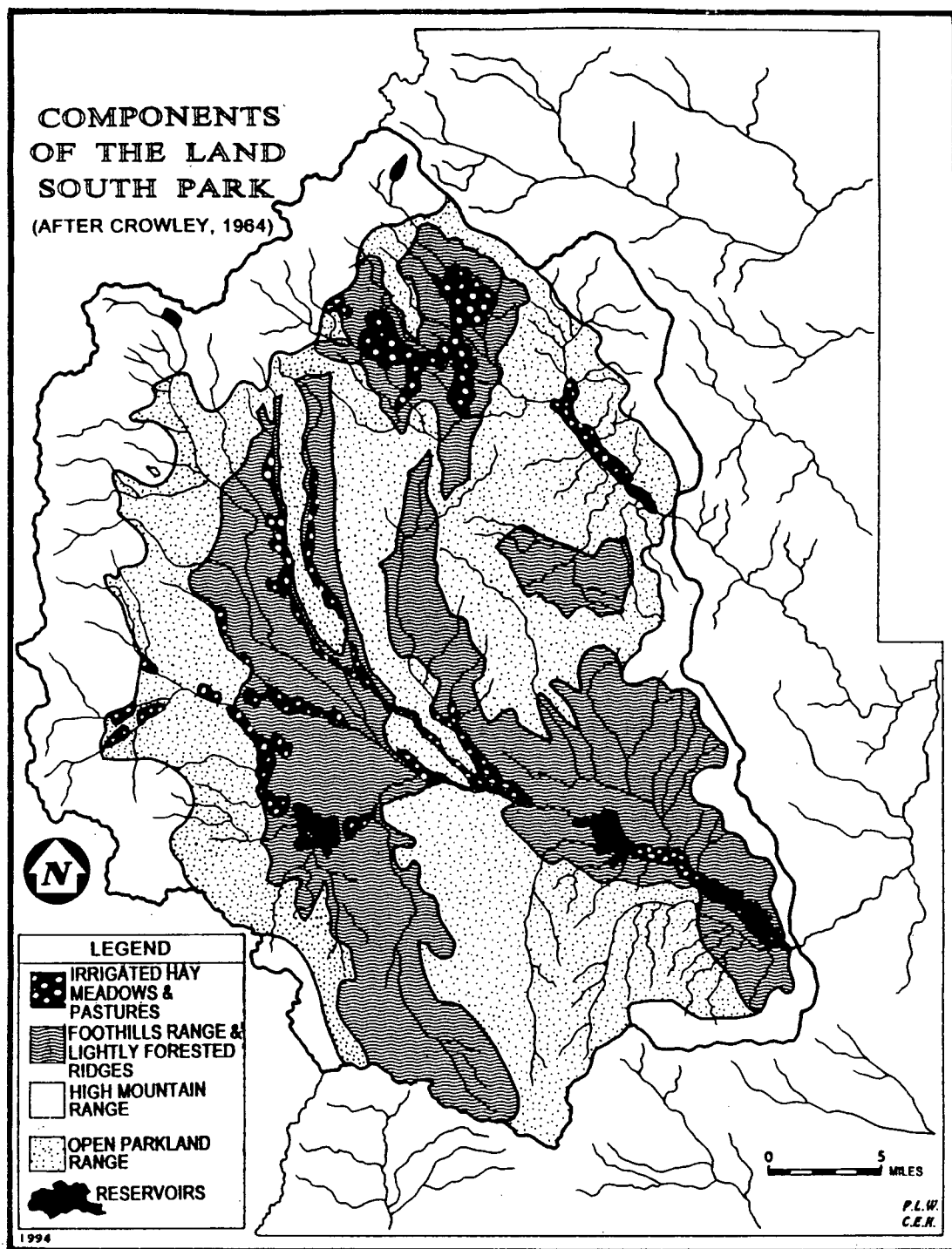
HAY PRODUCTION FOR PARK COUNTY, COLORADO, 1870 - 1889

Total Hay Production			
	<u>Acres</u>	<u>Tons</u>	<u>Yield</u>
1870		281	
1880	6,178	4,708	0.8
1889	16,376	19,547	1.2

LIVESTOCK INVENTORY FOR PARK COUNTY, COLORADO, 1870 - 1890

	<u>Horses</u>	<u>Mules and Asses</u>	<u>Cattle</u>	<u>Sheep</u>	<u>Swine</u>	<u>Oxen</u>
1870	56	1	1,114	900	29	97
1880	987	100	20,861	2,205	146	102
1890	2,488	133	26,377	28,211	171	4

**Table 3-3.** Park County Agriculture, 1870-1890 (Source: U.S. Bureau of the Census).



**Figure 3-7.** Map: Components of the Land (After Crowley, 1964). The map differentiates the four significant types of range in South Park. Each type of range had particular uses within the high country system of ranching.

timing of irrigation, snowfall and snowmelt, and forage conditions.

In the South Park system of ranching, the irrigated hay meadows were the critical component<sup>53</sup> (Figure 3-8). In some old but still somewhat applicable work, one researcher found that South Park herds were dependent upon the meadows for 60% of their feed each year.<sup>54</sup> The winter feeding season included a three-and-a-half to four month period of pure dependence on hay. In addition, livestock grazed on the irrigated meadows for approximately five weeks each spring and eight weeks each fall. A small part of the herd, usually the finest stock and the young bulls, remained on irrigated pastures through the summer.<sup>55</sup>

In this pattern of rotation, most stock were removed from the bottomlands every spring, when irrigation began. They were moved for several weeks to the open park range, the sparsest of the South Park ranges (Figure 3-9). In the early summer, those ranchers with access to the partially forested foothills range would move their stock again, while those without access might bring selected stock back onto portions of the irrigated pastures.<sup>56</sup> Sheep were typically moved high into the mountains in the summer. Under the U.S. Forest Service grazing permit system, instituted in the first decades of this century, the higher tundra range (above approximately 11,000 feet) was reserved for sheep and goats, the lower range for cattle and horses.<sup>57</sup> In the fall, the livestock were returned to the open park range for a few more weeks, then brought in closer to ranch

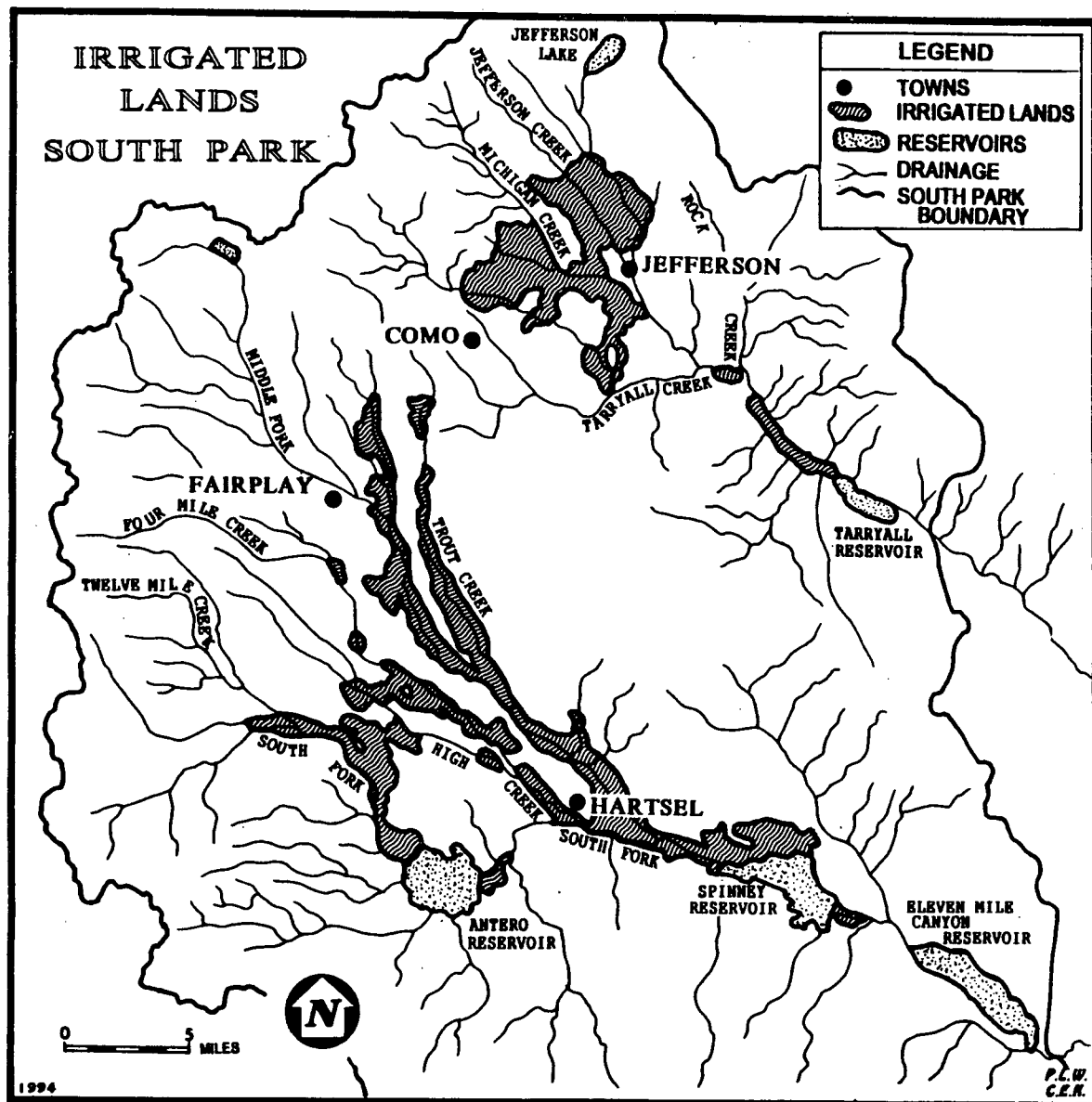


Figure 3-8. Map: Irrigated Lands, South Park.



**Figure 3-9.** Aerial view of South Park showing the open parkland, foothills, and high mountain ranges, n.d. (Courtesy, U.S. Geological Survey).

headquarters as winter approached. The key to sustainability was to move stock often, avoiding degradation of the land from trampling and overgrazing.

Other activities helped define the rhythms of life in high country ranching country: calving in the early spring, irrigating from April to July, haying in late summer, and selling and shipping of stock in the fall. Calving occurred just as the snows left the park.<sup>58</sup> Lambing followed shortly after. New stock were strengthened close to ranch headquarters, on South Park hay and pasture. When irrigation began in late April or early May, cow-calf pairs and ewes and their lambs were moved out, onto the dry open park, and from there rotated to higher range.

Irrigation usually occupied one man full time for the season to repair of ditches and headgates and to spread the water across the fields.<sup>59</sup> In South Park, as in all the mountain parks, ranchers used flood irrigation (Figure 3-10). They were forced to capture supplies as they were available, inundating the hay meadows with frigid snowmelt water each spring, which may have had an inhibiting effect on root development and plant growth.<sup>60</sup> Irrigation continued until late July or early August, at which time headgates were closed and the meadows allowed to dry sufficiently to permit harvesting of the hay crop. Today, haying crews are small due to mechanization, but prior to mechanization and on the larger spreads now retired by municipal water transfers, haying crews



**Figure 3-10.** Flood irrigation on Twelvemile Creek, 1993.

could be quite large. The labor force was migratory, working hay harvests in Colorado, New Mexico, Wyoming, and other states. In the recent past, South Park ranchers turned to Larimer Street, Denver's equivalent of the old Bowery in New York, to make up their haying crews.<sup>61</sup>

South Park meadows produced only one cutting of hay each year. After the harvest, if water were available, it could be diverted once again through the ditches to the meadows and pastures, replenishing soil moisture and supporting some additional growth that could be grazed. The harvesting process took one to two months.<sup>62</sup> The longer a rancher could wait to cut the hay, the higher the yield, but potentially the lower the quality. The hay was cut in the early years by horse-drawn mowers, then by tractor drawn mowers. It was left to cure on the ground, in the long light of South Park summer, then raked into windrows. Baling and rolling are now done mechanically. In earlier times, variants of the slide method were used. Hay production in South Park peaked in 1949, and since that time has declined (Figure 3-11). Livestock production has declined concomitantly. The irrigated meadows were the principal feed base, and the component that supported full utilization of South Park's other ranges: the open park, the foothills, and the high mountains.

Patterns of fall stock sales were determined by the nature of the operation.<sup>63</sup> In cattle ranching, the most common types were cow-calf and yearling operations. In cow-calf operations,



**Figure 3-11.** Hay bales, Freda Wahl Ranch, 1992. The Park Range is in the background.

the ranch supported a breeding herd of cows and bulls. The cows would calve in the spring, graze all summer, and the calves would be marketed in the fall. In yearling operations, the calves were held over a winter, supported on hay and on the range for another season, then marketed in the fall. In sheep operations, feeder lambs were shipped out every fall when the animals were brought down from above treeline. Marketing was handled in different ways at different times. The drovers/cattlemen of the gold rush brought the product directly to the market and to the consumer. Stock raisers in the 1860s and 70s continued the practice, sometimes using brokers, but from a land base the drovers/cattlemen never had. In the late 1870s, the Denver, South Park, and Pacific Railway penetrated the park from the northeast; in the 1880s the Colorado Midland laid track in from Colorado Springs.<sup>64</sup> The South Park cattle and hay industries were now tied much more closely to external markets by threads of steel. South Park hay and beef were sold at markets in Denver and Omaha and shipped as far as England.<sup>65</sup> When the railroad tracks were torn up in the first decades of this century, South Park ranchers turned to trucking to get their products to market. Most recently, connections between buyers and sellers have been made through televised satellite stock sale networks and through large regional exchanges.<sup>66</sup>

Over time successful high country ranchers expanded their land holdings.<sup>67</sup> During the homestead era it was not uncommon for family members to file on clusters of parcels. A husband

might secure 160 acres, his wife another 160 acres, and her brother an additional 160 acres. With the homestead as a nucleus, the most successful ranchers continued to expand their holdings, acquiring land from their neighbors as they chose to move on or failed in their endeavors.<sup>68</sup>

Initially, acquisition of open parkland was unnecessary. Ranchers homesteaded the bottomlands, irrigated hay meadows, and grazed their herds on the open range, which included the flat open park, the lightly forested hills and ridges, and the high mountains. They made extensive use of the land. The pattern began to change in the 1880s as settlement pressure increased. Particularly with the formation of the forest reserves in the 1890s, and the boom in dryland homesteading that peaked in the 1920s, South Park ranchers felt encroached upon, as the open range shrank and ultimately disappeared. Most of the dryland homesteads failed, and South Park ranchers acquired the holdings as the nuclei for new ranch units.<sup>69</sup> Under the terms of the Taylor Grazing Act, passed by congress in 1934, ranchers could acquire lease rights to adjacent federal lands under favorable terms. The intent was to cushion the impact of the disappearing open range on western ranching. Ranchers in South Park and elsewhere acquired lease rights to land around all their units, effectively controlling vast acreages. Although the Taylor Grazing Act helped some small individual ranchers, it worked most to the advantage of large ranchers and corporate ranchers with multiple units or holdings.

Sam Hartsel's ranch began with 160 acres at the confluence of the South and Middle Forks of the South Platte River. By 1885, when the state of Colorado conducted an exhaustive agricultural census, he had expanded it to 4200 acres.<sup>70</sup> When he sold the ranch in 1907, Hartsel had 8000 acres.<sup>71</sup> In the next half century, under various owners, the holdings were expanded to approximately 200,000 acres, including both deeded acreage and lands leased from the federal and state governments adjacent to the ranch's many units.<sup>72</sup>

Land was not the only critical resource in the high country system of ranching. Irrigation water fed the meadows, and was the key to sizeable hay yields, herds, and profits. Water was the lifeblood of South Park ranching. In 1889, the ranchers of South Park laid claim to water rights, as they had decades before to land. They did so formally, on paper, within the rubric of the law, 25 years after some of the ditches had first been put to use.

South Park ranchers transformed the land. By 1889 the surface of the park was etched with irrigation ditches and laterals. Once brown expanses of parkland were broken by lush green meadowlands. Irrigation water coursed across the floor of the park. Tall grass<sup>73</sup> waved in the summer winds. Ranch headquarters were dotted along the bottomlands. Sinuous trails and wagon tracks linked the ranches to one another, and with post offices and supply towns. Railroads and wagon roads crisscrossed the park. There were stock pens at the railway

stations. There were schools down the Tarryall, and in the towns on the Platte side of South Park. Ranching was well established in the high country.

### **South Park Water**

In the 1881, the state of Colorado established a system of irrigation administration. Districts were formed, water rights adjudicated in the courts, and water commissioners appointed to oversee the distribution of water. Initially South Park was not included, but in 1889, upon demand of the irrigators in the area, the matter went to court and, ditch by ditch, the water rights in South Park were defined.

Incorporated into an existing system of prior appropriation (first in time, first in right), each water right was assigned a priority number, in the order the ditches had been created and put to work irrigating the land. Over 200 rights were adjudicated in South Park in 1889. The list of claimants read like a virtual who's who in South Park ranching: Marie Guiraud, Alfred T. Edmondson, Joseph Rogers, Benjamin F. Spinney, Samuel Taylor, Edward P. Arthur, Horace Parmelee, Henry Schattinger, Charles Volz...<sup>74</sup> According to the Colorado State Engineer's annual report, 4,635.15 cfs (cubic feet per second) of water were decreed in Water District 23,<sup>75</sup> which encompassed principally South Park, but also included areas along the South and North forks of the South Platte River, above the railroad town of South Platte, just east of the Denver. South Park

irrigation accounted for the vast majority of the water: 4200 cfs (Appendix C: Ditches Database).<sup>76</sup>

For all intents and purposes, the most valuable water rights in South Park were contained in the 1889 adjudication. In that sense, South Park ranchers were smart to ensure that their rights were recorded and given a priority. Ditches adjudicated after 1889 were, in truth, paper rights. The South Platte River was over-appropriated, and once administration became effective, later appropriators, even those with ditches built in 1880 or after, could find themselves denied the right to take water in order to satisfy the need of a more senior appropriator downstream. But this was not the case in 1889. The state bureaucracy was incipient, and oversight and administration were practically non-existent.

Between 1859 and 1889, South Park had emerged as a ranching community, bounded by mountains, distance, wind, and snow, but tied by the 1889 adjudication, by the census, and by lines of communication to a rapidly changing world. Water and land were now property. Elements of the land (water, grass, and different types of rangeland) had become economic resources. A high country society and local ranching culture was coming together. Part of a capitalist society and steeped in American values, this culture valued resource use and development and prized individualism. South Park ranchers readily participated in the defining and privatizing the key resources: land and water. What South Park ranchers thought they were doing when they

adjudicated their water rights was staking a claim. What they were really doing was bringing their activities within the purview of a system of water rights administration - one the state of Colorado had devised to serve its own economic and political interests, as well as the interests of private property owners.

### Chapter Notes

1. Link, 1969.
2. Pike, Rpt. 1987, pp. 465-466 (December 13, 1806 entry).
3. Please note that the spelling "Eleven Mile" is used throughout this manuscript. On maps, in historical documents, and in state records, both the spellings "Eleven Mile" and "Elevenmile" will be found. "Eleven Mile" is used here for consistency.
4. Jackson and Spence, 1970, p. 717.
5. Jackson and Spence, 1970, p. 718.
6. Walter et al, 1990, pp. 55-57; Spronck, 1990, p. 22.
7. Klein, et al, 1978, p. 9.
8. Spronck, 1990, p. 23.
9. Klein et al, 1978, p. 1; also see Ficke et al, 1977.
10. Stark, 1949.
11. In this section I could use precise geological terminology, and discuss the uplift of the Rockies (Laramide Orogeny) in the Paleocene, the formation of South Park in the Oligocene, the upward tilting of the south end of the park in the Pliocene, the Wisconsin glaciation covering Illinoian glaciation, etc. It reads more smoothly as it is written, without the geological terminology. Those seeking more precise information, or preferring more scientific treatment are urged to consult Stark, 1949. What I have done in this passage is interpreted Stark's 150 page text, condensing and extracting what is important to the

understanding of South Park geology for the purposes of this particular study.

12. Renaud, 1945.
13. Renaud, 1945, pp. 5-6.
14. Simmons, 1966, p. 50.
15. Simmons, 1966, p. 49. Though this date seems early, this is the date given in Simmons' history. She writes, "One report states that even before 1700 French trappers came up the Arkansas River to the vicinity of Pueblo.... Etienne de Bourgmond is said to have seen Comanches in South Park in 1724. These occurrences predate the official French discovery of the Rockies in 1743 in Wyoming; therefore, the first Frenchmen in Colorado surely come from Louisiana rather than from the northern outposts of New France." Simmons book is a popular history, completely devoid of footnotes. As such it is impossible to check the sources of information.
16. For coverage of South Park's early history, see Simmons, 1966, the most complete history of the area. Also refer to Davidson, 1940; and Bair, 1959.
17. Simmons, 1966, p. 14. Simmons' history of South Park is entitled "Bayou Salado". This term and account of its usage have become accepted in local and regional histories, and they are often repeated. According to Simmons "Bayou Salade" is a Creole term. To my knowledge the French word "salade" means salad, and refers to lettuce, endives and other leafy items one may find in a salad. The term can also be used to connote a jumbled up mess - hardly appropriate to a place such as South Park. More likely in my opinion, the word "salant" was being used by French speaking Canadian trappers, and has simply been modified and bastardized by Americans in the time since Canadian trappers first penetrated the park. "Salant" means saline, and can also be used in relation to salt marshes and areas where salts form a hard pan on the surface of the soil. Both salt marshes and saline soils are found in South Park, especially in the vicinity of Salt Creek.
18. See discussion in Simmons, 1966. Also The Concise Oxford French Dictionary.
19. Simmons, 1966, p. 20.
20. Simmons, 1966, p. 62.

21. This is not sexist language. Quite literally, I mean men. According to the 1860 census, the ratio was 115 to 1 in the mining towns of South Park (U.S. Bureau of the Census, 1860).
22. Simmons, 1966, pp. 62-76.
23. U.S. Bureau of the Census, 1864, p. 548.
24. Kerwin, 1860; and Stahl, 1860 and 1862.
25. U.S. Bureau of the Census, 1872, p. 624.
26. The information in this section is derived from U.S. Bureau of the Census, 1860, Manuscript Census, Population Schedules.
27. Montgomery Mining District, 1861-1866; and Mosquito Mining District, n.d..
28. Mosquito Mining District, n.d., p. 122.
29. Hayden, 1874, p. 302.
30. Hayden, 1874, pp. 301-302.
31. For more on the Great Surveys, refer to Bartlett, 1962.
32. Hayden, 1874, p. 675.
33. Hayden, 1870, p. 223.
34. All this is from Frazier's report in Hayden, 1870, p. 223.
35. Hayden, 1870, p. 179.
36. Hayden, 1874, p. 674.
37. Hayden, 1874, p. 37-38.
38. Hayden, 1870, p. 249.
39. Hayden, 1874, p. 674.
40. Hayden, 1870, p. 250.
41. Hayden, 1874, p. 672.
42. Hayden, 1870, p. 245.
43. U.S. Bureau of the Census, 1864 and 1872.

44. Hayden, 1874, p. 674. The Hayden survey estimates the populations as follows: Tarryall (200), Hamilton (100), Quartzville (200 in 1871), Alma (500 in 1872), Dudley (200 in 1872). This suggests a resurgence in mining in the early 1870s, after the census was taken.
45. Crowley, 1964; Davidson, 1940; Simmons, 1966; and Wilks, 1963.
46. Wilks, 1963, p. 26; also see Davidson, 1940, and Simmons, 1966.
47. Wilks, 1963, pp. 1-25. Also see Anonymous, 1899, pp. 171-181.
48. Fairplay Flume, July 17, 1879, p. 3.
49. Information in this section is derived from U.S. Bureau of the Census, 1895. Tables are derived from U.S. Bureau of the Census, 1864-1989 and 1864-1992.
50. U.S. Bureau of the Census, 1895.
51. U.S. Bureau of the Census, 1872, 1883, and 1895.
52. The high country system of ranching is discussed in detail in geographer John Max Crowley's 1964 Ph.D. dissertation (Crowley, 1964). The pattern identified by Crowley and described here is confirmed in interviews with South Park ranchers, past and present (See Brompton, 1992 and 1993; Coil, 1992; McDowell, 1993; and Teter, 1993).
53. Crowley, 1964, pp. 75-76, 78, and 90.
54. Crowley, 1964, p. 92.
55. Crowley, 1964, pp. 90-140.
56. Crowley, 1964, pp. 136-139.
57. Crowley, 1964, pp. 272-279.
58. Crowley, 1964, pp. 54-56.
59. Personal Communication: McDowell, Coil, Teter, and Curry.
60. Crowley, 1964, pp. 139-140.
61. Personal Communication: McDowell, Brompton, Teter.

62. Crowley, 1964, pp. 140-152; Also see Young, 1983, for a good general treatment of haying, and see Peake, 1937, for a detailed work on the Colorado range cattle industry.
63. Crowley, 1964, pp. 56-61.
64. For more information on railroads in South Park, see Abbott, 1989, Chappell et al, 1974, Freeman, 1896, Kindig and Haley, 1986, McFarland, 1980, and Thomas, 1986.
65. Brompton, Personal Communication; Crowley, 1964, pp. 56 - 61; Peake, 1937.
66. Coil, Personal Communication.
67. U.S. Bureau of the Census, 1864-1989.
68. U.S. Bureau of the Census, 1864-1989; also see Crowley, 1964, pp. 40-47.
69. Crowley, 1964, pp. 190-192; also see Simmons, 1966, Davidson, 1940, Wilks, 1963, and Peake, 1937.
70. U.S. Bureau of the Census and the State of Colorado, 1885, Enumeration district 1, p. 4.
71. Wilks, 1963.
72. Young, 1975.
73. For those small minded, literal individuals lacking in imagination it should be noted that "tall grass" is not technically the tall grass of the tall grass prairies, but rather "short grass" grown tall in the fields such that it reaches the belly of cattle grazing in the meadows.
74. Park County District Court, 1889-1970 (Case Number 341, October 1889).
75. Colorado State Engineer, 1882-1946 (Report of J.P. Maxwell, 1891, p. 197).
76. The database contains information for over 300 South Park water rights, assembled from court documents including adjudications and transfer decrees and from state administrative records. Please refer to the Appendix.

## CHAPTER FOUR

### WATER ADMINISTRATION

#### The Framework

The system of prior appropriation was introduced to the central Rocky Mountains by miners in the Pikes Peak gold rush. Though Hispanic settlers in the San Luis Valley had irrigated as early as 1852, it was not Spanish water law per se that spread through the gulches of the Colorado Rockies or was concretized in the laws of the territory and later the state.<sup>1</sup> Prior appropriation, a system based on the idea of first in time first in right, found expression initially in mining district bylaws and organizing documents.<sup>2</sup> Miners needed water for placer mining and, in the context of scarcity in the gold fields of California and Colorado, developed systems to allocate a precious resource. The system was the product of conditions in which precipitation was variable and droughts could be prolonged.

The system of prior appropriation adopted in the California gold fields was based on the manner in which mining claims were allocated.<sup>3</sup> Claims were limited in size; diligence had to be demonstrated in working the claims or they were effectively forfeited. Water law evolved in a similar way. Miners and irrigators were allowed to claim only an amount of water they could put to beneficial use. Water users were required to demonstrate diligence in developing their water rights by

constructing ditches and canals, diverting water into sluice boxes, pumping it through hydraulic mining hoses, or irrigating a field with it. Conflicting claims were resolved according to the priority in time of the claim.

The prior appropriation system spread throughout the West in the decades following the 1849 rush to the gulches of the Sierras. Colorado adopted the doctrine in perhaps its purest form.<sup>4</sup> Unlike California, riparian rights were given no standing whatsoever. Unlike many other states, Colorado was explicit - in early territorial documents dating back to 1859, as well as in the state constitution written in 1876 - about the priority of water rights. Oddly, in other western prior appropriation states, priority, while a key feature, remained unwritten and unsupported by strong statutory provisions.<sup>5</sup>

At the national scale, the doctrine of prior appropriation remained on tenuous ground until the passage of the Desert Land Act of 1877. The act granted states the right to define their own water laws and gave formal federal approval to the system of prior appropriation. The act effectively defined water rights as private property rights under the legal and administrative purview of the states.

In Colorado and other western states, water rights do not entail the simple right to possess water and claim ownership of it as a commodity.<sup>6</sup> Water rights involve the right to use water. According to the Colorado Constitution, the waters of the streams that lie within the state's borders belong to the

people and the state of Colorado. Individuals have the right to claim, sell, or purchase water rights. Individuals holding water rights have the right to apply those waters to beneficial use in order of priority. Article XVI of the Colorado Constitution reads:

Section 5. Water of streams public property. - The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.

Section 6. Diverting unappropriated water - priority preferred use. - The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring to use the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

Section 7. Right-of-way for ditches, flumes. - All persons and corporations shall have the right-of-way across public, private and corporate lands for the construction of ditches, canals and flumes for the purpose of conveying water for domestic purposes, for the irrigation of agricultural lands, and for mining and manufacturing purposes, and for drainage, upon payment of just compensation.

Section 8. County commissioners to fix rates for water when. - The general assembly shall provide by law that the board of county commissioners in their respective counties, shall have power, when application is made to them by either party interested, to establish reasonable maximum rates to be charged for the use of water, whether furnished by individuals or corporations.<sup>7</sup>

The Colorado Constitution established the interests of the state, defined conventions for the use of water, and attempted to protect its citizens from the predatory practices of water developers and speculators. It established a system of

preference whereby uses were prioritized: domestic use was most essential, agriculture was second in importance, and industry and mining (despite the fact that mining had created the system) were accorded the last priority. Preference reflected the agrarian and domestic values of nineteenth century society.

Supported by statutory provisions, Article XVI of the Colorado Constitution provided the legal basis for the evolution of water rights administration within the state. The system that took shape divided power and authority in water matters between the courts and the Colorado State Engineer. Through the courts, water rights were adjudicated and disputes resolved. Through the State Engineer's office, created in 1881, water was administered and distributed.

Prior to the Water Rights Determination and Administration Act of 1969,<sup>8</sup> water matters were handled through the local, district courts.<sup>9</sup> This included adjudications, disputes, reductions and abandonments of water rights, changes in the type or place of use, findings of diligence, and other matters. After 1969, water issues were directed through newly-created water courts.<sup>10</sup> The state of Colorado was divided into seven irrigation divisions, each representing one of the state's major drainage basins (Figure 4-1). The 1969 Act created a water court in each division, responsible for all water matters within the basin. A water judge was appointed and given the assistance of a referee, who was empowered to handle day to day court matters and rule on water rights issues. If the referee's

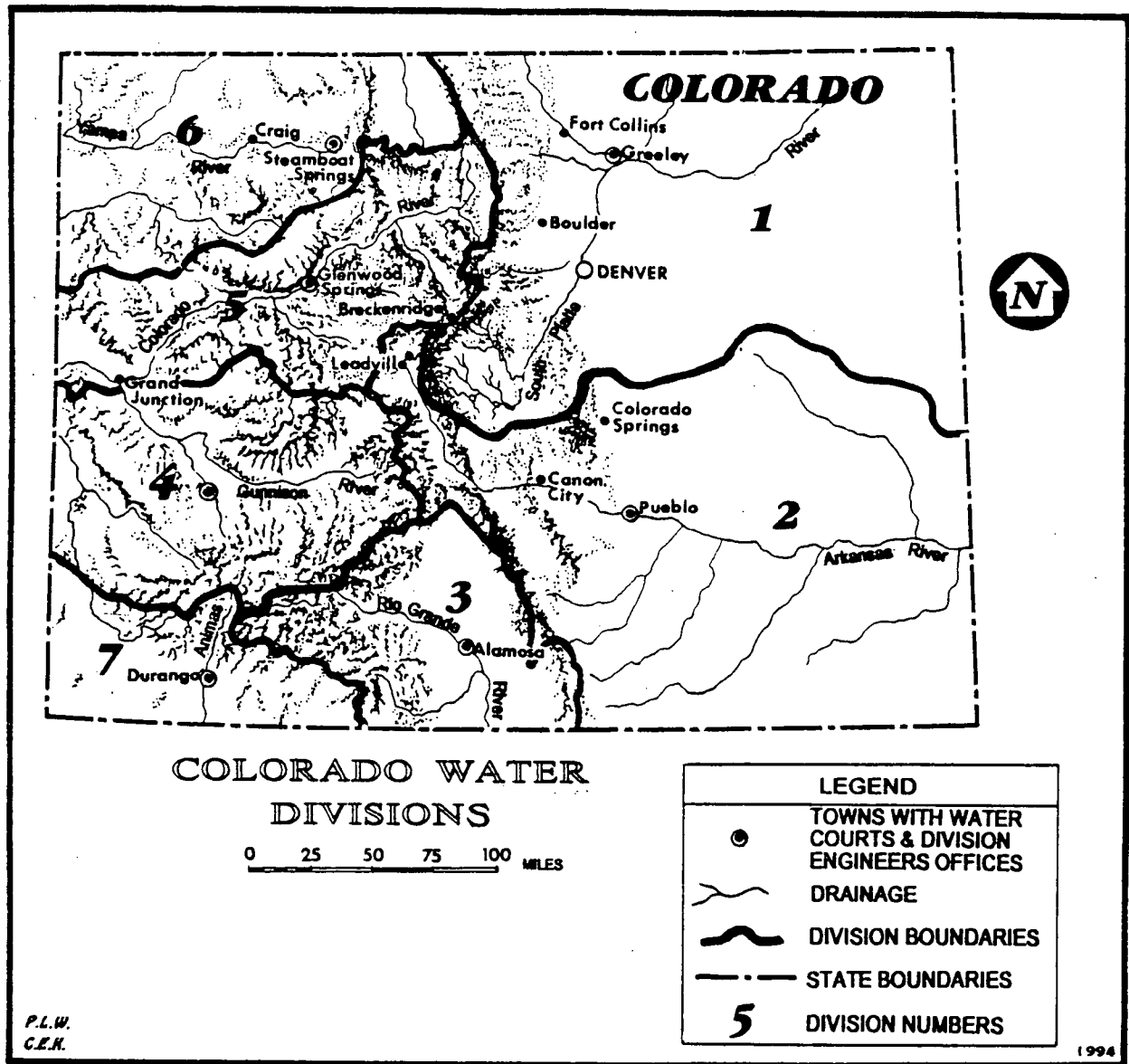


Figure 4-1. Map: Colorado Water Divisions.

ruling was disputed, the water judge would hear the case. In the event that the ruling proved contentious, appeal could be made to the Colorado Supreme Court. In more complex cases, the water referee had the option of referring the case to the judge for consideration. The 1969 Water Rights Determination and Administration Act succeeded in streamlining the judicial management of water, but it removed the process somewhat from local control. No longer were cases heard at the county seat. No longer was access to the courts so easy or knowledge of the courts so immediate.

The Colorado State Engineer was charged with administering the decrees of the court. It was the State Engineer's responsibility to see that water was distributed in accordance with state statute and in consonance with district adjudications. Water right adjudications defined local water rights: the claimants, the amounts of water taken, the use to which the water was put, the point where the water was diverted from the stream, the name of the ditch, the date it was first put to use, its priority number within the district, and in some cases the place the water was put to use. Adjudications could occur within a district on an annual basis, and each took precedence over the adjudication that followed. In other words, a ditch adjudicated in 1889, with a priority date of June 1, 1878, would be considered senior to a ditch adjudicated in 1913 with a priority date of May 15, 1867. It was not only a matter of when a user puts the water to work. Legally it was a matter

of when that use was incorporated into the state's legal and administrative system.<sup>11</sup>

The State Engineer administered Colorado's water through seven division engineers, each responsible for a major drainage basin within the state. The division engineers, in turn, regulated water use through a team of assistant engineers, and a network of water commissioners and deputies operating at the local or district level.<sup>12</sup> It was the local water commissioner's responsibility to communicate river calls to water users within the district. A river call could be initiated by any appropriator who was not receiving a full allocation of water. The river call was, quite literally, a call for water from the river. The call could be initiated anywhere in the river system.<sup>13</sup> The assumption was that if an appropriator was not receiving water, junior appropriators upstream were receiving the allocation.<sup>14</sup> Once the district water commissioner was notified, an administrative process was set in motion whereby the priority date of the water-short appropriator's ditch could be communicated to local water commissioners, who in turn would see that ditches with priorities junior to the water-short ditch were shut down.

The principal responsibilities of district water commissioners remained essentially the same, before and after the passage of the 1969 Act. Local water commissioners attempted to enforce Colorado's priority system. They kept records of diversions in the districts, inspected water storage

facilities, confirmed diligence in the development of water rights, and documented non-use and abandonment.

Prior appropriation doctrine is vastly more complicated than this rudimentary account implies, but it has been treated in considerable detail elsewhere.<sup>15</sup> Detailed legal explication is unnecessary here, but the essentials of the system must be understood if the South Park water transfers are to be brought into clearer focus. The transfers took place within a legal and administrative system that permitted changes in the type and location of use. The transfers also represent two of the most essential elements of prior appropriation doctrine: the ability to move water from one location to another in order to put it to economic use, and the treatment of water rights as property rights that can be bought and sold.<sup>16</sup>

#### **The Emergence of the State Engineer's Office**

By 1880, Colorado's population had swelled to close to 200,000.<sup>17</sup> Miners still roved the mountains in search of signs of mineralization, but the most significant and stable part of the population was clustered on the piedmont, just east of the Front Range. A portion lived in the cities. Others resided on farms, where irrigation was used to raise a variety of crops. Demand for irrigation water was high, and as conflicts between agricultural users arose with increasing frequency, the state legislature recognized the need for a superintendency of the state's waters.<sup>18</sup>

In 1881, the Office of the State Irrigation Engineer was established for the purpose of distributing the state's waters. The office assumed oversight of ten irrigation districts, created two years earlier by an act of the legislature.<sup>19</sup> Each district had a local Superintendent of Irrigation or water commissioner. From 1879 until the passage of the Water Rights Determination and Administration Act 90 years later, appointment of water commissioners was locally controlled. County commissioners recommended appointees to the governor, and water commissioners were paid at least in part out of local coffers. After 1969, water commissioners were hired by the state as salaried employees.

The tasks confronting the state's first Irrigation Engineer, Eugene Stimson, were formidable. In his first biennial report Stimson stated that he had difficulty getting money from the legislature to pay his employees.<sup>20</sup> These difficulties cost him his assistant.

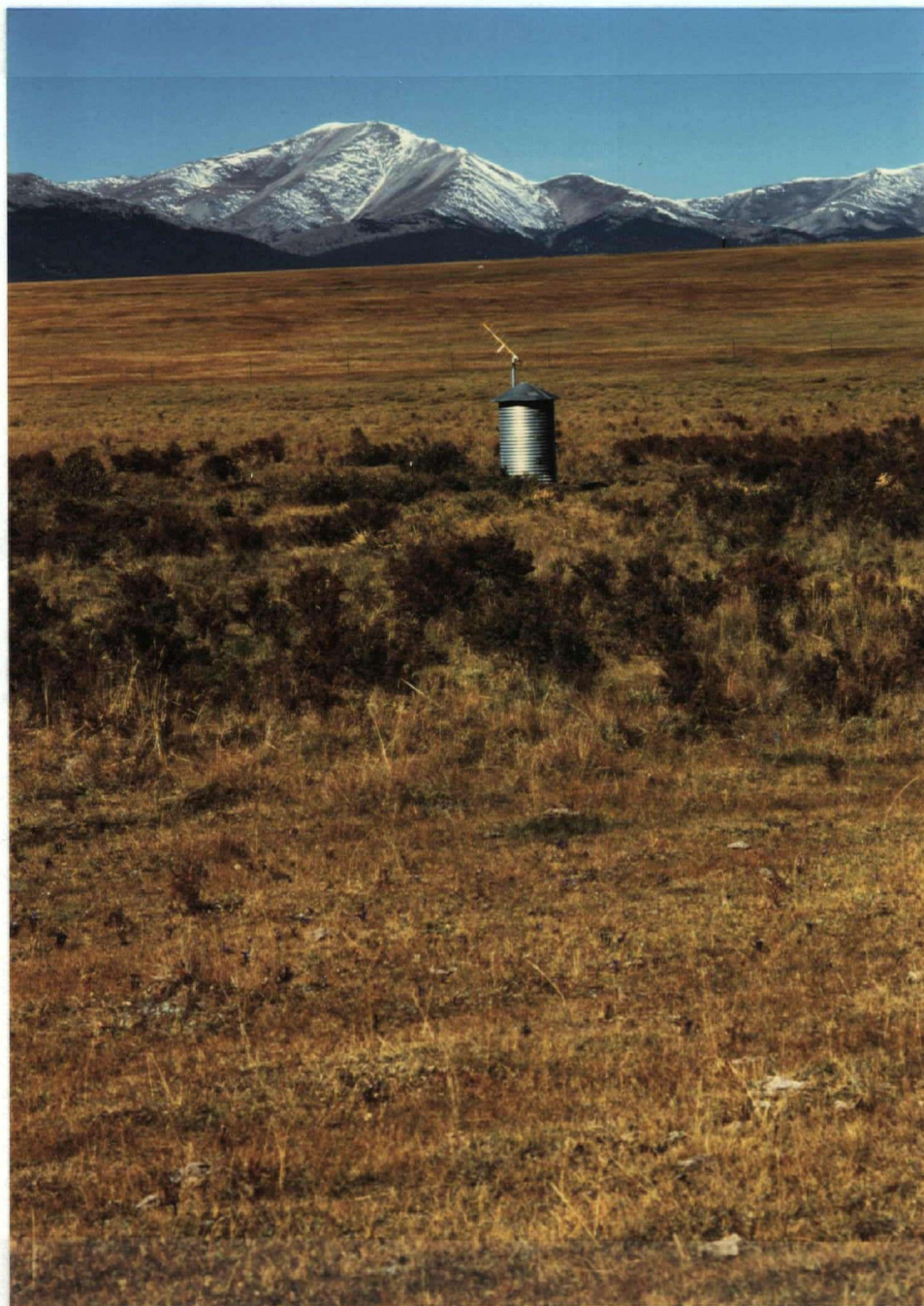
Initially the agency focused on survey work and stream gauging. In order to distribute the state's water it was necessary to determine the amount of water flowing in the rivers, then ascertain the actual capacity of irrigation ditches. Work focused initially on the Poudre River, a major tributary of the South Platte, where conflicts between irrigators had been most intense in the years leading up to the agency's formation.

When E.S. Nettleton took over Stimson's position in April of 1883, he found the office in disarray and funding still inadequate. Organization of the office, its policies and procedures, proceeded from the ground up. Nettleton is credited with "inaugurating" the state's system of water rights administration.<sup>21</sup> He also worked with the legislature and the governor to secure more money. Efforts at surveying and gauging streams expanded in north central Colorado to the Big Thompson and Saint Vrain drainages.<sup>22</sup> In addition, the division of the state into water districts continued; by 1885 there were 16, by 1887 34 had been designated.

Colorado's administrative system came together quickly. In his 1887 report to the governor, Nettleton proudly noted that the system was arousing interest in places as far away as Australia and was drawing favorable reaction from other western states like Wyoming.<sup>23</sup> The system was expanded and improved under the State Engineers who followed Nettleton. Measurement of streams was extended across the state to establish base flow figures, then measurements continued to develop some understanding of year to year fluctuations in stream flows.<sup>24</sup> As court adjudications brought ditches into the legal and administrative system, districts were further defined, officials appointed, and local administration begun. The state developed forms and procedures, including, at least in theory, annual reports from the district water commissioners.

The early system was far from perfect, but technology did much to improve administration. The advent of the automobile made access to ditches and headgates easier for local water commissioners. The increasing ubiquity of the telephone did much to speed the communication of river calls. In recent years, the development of satellite technology has enabled the state to make the transition to a system of satellite monitored stream gauging stations, powered by solar panels (Figure 4-2). The computer has allowed the coordination of information about Colorado water, water use, and water users on an unprecedented scale.

The expansion of Colorado's administrative system for water proceeded like patchwork. Some parts of the state, most notably the piedmont and eastern plains, came more rapidly into the system and more completely under the eye of the State Engineer's office. In the mountains administration was at best partial. Some districts, like Water District 23, which included South Park, were large and contained hundreds of ditches carrying small amounts of water. Since personnel were assigned on the basis of the total cfs (cubic feet per second) of water decreed within the district, not the number of ditches or complexity of the irrigation network, Water District 23 had too few water commissioners and deputies to regulate use. Districts such as those on the eastern plains, where farmers drew water from large mutual ditches and canals, were less complicated to administer.<sup>25</sup> Since large amounts of water were diverted, the



**Figure 4-2.** Stream gauging station, part of the state's present satellite monitoring system for stream flows, South Park, 1993.

number of water commissioners and deputies was adequate to the task. Monitoring and enforcement were simplified too because the state's responsibility ended at the headgate where large mutual ditches took water from the river. Beyond that point, apportionment of water was the responsibility of the shareholders.

The extent to which water disputes arose was in part a function of the water supply each year. Beginning in 1881, the State Engineer monitored the water supply and the snowpack each year. The precision of the measurements and data used by the agency increased over time, as did appreciation of the variability of the water supply and understanding of the extent of overappropriation on Colorado's rivers.

Administration evolved as did irrigation. In an interesting section of his report to the governor for the years 1925 and 1926, State Engineer Michael C. Hinderlider analyzed the pattern of irrigation development in Colorado.<sup>26</sup> He distinguished first a pioneer period characterized by "straggling" ditches: small ditches built to irrigate small plots of crops for sale in the mining camps. Around 1864, a practice was adopted for claiming a water right by "posting of a notice on the bank of the stream at which point the water was to be diverted, and the filing of such notice in the office of the county recorder."<sup>27</sup> By 1870 this practice was universally accepted.

In the second phase of irrigation development, which Hinderlider identified with the years 1870-1874, mutual companies and cooperative ditches emerged. The State Engineer noted that "the greater portion of our water rights, in volume if not in number, were initiated under this method."<sup>28</sup> Following this stage came a third period, similar to the second but much greater in scale. Canals were extended and improved, and new canals were built. Large sections of land were brought under the ditch. Also characteristic of this period, which lasted from 1874 to 1890, was consolidation of existing irrigation works and water rights. The scale of these endeavors required external capital.

After 1890, the state entered a period of dam building.<sup>29</sup> As Coloradans came to grips with the realities of their water situation, the need for storage was recognized. Snowmelt provided abundant supplies in the spring, but by summer water levels had dropped substantially. Dam building provided the potential to give irrigators water more consistently over the course of the growing season. For cities, storage meant supplies could be held over to fill domestic and industrial needs in times of drought. Dam building has continued to the present, though environmental opposition and changing public attitudes have led to a decline in recent years.

The last stage identified by Hinderlider was one characterized by increasing federal involvement in water projects, as local and private investment proved inadequate to

fund development. The pattern of federal involvement has changed substantially since Hinderlider's time. Today the federal government has an expanded role. It is involved in large scale irrigation project development and is implicated in a myriad of ways in water use via the assertion of federal reserved rights and environmental regulations.

A sixth and seventh stage can be added to Hinderlider's scheme regarding irrigation development in Colorado. The sixth begins with the introduction of center-pivot irrigation and continues to the present. The development of groundwater, most significantly on the eastern plains, has transformed Colorado agriculture, allowing irrigation and cultivation to extend far beyond riparian areas. In 1969, the Water Rights Determination and Administration Act integrated the management of groundwater and surface water, inaugurating another distinguishable stage in Colorado's irrigation development. As suggested previously, the 1969 Act also entailed extensive administrative restructuring and a marked decrease in local control. South Park irrigators did not anticipate these developments when they demanded rather strenuously that their water rights be adjudicated back in 1889.

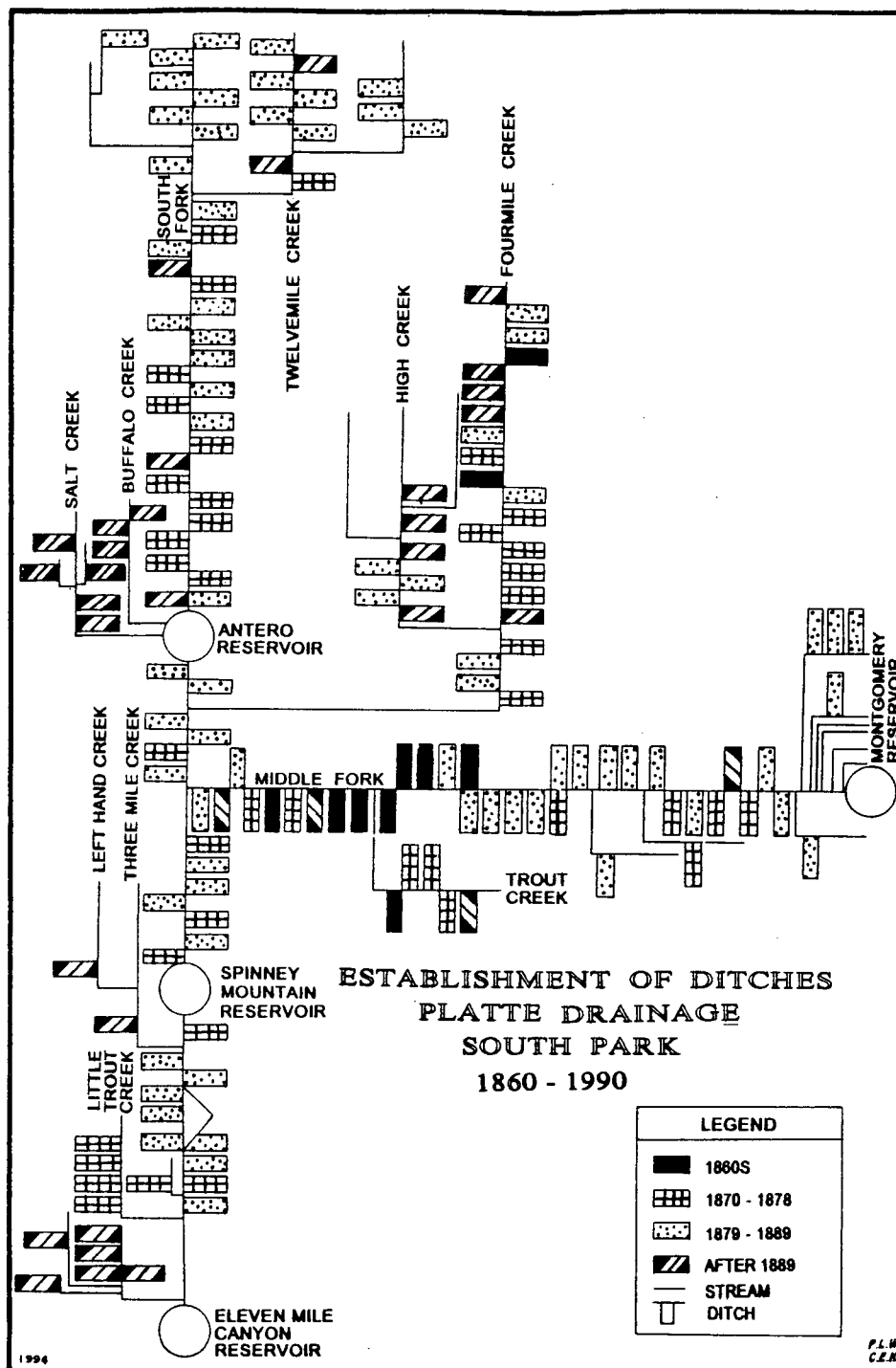
### **Adjudication**

District 23 was formed in August of 1888, and the original adjudication of water rights in the district took place the following year. According to State Engineer J.S. Greene, the district was created

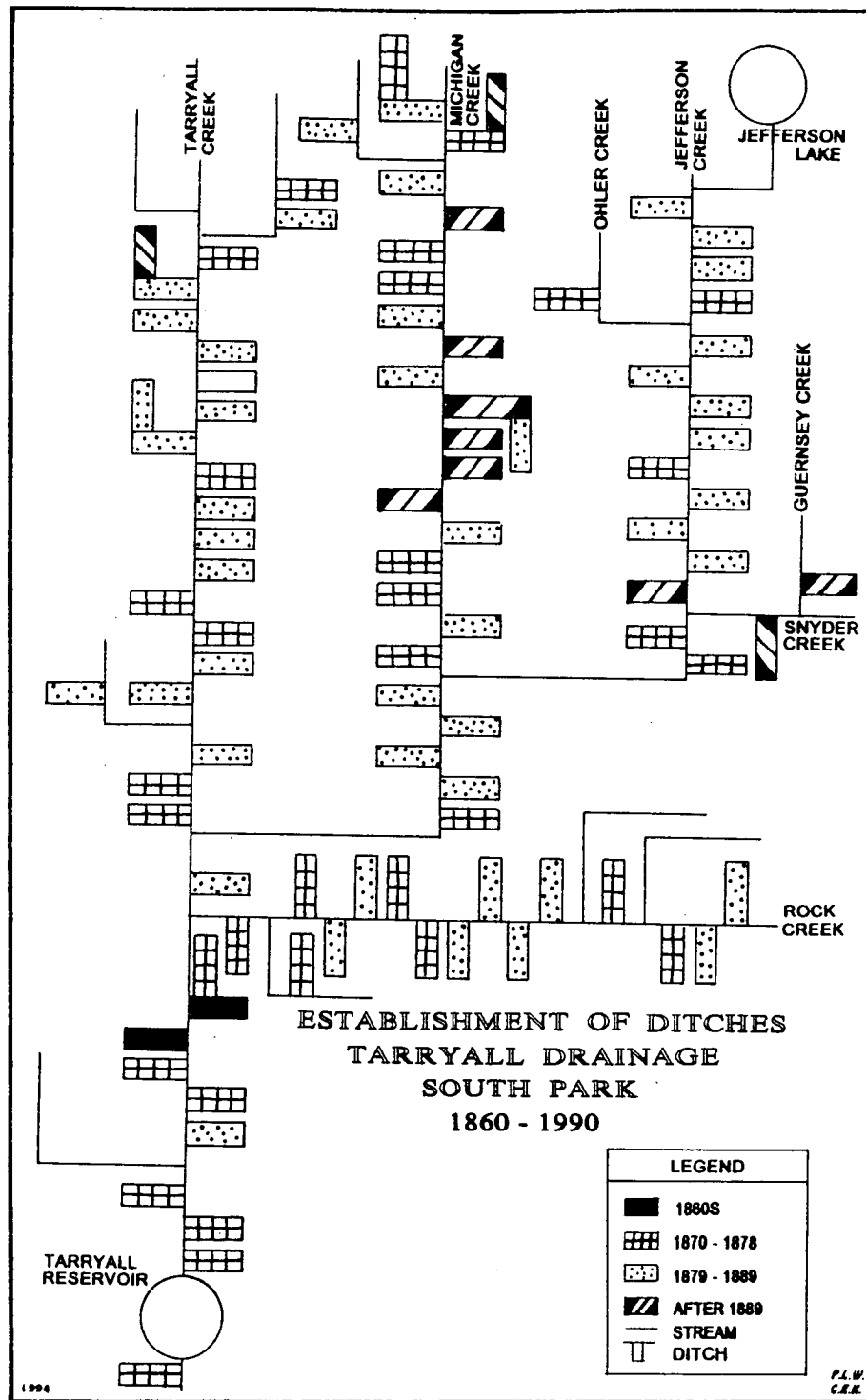
upon petition from numerous residents and users of water for irrigation in South Park. The creation of this water district was desirable for the following reasons: first, that the superintendent of irrigation should be able to control the use of waters in South Park, which he is not able to do unless that portion of the country is embraced in a water district; second, that the residents of the Park may secure an adjudication of their water rights, which can only be done if they are embraced in a water district.<sup>30</sup>

In all, 228 water rights were adjudicated within the district, which encompassed South Park and mountainous areas to the east<sup>31</sup> (Figures 4-3 and 4-4). The vast majority of the ditches were located in South Park, where ranching was thriving by the late 1880s. The ditches varied in size. Some like the mighty Sigafus Ditch carried several priorities, representing the ditch's establishment in 1873 and later enlargements in 1875 and 1876. Under the three Sigafus Ditch priorities a total of 60 cfs of water could be claimed: 25 cfs under the original priority, 25 cfs under the first enlargement, and 10 cfs under the second enlargement.<sup>32</sup> Most South Park ditches were small, carrying 12 cfs or less. Often ranchers would use a number of ditches to irrigate a single hay meadow or, in cases where their land was in complex terrain, would develop a network of ditches to irrigate small fields of hay.

Between 1889 and 1913, an additional half-dozen water rights were adjudicated in Water District 23.<sup>33</sup> The 1913 adjudication brought another hundred ditches into the state system, the 1918 proceedings incorporated approximately 30 more,<sup>34</sup> and so. The number grew until there were in excess of 400 water rights decreed in South Park alone (Appendix C). Many



**Figure 4-3.** Establishment of Ditches, Platte Drainage, South Park, 1860-1990. In this set of schematic line drawings, patterns of establishment and adjudication of water rights are shown within the South Park drainage system, divided to show the South Platte and Tarryall sides of South Park.



**Figure 4-4.** Establishment of Ditches, Tarryall Drainage, South Park, 1860-1990.

of these water rights proved to be futile, meaning that they were rarely, if ever, in priority; and water was frequently not available for irrigation. In high-water years and under flood conditions, these junior ditches might receive an allotment. On the ground this was not an issue until enforcement of the priority system was improved in the twentieth century. Early irrigators, especially those located near the headwaters, took water both in and out of priority. Once the state gained control of diversions, junior ditches became relatively worthless. Today in South Park, the most valuable water rights are those adjudicated in 1889, with priority dates of 1878 or earlier.

During the heyday of irrigation South Park was etched with hundreds of small ditches. Distributed up and down the park's two principal streams, the South Platte and the Tarryall (Figure 4-5), ditches diverted water from smaller tributaries and springs as well. In the following pages, a series of diagrams (line drawings) schematically represent the ditches of South Park. Line drawings are used by engineers and hydrologists and show simply the arrangement of ditches, tributaries, and reservoirs along a stream or stretch of river. An original set of line drawings is presented here to give some sense of the complexity of the South Park system.<sup>35</sup> Further, the line drawings depict the amount of water decreed to selected South Park ditches, distinguishing large ditches like the Canon Ditch from smaller carriers like the Mary G. Borden Ditch. The line

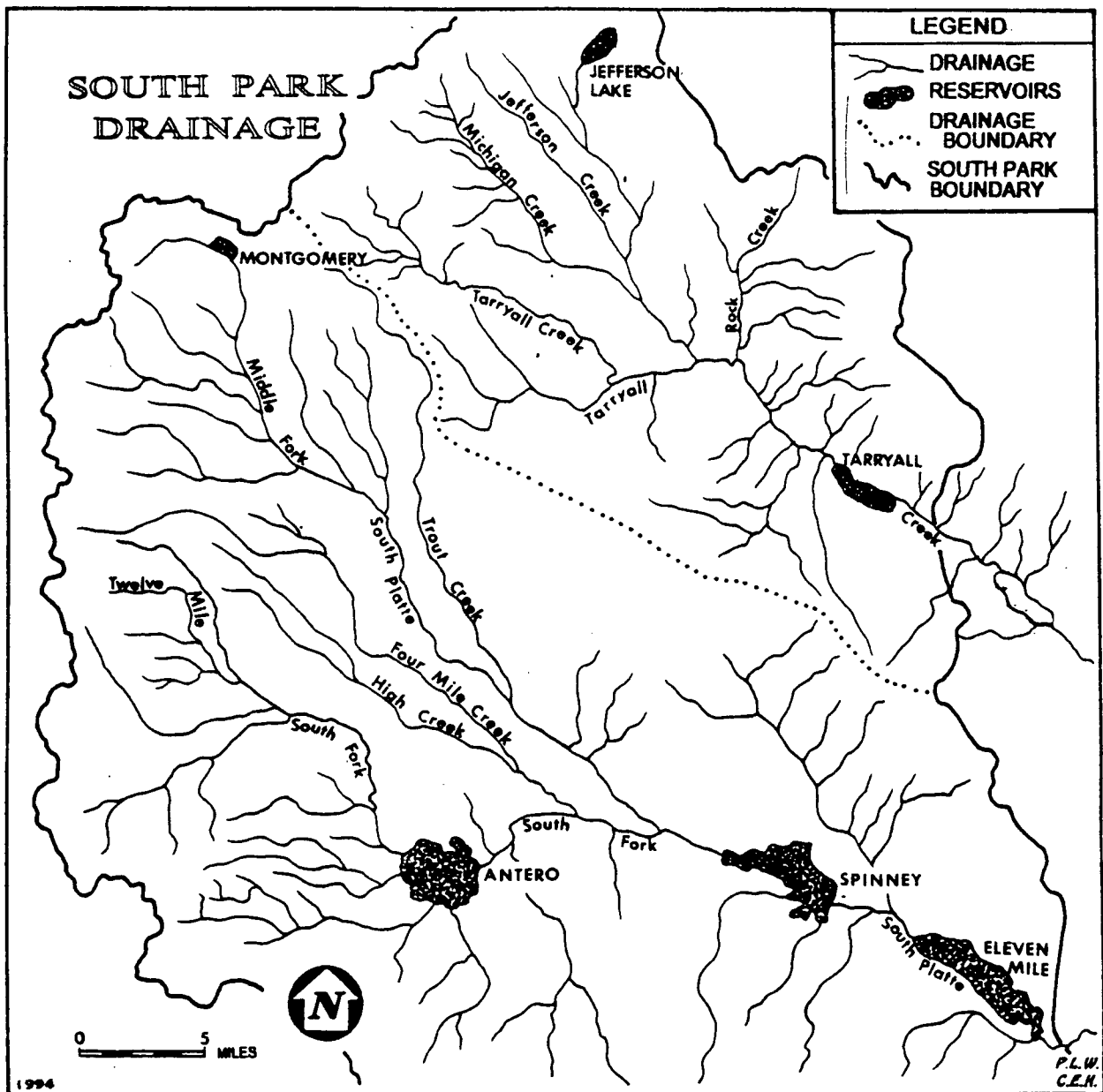


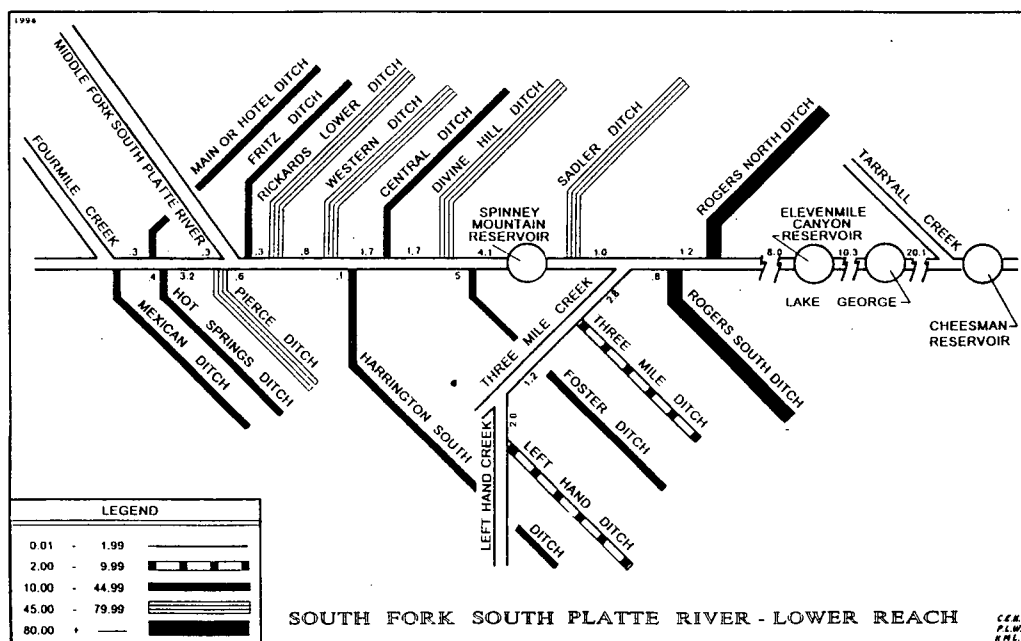
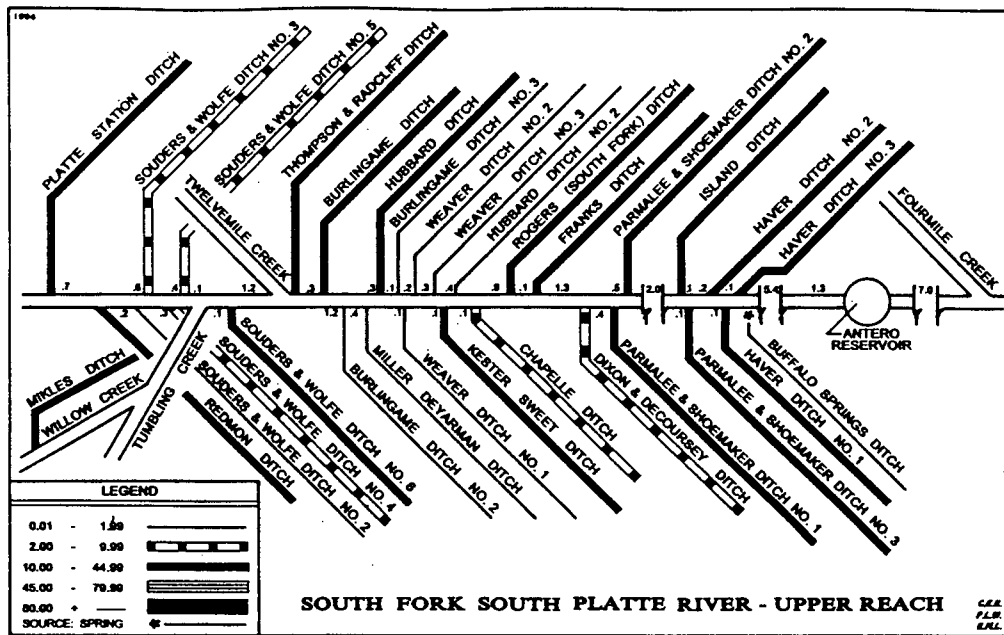
Figure 4-5. Map: South Park Drainage.

drawings are clustered by drainage. The Platte side of South Park is shown in the first four pages, and the Tarryall side in the next two (Figures 4-6 to 4-12).

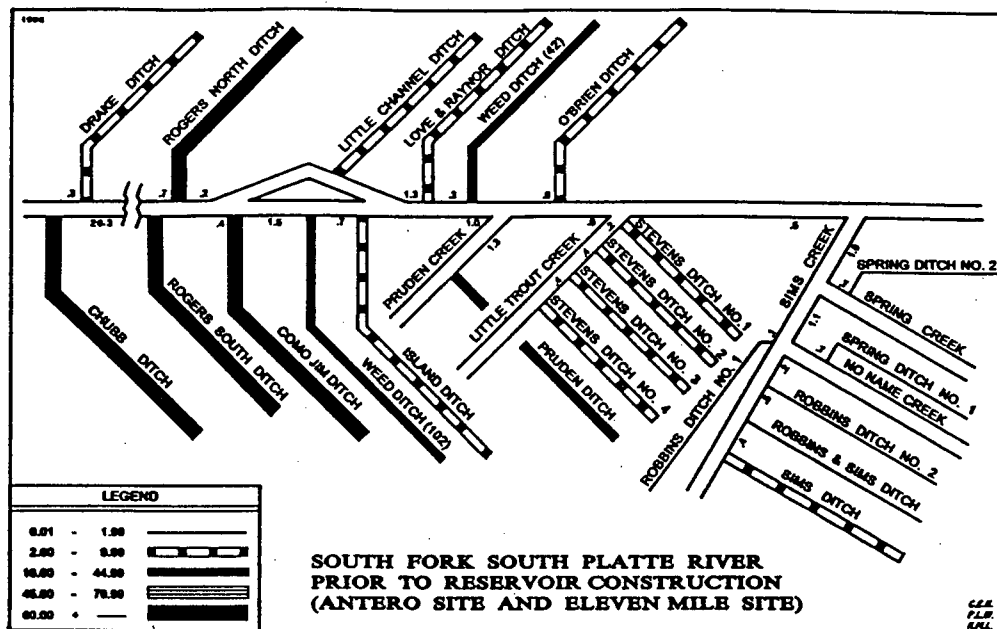
Earlier in this chapter, and in subsequent chapters, another set of line drawings show on one page a simplified schematic representation of the Tarryall side, and on another page, the Platte side of South Park (Figures 4-3 and 4-4). These line drawings are used like thematic maps to portray patterns within the system: patterns of city ownership, patterns of adjudication and priority, and other elements of interest. The line drawings presented in Figures 4-6 through 4-12 provide the detail: ditch names, location relative to other ditches, and the amount of water decreed. They show only selected ditches: those involved in agricultural to municipal water transfers, and ditches historically or presently used for irrigation. Ditches that were decreed for domestic use (including ranch claims), for mining, municipal or industrial use, or for fish culture have been excluded. Also, some very junior ditches, for example the Chet Ditches,<sup>36</sup> adjudicated in 1953, were excluded as well. The smaller scale line drawings provide a view of the larger system and the patterns within it.

### **State Administration in South Park**

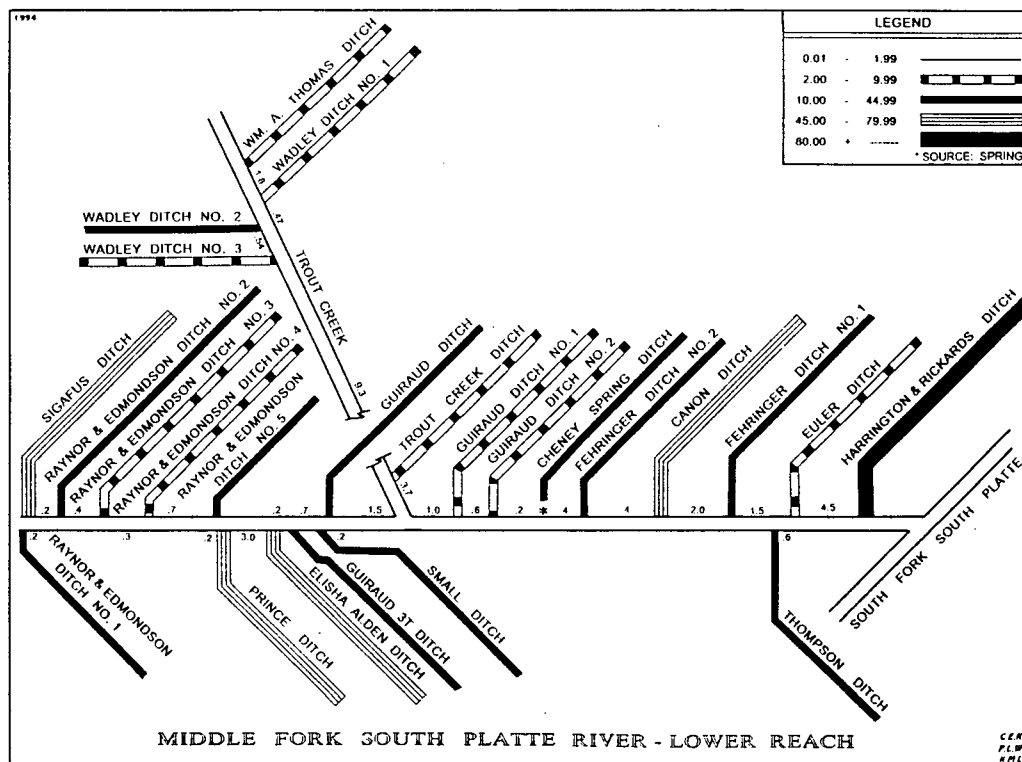
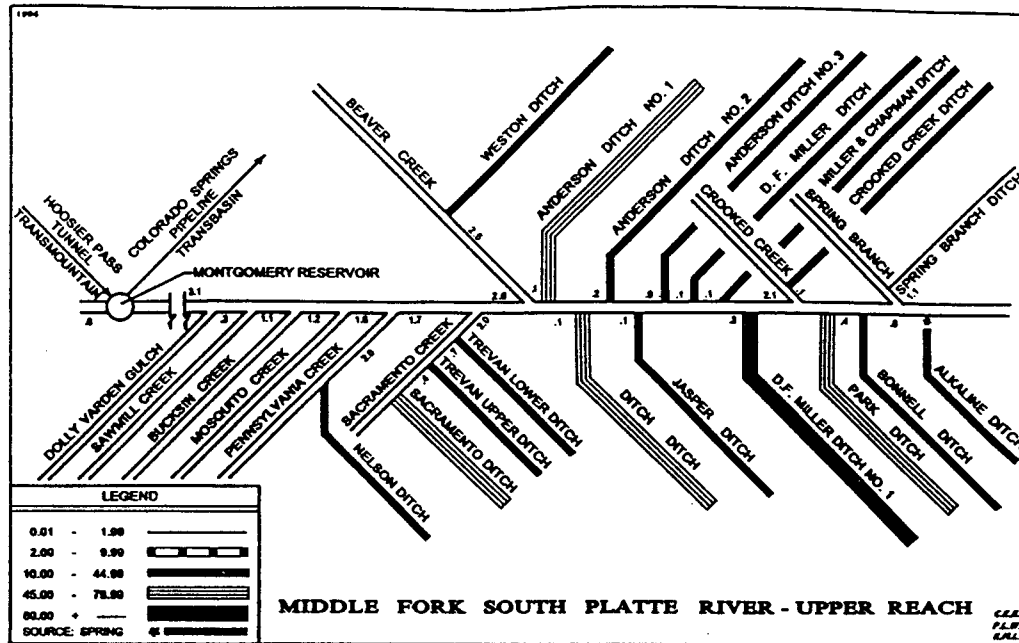
South Park proved to be one of the most difficult districts in the state of Colorado to administer due to its size and vast number of small ditches. The nascent district had been formed



**Figure 4-6.** Line Drawings, South Fork South Platte River, Upper and Lower Reaches, showing irrigation ditches in South Park and selected reservoirs in District 23. In these line drawings, and those in the pages that follow, irrigation ditches and streams are represented schematically. The ditches are coded to represent the amount of water (in cfs) decreed to each ditch.



**Figure 4-7.** Line Drawings, South Fork South Platte River Prior to Reservoir Construction, showing ditches inundated by Antero and Eleven Mile Canyon Reservoirs and not shown on the previous set of line drawings.



**Figure 4-8. Line Drawings, Middle Fork South Platte River, Upper and Lower Reaches.**

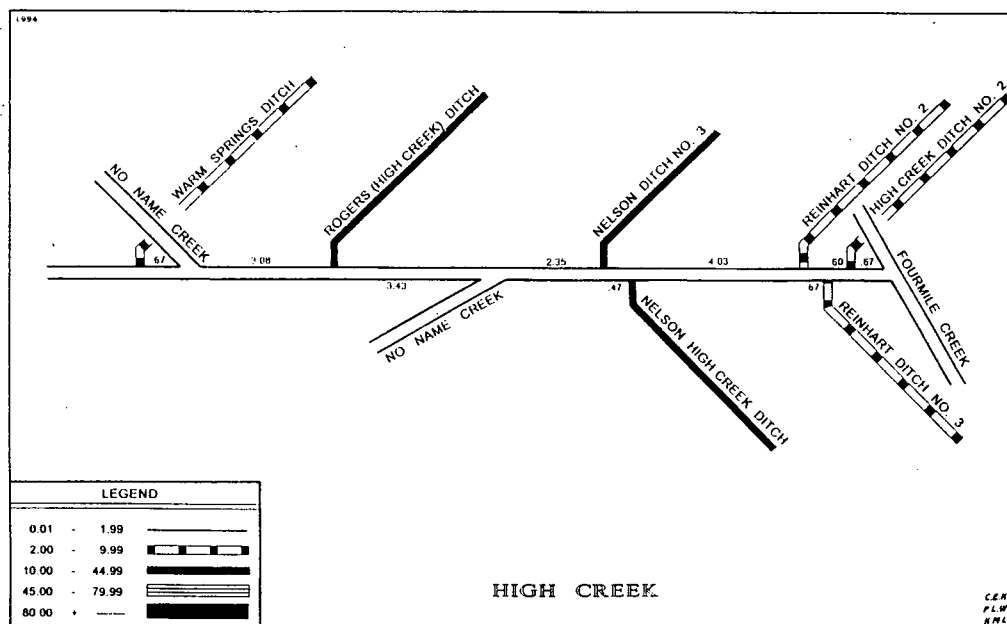
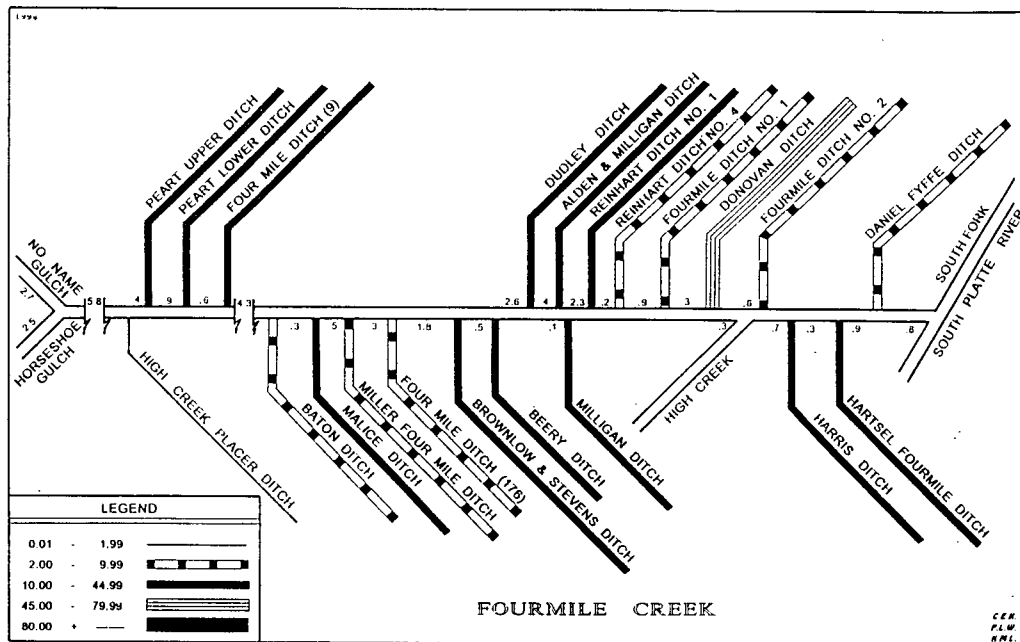
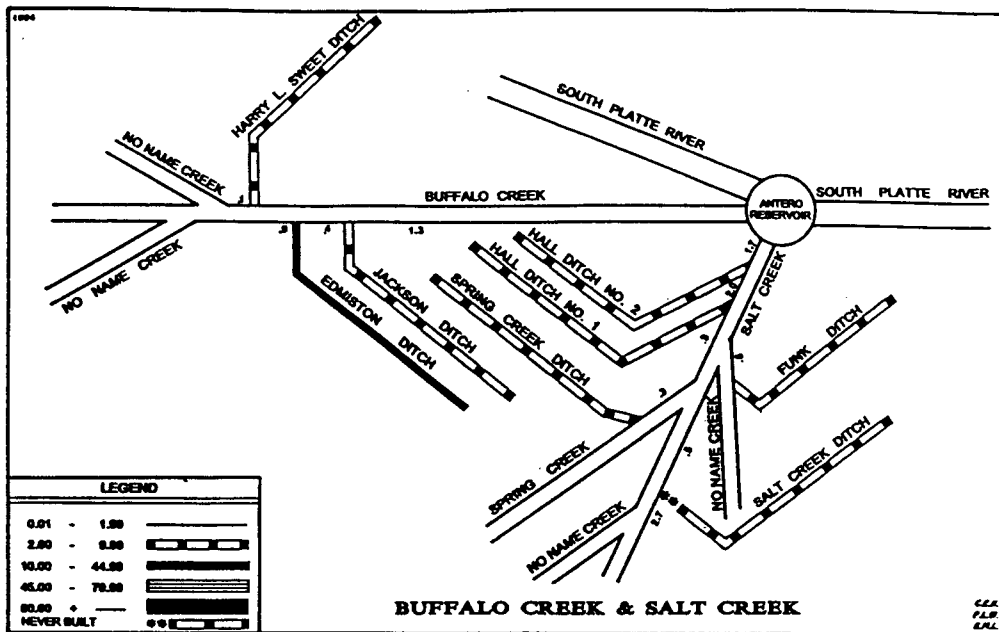
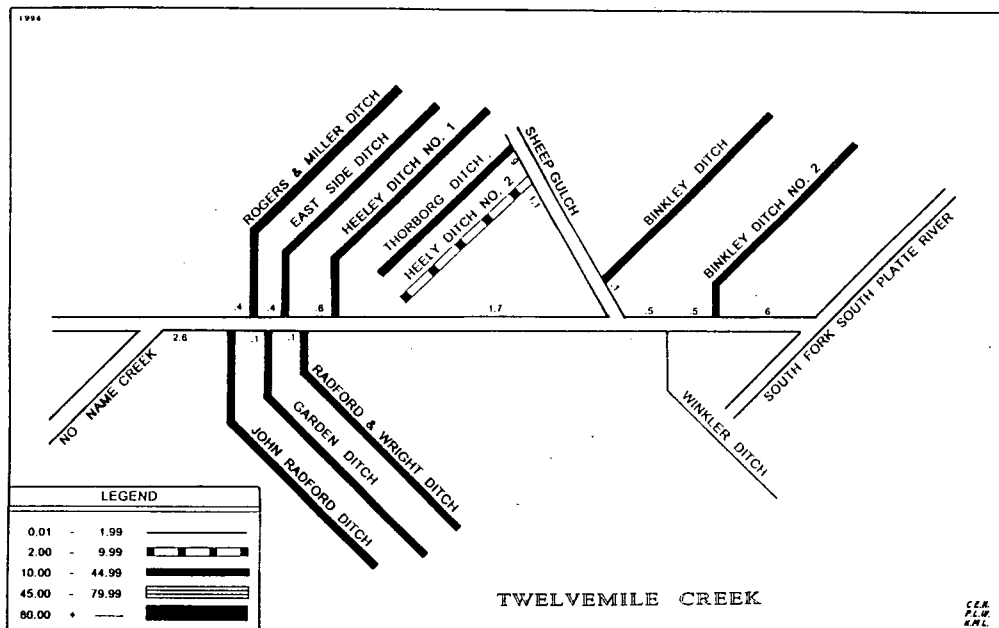


Figure 4-9. Line Drawings, Fourmile Creek and High Creek.



**Figure 4-10.** Line Drawings, Twelvemile Creek and Buffalo and Salt Creeks.

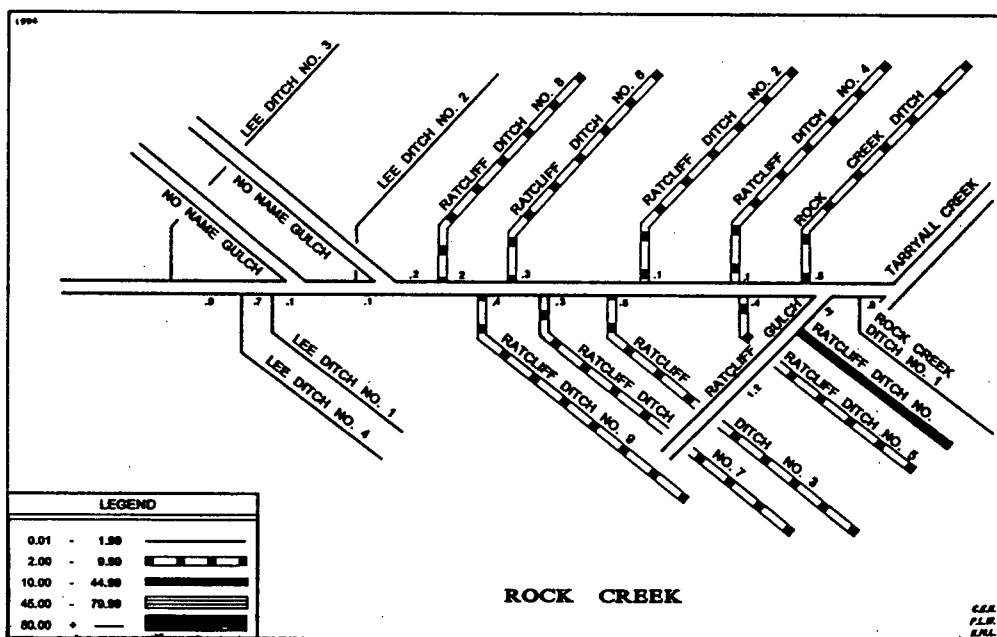
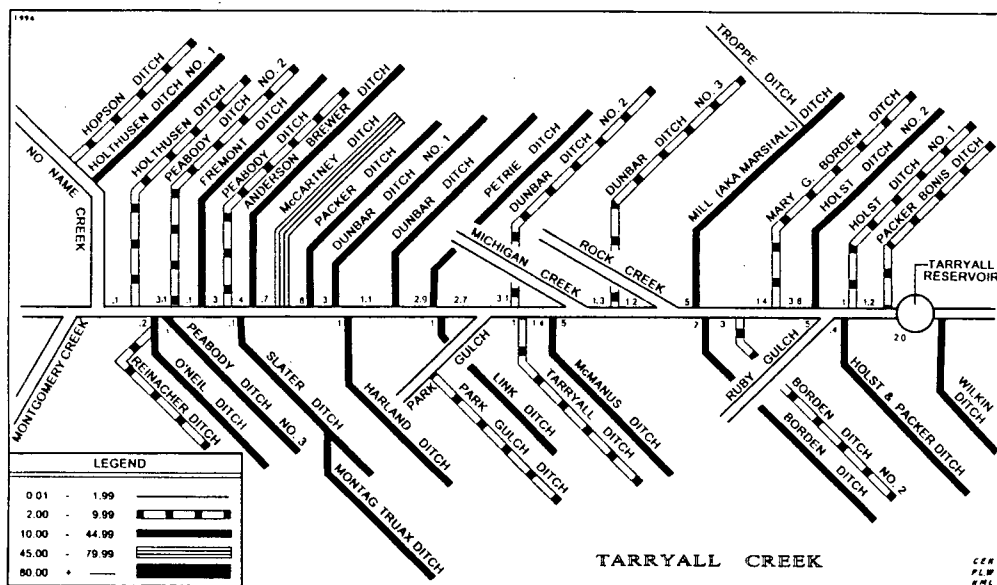


Figure 4-11. Line Drawings, Tarryall Creek and Rock Creek.

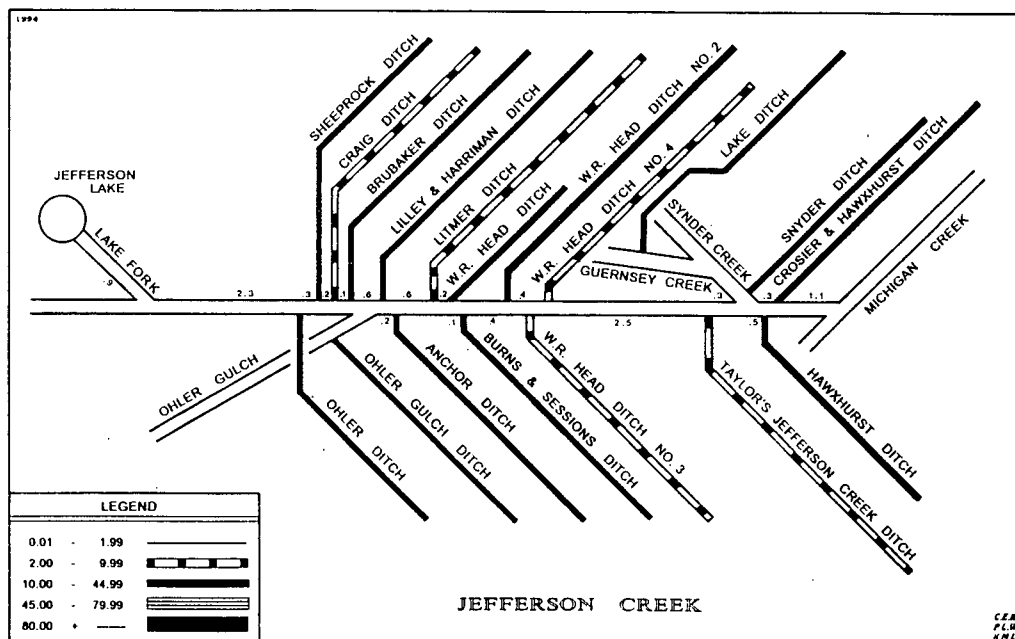
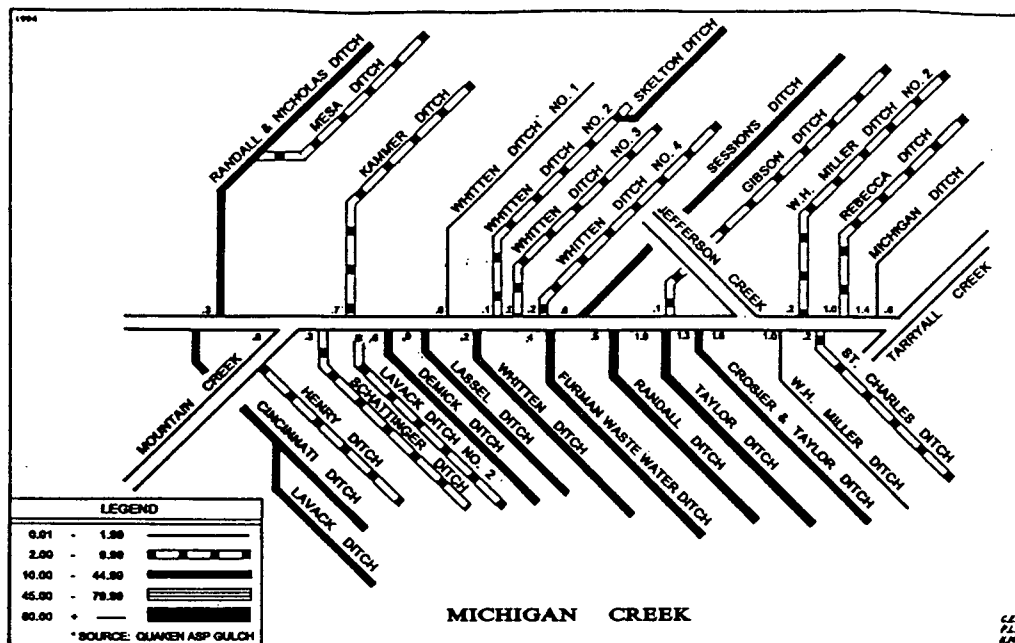


Figure 4-12. Line Drawings, Michigan Creek and Jefferson Creek.

at the behest of local ranchers, but the state had a powerful interest in extending its administration into the high country. Around the time the district was formed, the Farmer's High Line Canal and other irrigators in the South Platte Valley east of the foothills, filed suit against the state of Colorado and the State Engineer.<sup>37</sup> At issue was the failure of the state to close down South Park ditches that were running water out of priority. The plaintiffs all held water rights on the middle reach of the South Platte close to Denver. They asserted that the state was shutting down their ditches to supply the needs of senior appropriators downstream, while taking no action in South Park, which lay above them.

With the Farmer's High Line suit hanging over their heads, the state worked quickly to do the basic surveys and gauging necessary for the local water commissioner to have some basis for the enforcement of water orders. Still, enforcement proved difficult. The Superintendent for Irrigation for Division 1, the South Platte, went personally to South Park in an effort to impose the priority system, "but aside from being unable to secure the needed information, he found that in the excited condition of the people it would require state militia to enforce his orders."<sup>38</sup> In such a climate, the local water commissioner was hesitant to close headgates to ditches that were running out of priority. In his report to the governor for the 1890 irrigation season, the State Engineer noted that on

June 4 orders were communicated to water commissioner Hanlin, but no action was taken to close down South Park ditches.<sup>39</sup>

Historically, South Park irrigators were accustomed to turning water out into the fields in the spring, and allowing the ditches to run continuously until the haying season. While 'first in time, first in right' had succeeded in bringing sometimes ornery South Park ranchers into the system, once in, there was little incentive to yield to calls from senior appropriators, especially those outside the district.

Administration continued to evolve. District water commissioners were expected to file annual reports summarizing diversions, new ditches adjudicated in the districts, and estimates of irrigated and irrigable acreage. District 23 water commissioners, unfortunately, were less diligent than others, and for many years no information is available for South Park.<sup>40</sup> This may be due in part to the high turnover in personnel in the district, which resulted in numerous new appointments in the middle of the irrigation season. Indeed, early numbers in water commissioner reports are often highly inaccurate, so even where figures are reported they are often of questionable value. Early reports put the irrigated acreage in South Park close to 75,000 acres in the early 1890s.<sup>41</sup> By the end of the decade, the new water commissioner's estimate was about 60,000 acres,<sup>42</sup> and by 1905 the estimated acreage that could potentially be irrigated was set at 26,000 acres.<sup>43</sup> District 23 water commissioner Alonzo Wright noted in the back of one of his field

books, that "because information on length of ditches and laterals is so sketchy, and the number of acres irrigated by others is so inaccurate,"<sup>44</sup> no report was made for that particular year. Apparently part of the problem was that South Park irrigators were reluctant to share information with local water commissioners. William Metz, the water commissioner in 1948, found that some ranchers flatly refused to give definite information, so he had to make estimates of irrigated acreage and talk to ranch foremen and hay crews to ascertain the number of stacks and the tonnage.<sup>45</sup>

The problems of managing an area the size of District 23 cannot be underestimated. In the nineteenth century, when water commissioners rode on horseback to police their districts, it required four deputies to oversee irrigation in the area.<sup>46</sup> Problems with enforcement continued into the twentieth century as well. In the division engineer's report for 1910, Fillmore Cogswell wrote:

On June 6 I received a written refusal from the water commissioner in District No. 23, to carry out my instructions to shut down ditches in his district post dating January 1, 1879. On June 18 he resigned and a new commissioner was appointed by the Governor, who reported for duty on June 23.

Between the dates of July 11 and 14 the water commissioner of District No. 23 and the Division Engineer closed down 25 ditches post-dating January 1, 1867, in the South Park, near Hartsel. Since that date the ditch owners in District No. 23 have closed down their ditches whenever they were instructed to do so by the water commissioner.<sup>47</sup>

That June rancher David Collard lost his job, and Alonzo Wright took his place as District 23 water commissioner (Figures 4-13 and 4-14). A spate of dry years did not improve the situation



**Figure 4-13.** Headgate in disrepair, Benjamin Spinney's ranch on the South Fork of the South Platte River, 1910. Division engineer Cogswell noted, "This headgate was in very bad condition. There were no bottom boards. An open channel 5 feet wide, alongside the headgate allowed any water in the stream to flow into the ditch up to the capacity of the ditch." (Courtesy, Colorado State Archives).



**Figure 4-14.** Newly appointed water commissioner Alonzo Wright and division engineer Fillmore Cogswell closing down the Raynor and Edmondson No. 2 Ditch on the Middle Fork of the South Platte River, 1910 (Courtesy, Colorado State Archives).

in South Park. Under drought conditions competition for water intensified.

In 1911, Alonzo Wright encountered conditions that might be termed an improvement over the previous year, but remained far from satisfactory from the point of view of the state. Wright described a marked difference in attitude in different parts of South Park:

In the northern part of the district, irrigators in Tarryall, Michigan and Jefferson Creeks have show a disposition to be more law-abiding and have been much more willing to obey the order of the water officials than before. Information relative to the names of ditches, location of headgates, etc. was freely and kindly given, and I know of no instance were an open, defiant violation of the law - such as frequently occurred in other parts of the district was committed.

On the South and West of the district along the South Platte and its tributaries an entirely different feeling was manifested. During the irrigation season of 1910 I found in this locality a very bitter, defiant feeling existed against the State Engineers... Embarking on my duties early in the season of 1911 I found the same state of feeling still existing. The streams were low and water everywhere scarce. Demands were frequently made upon this district by the Division Engineer for water to supply shortages in other districts for ditches holding older priorities, but in rare instances were any of these demands respected. Headgates were closed only to be found open and ditches running to their full capacity on the following morning. The experiment of locking the headgates was tried but with no better results. In many instances on the following morning the locks were found broken off, gates raised and ditches running full.

This condition prevailed until the close of the season. A very large force of deputies would have been necessary to handle the situation successfully and as these were not available the situation was allowed to remain.<sup>48</sup>

The same year the Farmer's High Line case finally went to court. State Engineer Charles Comstock observed,

For more than twenty years there has been more or less friction between the ditch owners along the South Platte river below Platte Canon and the ditch owners up in the

South Park, or District No. 23, the latter refusing to obey the orders issued by the irrigation officials to close down the junior ditches in order to supply the demands of senior ditches in the lower valley. The South Park people contended that as their ditches were short and seldom extended more than a mile away from the river, the irrigation of their grass land did not materially affect the flow of the water to the valley nor to any great extent retard it.<sup>49</sup>

In February of 1912 an injunction was issued enjoining the state's irrigation officials to distribute water in strict accordance with the priority system and ordering South Park irrigators to comply. The ruling was appealed unsuccessfully to the Colorado Supreme Court.

State oversight of irrigation in South Park was only partial, as evidenced by the small number of ditches reported in diversion records prior to the 1970s. In 1921 and 1922, information was only reported for 60 out of over 409 ditches in the district.<sup>50</sup> In the 1960s, only 157 ditches were reported on a consistent basis by water commissioner Axel Carlson.

Technology speeded communications and improved administration. In 1929, C.C. Hezmalhatch assumed the position of Division 1 Engineer and initiated the practice of daily telephone calls from the district water commissioners to the division office. Hezmalhatch was able to keep track of precipitation and storm patterns at the headwaters, monitor problems in the districts, and communicate river calls on a daily basis.

Administrative problems in South Park continued. Dry conditions set neighbor against neighbor. In his 1931 report to

the state engineer, Hezmalhatch wrote:

In District No. 23, South Park, for almost the first time, conflicts existed between senior and junior appropriators, i.e., the senior appropriators were shorted, due to juniors above diverting the supply. Some improvement in administration in this district is being made each year. However, a few years like the past, in which some users demand service, would be of material assistance.<sup>51</sup>

Divisive as it sounds, conflict in South Park served the state's interests. If conditions could prompt South Park irrigators to turn on each other, they could no longer present a unified front to state administration or as effectively defy water orders. With lines of cleavage defined, the local water commissioner was in a better position to enforce the priority system, especially since the senior appropriators were on his side.

As nature would have it, the drought Hezmalhatch described in 1931 lasted until 1938.<sup>52</sup> The state engineer described the conditions at the beginning:

The seasonal conditions of 1931 will doubtless go down in history as the most trying which the irrigationist has ever had to meet, not only from the standpoint of insufficient water supplies, but also as the result of a combination of other conditions, such as prolonged and excessive temperatures, deficient rainfall, insect pests, low crop returns, both in tonnage and quality, all culminating in ruinous price returns, generally below costs of production. The net result of which has been a body blow to irrigated farming and livestock interests, our two principle industries.<sup>53</sup>

The state and the city of Denver took advantage of the divisions the drought and general conditions created in the South Park ranching community. The state consolidated its position, and Denver purchased land and water rights,

establishing a toehold in the Park and setting the stage for the transfer of South Park water to municipal hands.

Despite significant changes in the 1930s, problems in administration continued. In the 1940s, special deputies from the division office were assigned to South Park to assist the local water commissioner and his team of assistants.<sup>54</sup> One of the special deputies was J. Eugene Whitten, who in 1943 became division engineer, and later served as the State Engineer from 1951 to 1964.

During the summer of 1939 Whitten was assigned to the main office in Denver. He kept a diary in which he recorded short notations, many of them pertaining to District 23. On June 30 he noted, "Desserich [the water commissioner] called from Fairplay reports streams holding up well. Little trouble except with one or two offenders who irrigate at night."<sup>55</sup> As administration improved, some South Park irrigators sought to circumvent enforcement. Those who did paid a price. In July, one of the offenders, rancher George Teter, was arrested,<sup>56</sup> though the deputy district attorney proved reluctant to prosecute the case.<sup>57</sup> An editorial in the Park County Republican and Fairplay Flume expressed sentiments in the district:

This summer's critical water situation in South Park has revived a great deal of interest and comment upon... a condition that is manifestly unfair and emphatically deplorable. The filing of a criminal suit against one of our ranchers who is reported to have been unable to resist the very human urge to disregard ill adapted water decrees, by diverting water originating just above his place upon his parched meadow, which produces his ranching necessity -

hay... hay is a lifeblood of the entire industry, since it is often the determining factor in permitting a rancher to run that amount of stock which means the difference between just meeting necessary expenses and a reasonable profit.<sup>58</sup>

The editorial described ranching as "the only stable and reliable enterprise in this country." Blame for the water shortage was put squarely on the shoulders of Denver, who by this time had two large storage reservoirs in South Park:

It is enough to excite to profound profanity any civic-minded citizen, let alone a directly affected rancher, to drive through our considerable hay producing areas and see the parched meadows, and then drive on down the rivers and see water still being stored in almost filled-to-capacity reservoirs for an unnecessary measure of protection to interests whose claims to such water at best are subject to considerable suspicion, and whose methods of obtaining such waters can hardly be held to be above reproach. Such vested interests often enjoy privileges generally conceded to extend to abuses of rights, but they likewise sometimes hang themselves by their own extensive abuses of such rights, born of their successes in comparatively minor abuses; overstepping their rights to such an extent, merely upon presumption that the little fellows cannot or will not assume the expense and bother of seeking retribution and protection of their statutory right through the medium of the courts.<sup>59</sup>

In September of the same year Whitten recorded more problems in District 23:

Metz called from Fairplay. Reports that Mr. Fred Wahl opened the headgate of the Randall ditch... and that after Metz closed it Wahl called Metz on phone and said he was going to open said headgate regardless of consequence. Instructed Metz to ascertain if he does open the said headgate and if he does so against orders to obtain a warrant for Mr. Wahl's arrest.<sup>60</sup>

The following irrigation season some ditches were still diverting water against orders, but in general the situation appeared to be improved, at least at the start of the season.<sup>61</sup> George Teter continued to resist state control and irrigated at

night. After finding conclusive evidence, Whitten locked the headgate of Teter's Bonnell Ditch on the Middle Fork of the Platte. Teter protested, but Whitten told him the ditch would remain locked until it came back into priority.<sup>62</sup> Indeed it was, but again the following summer Whitten and his men were back locking the Bonnell Ditch headgate.

George Teter was by no means the only offender. He had the misfortune to ranch just outside the town of Fairplay, with his ditch and his headgate easily accessible from the road or via an abandoned railroad grade that ran down the Middle Fork from Fairplay to Garo. Enforcement was most rigorous close to town and in areas that could be reached by Park county's sparse network of dirt and gravel roads. Diversion records kept by local water commissioners continue to reflect this pattern through the 1950s and 1960s.<sup>63</sup>

Not all work done by people from the State Engineer's office was so charged or interesting. Much of the activity during the 1940s, 50s, and 60s in South Park centered on checking the condition of headgates, and installing flumes and measuring weirs below, so diversions could be more accurately measured (Figure 4-15). These functions were important. Without proper headgates water could run continuously in ditches, and without flumes appropriators could take more than their decreed amount.

By 1942, the war was having an impact on administration in South Park and elsewhere in the state of Colorado. In November,



**Figure 4-15.** Measuring flume, Sheeprock Ditch on Jefferson Creek, 1993.

the issue of gasoline rationing was discussed at a water commissioners meeting.<sup>64</sup> Adjustments had to be made which curtailed enforcement and other activities.

During the middle part of the twentieth century there was a gradual improvement in administration. By the 1960s, the State Engineer's office was turning its attention increasingly to groundwater, to monitoring reservoir and pipeline construction projects and to grappling with the issues surrounding interbasin transfer of water from the western slope of the Rockies. Irrigation in South Park drew less comment from the main and division offices. In 1964, the state engineer noted in his annual report "The South Park area was extremely dry and caused no end of controversy among the ranchers."<sup>65</sup> The situation was complicated in mid-August by the sudden death of long time District 23 water commissioner Axel Carlson, who was killed in a head-on car collision in South Park. For the next several years there was no full time water commissioner in the park, and personnel from the division office were sent to the district periodically to monitor the situation.<sup>66</sup>

By the late 1960s, the present era of accelerated agricultural to municipal water transfers was beginning. Water commissioners were called upon to testify in court to authenticate diversion records and describe historic use under the ditches involved in the transfer proceedings.<sup>67</sup> Water commissioners accompanied city engineers and scientists on field trips, and sometimes they were called upon to find the source of

illegal irrigation water affecting areas subject to court mandated dry up. As the transfers proceeded, District 23 water commissioners became less involved with regulating irrigation in the field and more concerned with keeping track of city accounting of diversions.

Administration was revolutionized in the 1970s by computerization at the level of the division office. In the 1990s, computers were introduced at the district level when then deputy water commissioner Denise Paprocki brought her own personal computer to the office. At the state level, beginning in the 1970s, water diversion records were processed each year and summarized by computer. Over the next two decades, efforts focused on getting complete and accurate information into the state's data base. Methods of measuring the flow of water in ditches and streams became more sophisticated (Figure 4-16), and in 1985 satellite monitoring of stream flows was initiated. Beyond technological advances, the Water Rights Determination and Administration Act of 1969 produced a restructuring of water administration in Colorado. As promulgated, the act produced greater centralization in administration. Water commissioners became salaried state employees, no longer selected with input from county commissioners. Water matters were no longer heard in district court, but in water courts sometimes over a hundred miles away. The new water courts and the division offices were often within walking distance of one another.



**Figure 4-16.** As her deputy and local irrigator Tom Parmelee look on, water commissioner Denise Paprocki measures the flow of a ditch on Twelvemile Ranch, one of the last active irrigation ditches in South Park, 1993.

Indeed water administration remains imperfect to the present, with a certain amount of guesswork involved despite the pervasiveness of technology. District 23 remains vast, with one full time water commissioner and a deputy hired only for the irrigation season. Some ditches are still hard to access, others continue to run illegally at night.

Since the inception of the Colorado State Engineer's office in 1881, the state has developed policies, procedures, forms, and techniques designed to make administration and documentation as uniform as possible. Technology provided the means to more effective administration. Legal changes, most notably in 1969, promoted further centralization.<sup>68</sup> Administrative restructuring removed the water court from Fairplay to Greeley, 135 miles from South Park, and excluded local government from the appointment and remuneration of water commissioners. In fact, this latter change has depoliticized the selection of water commissioners, which is beneficial, but more significantly it represents the expansion of power at the state level and the contraction of local power.

Under the administrative control of the State Engineer's office, and within the legal framework provided by the Colorado doctrine of prior appropriation, a set of events were about to unfold. South Park's irrigation water was to be transferred to urban hands, at first slowly in the 1930s, and then in a rush in the later decades of the twentieth century.

## Chapter Notes

1. This is not to imply that Spanish water law had no influence on the system of prior appropriation that emerged in Colorado and California. For a more thorough discussion of Spanish water law, see Dunbar, 1983, pp. 4-8; and consult references identified in Lee, 1978 and 1988.
2. Montgomery Mining District, 1861-1866; Mosquito Mining District, n.d.
3. For an excellent discussion of the evolution of water law in California, see Dunbar, 1983, pp. 61-72. Dunbar's 1983 book is considered a classic, providing a thorough treatment of the evolution of water law in the western United States.
4. "Though modified, prior appropriation based on constitutional law is the foundation of water law in Alaska, Arizona, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming. A hybrid system originally based on riparian rights but later converted to an appropriation system, commonly called the 'California System', is used in California, Kansas, Mississippi, Nebraska, North Dakota, Oklahoma, Oregon, South Dakota, Texas and Washington." (Colorado State Engineer, 1989).
5. Dunbar, 1983, p. 74. Note that, for this reason, pure appropriation doctrine is often referred to as the Colorado Doctrine.
6. The information contained in the **Framework** section of this chapter represents a condensed version of the author's understanding of prior appropriation and administration in Colorado based on the following sources: Dunbar, 1983; Vranesh, 1986; Colorado State Engineer, 1989; and discussions with water commissioners Mark Curry and Denise Paprocki and with water attorney Michael Walker.
7. Colorado State Constitution, Article XVI. As quoted in Vranesh, 1989, p. 61.
8. In addition to restructuring the courts, the 1969 act integrated the management of ground and surface water. This was perhaps, in broader perspective, its most significant contribution. In this study however, which emphasizes the allocation and reallocation of surface rights, the role of the act in changing legal and administrative arrangements is of greatest interest.

9. Prior to 1969, local district courts were charged with carrying out the laws of the state of Colorado in regard to water, in just the same way that they were charged with carrying out the laws of the state in regard to criminal and civil matters.
10. This represents consolidation and centralization. After 1969, the water courts handled matters heard previously in local district courts.
11. Adjudication did not prove problematic because within each district the first adjudication was treated as "original" - meaning that ditches adjudicated in 1889 in South Park with 1867 priority dates were senior to ditches adjudicated at earlier times in other water districts, bearing 1868 priority dates. Within districts adjudication did not prove problematic because at first there was an absence of rigorous enforcement. By the time enforcement became effective, adjudication was an accepted fact.
12. Water commissioners are state officials. In this sense there is no local jurisdiction per se, only state jurisdiction. State jurisdiction extends into local areas through the district water commissioners. Water commissioners exercise authority within local areas, within the boundaries of their water districts.
13. The priority system applies to the river system as a whole (to the mainstem and its tributaries).
14. The basis for conflict between upstream and downstream appropriators lies in physiography and gravity. Water flows first past the headgates of upstream appropriators before reaching the headgates of downstream appropriators. In the absence of well developed enforcement junior upstream appropriators could take water regardless of the priority of their claims in terms of either priority date or date of adjudication.
15. Dunbar, 1983; Langum, 1985; and Pisani, 1987.
16. As will become clear later in this thesis, a complex administrative grid was being imposed on South Park. The administrative system was a state system and operated at that scale. As such, it emphasized the needs of the largest populations, the most productive regions, the most beneficial uses. Those with the economic resources to purchase and transfer water rights were those to whom the benefits of the system ultimately accrued.
17. U.S. Bureau of the Census, 1864-1992. 1880 Census.

18. Colorado State Engineer, 1882-1946. Eugene K. Stimson, 1882, pp. 7-8. Stimson emphasizes that conflicts were not between competing types of users, but rather between irrigators.
19. Colorado State Engineer, 1989, p. 3.
20. Colorado State Engineer, 1882-1946. Eugene K. Stimson, 1882, p. 17.
21. Colorado State Engineer, 1882-1946. Addison J. McCune, 1902, p. 15.
22. Colorado State Engineer, 1882-1946. E.S. Nettleton, 1885, p. 8.
23. Colorado State Engineer, 1882-1946. E.S. Nettleton, 1887, p. 7.
24. From reading the "water supply" section of the state engineer's biennial reports, it becomes evident that in the nineteenth century that state's water supply had been seriously overestimated. Year after year the notation "dry year" appeared, suggesting that low precipitation totals were not yet understood as the norm in this region.
25. Frank Milenski, personal communication. Also see Milenski, 1990.
26. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1927. pp. 14-17.
27. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1927, p. 14.
28. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1927, p. 14.
29. At this juncture some readers might expect a discussion of the conservation movement. It should be noted that the schema I am describing here is that outlined by Michael C. Hinderlider. He made no mention of the conservation movement per se, perhaps because he himself was part of it - a classic example of the cliché 'inability to see the forest for the trees'. Those interested in the conservation movement are urged to consult Roderick Nash's classic Wilderness and the American Mind (1967), and his edited volume American Environmentalism: Readings in Conservation History (1990).
30. Colorado State Engineer, 1882-1946. J.S. Greene, 1889, p. 226.

31. Park County District Court, 1889-1970. 1889 Water Rights Adjudication (Civil Action 341).
32. Appendix C.
33. Appendix C.
34. Park County District Court, 1889-1970. 1913 and 1918 Water Right Adjudication (Civil Action 341).
35. It should be noted that these line drawings are not copies or duplicates of anything that exists in the public record. The skeletons for these line drawings were researched and designed by the author using maps, field work, and interviews. Where line drawings did exist they were used as a base, but in many cases contained only those ditches active at the time the drawing was made. For further information on sources of information and credits for these and other maps and figures contained in this thesis, please refer to Appendix A.
36. The Chet Ditches Numbers 1-4. Appendix C.
37. Colorado State Engineer, 1882-1946. J.P. Maxwell, 1891, p. 54.
38. Colorado State Engineer, 1882-1946. J.P. Maxwell, 1891, p. 58.
39. Colorado State Engineer, 1882-1946. J.P. Maxwell, 1891, p. 59. On p. 63, the State Engineer notes that all other water commissioners in all other districts were cooperative in closing ditches in water-short year 1890.
40. Colorado State Engineer, 1882-1970.
41. Colorado State Engineer, 1882-1946. Maxwell, 1893, p. 70; C.B. Cramer, 1895.
42. Colorado State Engineer, 1882-1946. H.A. Sumner, 1897, p. 99.
43. Colorado State Engineer, 1882-1946. Thomas W. Jaycox, 1907, p. 137.
44. Colorado State Engineer, District 23 Water Commissioner, 1911-1969. 1912 Field Book, p. 84.
45. Colorado State Engineer, District 23 Water Commissioner, 1911-1969. 1948 Field Book, p. 89.

46. Colorado State Engineer, 1882-1946. H.A. Sumner, 1897, p. 99.
47. Colorado State Engineer, 1882-1946. Charles W. Comstock, 1911, p. 36.47.
48. Colorado State Engineer, District 23 Water Commissioner, 1911-1969. 1911 Field Book, pp. 81-83.
49. Colorado State Engineer, 1882-1946. Charles W. Comstock, 1913, p. 30.
50. Colorado State Engineer, 1882-1946. Addison J. McCune, 1923, p. 57.
51. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1933, p. 201.
52. It should be noted that a few good water years were reported during this period, but were insufficient to make up the deficit.
53. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1933, p. 12.
54. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1943, p. 437.
55. Whitten, 1939-1947. 1939 Diary, June 30.
56. Whitten, 1939-1947. 1939 Diary, July 19.
57. Whitten, 1939-1947. 1939 Diary, July 21.
58. Park County Republican and Fairplay Flume, July 28, 1939, p. 4.
59. Park County Republican and Fairplay Flume, July 28, 1939, p. 4.
60. Whitten, 1939-1947. 1939 Diary, September 28.
61. Whitten, 1939-1947. 1940 Diary, May 15.
62. Whitten, 1939-1947. 1940 Diary, May 25.
63. Appendix E.
64. Whitten, 1939-1947. 1942 Diary, November 24.
65. Colorado State Engineer, 1956-1966. A. Ralph Owens, 1966, p. 67.

66. Colorado State Engineer, District 23 Water Commissioner, 1938-1993. Correspondence File (Current). Letter from Edward W. Blank, Assistant Division Engineer, to David Fox, Engineer, October 25, 1984.
67. Mark B. Curry (retired water commissioner) and Denise Paprocki (water commissioner), Personal Communication.
68. Some readers might wonder how to reconcile claims of increased centralization and increasing control by the state with imperfections in administration and compliance in South Park. I would point out that these things need not be absolute in order to represent a relative intensification over time of state administrative control.

## CHAPTER FIVE

### EARLY TRANSFERS

#### The Denver Water System

Early prospectors were drawn to the site of Denver by the presence of water and minerals. Miners first found signs of color at the confluence of Cherry Creek and the South Platte River in 1858. In the semi-arid landscape of the Colorado, initial settlement had to take place in locations where water was readily available. The site of Denver (first called Auraria) met this basic criterion.

In the city's early years water was drawn from individual and community wells and the City Ditch established to serve the growing community.<sup>1</sup> Numerous private and quasi-public companies were formed, at least on paper, to bring water to Denver, but few of the plans reached fruition. The city acquired what water rights it could, but due to problems of capitalization it was limited in what could be purchased.

In 1872 the Denver City Water Company was formed, and over the next two decades numerous small private water companies sprang up. Cycles of competition and consolidation ensued. Many of the smaller, less well capitalized companies failed and were forced into bankruptcy.<sup>2</sup> In the 1870s, the Denver City Water Company succeeded in providing pressurized water for the first time. A pair of Holly pumps with a capacity of 2,500,000 gallons per day were put into operation at the base of 15th

Street to pump water from just below the confluence of Cherry Creek and the South Platte River.<sup>3</sup> This initially served a population of 6,000, but as Denver's population grew, a third pump had to be installed. This rudimentary system met city demand through the 1870s<sup>4</sup> (Table 5-1).

In 1875 the city assumed control of the Platte Ditch, which was in bad need of repair.<sup>5</sup> Operation of the ditch under city control began in June. According to the Denver Times,

When the water was first let in, the farmers took it all. Sluice ways and flood gates were open and the water did not reach the city for several days. Then when it began to appear, the people of the suburbs turned it into their gardens. The water police made strenuous efforts to keep the stream flowing to the heart of the city, but the women would drive them away with clubs, brooms, mops and second hand umbrellas until life became a burden to the officers.<sup>6</sup>

#### GROWTH OF DENVER, 1860 - 1950

<u>Year</u>	<u>Population</u>
1860	4,749
1870	4,759
1880	35,629
1890	106,713
1900	133,859
1910	213,381
1920	256,491
1930	287,861
1940	322,412
1950	415,786
1960	493,887
1970	514,678
1980	492,365
1990	467,610

**Table 5-1.** Growth of Denver, 1860-1950. The table shows the city of Denver's expanding population. Development of the city's water system was driven by expanding demand, both actual and anticipated. (Source: U.S. Bureau of the Census).

In the 1880s, the city developed a series of infiltration galleries,<sup>7</sup> and the focus turned to water system expansion and the development of proximate supplies. Small companies proliferated to serve specific areas and types of users. The Denver City Water Company and the Denver City Irrigation and Water Company merged in 1882 to form the Denver Water Company.<sup>8</sup> In 1894, further consolidation occurred when the Denver Union Water Company was formed bringing together 10 smaller companies, including the Denver Water Company.<sup>9</sup> With a relative monopoly, the Denver Union Water Company proceeded with development of the water system, making long range plans and securing the money to build Cheesman Dam, providing the city with its first mountain storage. Cheesman Reservoir filled for the first time in 1905. In 1918, the city of Denver floated a bond and bought the Denver Union Water Company forming the Denver Water Department,<sup>10</sup> a powerful organization, staffed by engineers, technicians, and attorneys, and overseen by the Denver Board of Water Commissioners. In the decades that followed, the city worked on expanding its supply and extending service to nearby municipalities. Strategies for developing the supply included the acquisition of South Park water rights and other direct flow water rights on the South Platte and its tributaries. In the 1920s the city also turned its attention to trans-mountain diversions,<sup>11</sup> and since that time has pursued an aggressive policy of water rights acquisition and development on the western slope of Colorado.

In 1915 the Public Utilities Commission in Denver purchased Antero Reservoir in South Park. Due to legal complexities, the city did not assume functional ownership of the reservoir until 1924, but the acquisition of the dam and lake behind it gave Denver its first direct interest in South Park.<sup>12</sup> Already, eyes had turned to the high basin as a potential source of municipal water. By the turn of the century the city had adopted a "policy of acquiring irrigated ranches above Denver for the sake of their valuable water rights."<sup>13</sup> In the decades that followed, the city implemented this policy in South Park and elsewhere along the South Platte River.

The development of direct flow water rights for municipal use occurred through a process of water transfer in which water decreed for irrigation use in one location was, through the courts, transferred from one type of use to another, and from one location to another. Such changes occurred within the rubric of the Colorado doctrine of prior appropriation. The legal basis for transfer was established in the landmark case of Coffin v. Left Hand Ditch. This case established the legality of interbasin transfer by permitting the diversion of water out of its natural basin of origin into another drainage.<sup>14</sup> The case established that such movements were not, de facto, detrimental to the basin of origin, at least not within the court's interpretation of Colorado's doctrine of prior appropriation. Coffin v. Left Hand Ditch confirmed the portability of the resource and the rights attached.

In the early 1890s, the case of Strickler v. Colorado Springs further defined the permissibility of water transfers. In his report to the Governor for the year 1891 and 1892, State Engineer J.P. Maxwell noted that the case established that,

a prior appropriator of water from a stream may change the point of diversion and the place of use without losing his priority, provided the rights of others are not injuriously affected by such change... [and that] a priority to the use of water for irrigation is a property right, and may be sold and transferred separately from the land in connection with which the right ripened.<sup>15</sup>

In the wake of the Strickler decision, the Denver Union Water Company turned its attention to the hinterland - to South Park and its potential for agricultural to municipal water transfers. In 1924 state control of the transfer process was strengthened when a judge ruled that "no change in the point of diversion can be allowed without an order from District Court."<sup>16</sup>

The transfer process was now firmly in the hands of the courts, and important legal principles and precedents had been established. In Colorado, water was portable. It was property that could be sold and exchanged, transferred from place to place and use to use, while retaining its original priority within the system. Transfers were allowed both within drainage basins and between them, and in either case no injury was perceived, de facto, to occur in the area of origin.

Once a legal basis was established for agricultural to municipal water transfers, Denver proceeded with plans to acquire South Park water for urban use. At first engineers were called in to assess the city's situation and propose long range

plans for expanding supplies. Next, concrete steps were taken to develop storage in the high basin and to purchase senior irrigation water rights.

### **Early Designs and Plans**

In 1892, engineer J.D. Schuyler wrote a report addressed to the directors of the Citizens Water Company in Denver in which he urged the company to pursue the acquisition of agricultural lands and water.<sup>17</sup> The one drawback Schuyler perceived was that, historically, irrigation water had been diverted only during the irrigation season, not continuously as a municipal supply would require. As such, storage was needed to impound supplies for use the year round.

By 1903, civil and hydraulic engineer J.C. Ulrich had been hired by the Denver Union Water Company to conduct a study of the irrigation ditches on the Tarryall side of South Park. Ulrich gauged the flow of streams and ditches in the area, and talked with local irrigators to ascertain the extent of acreage under the ditch. According to Ulrich's own admission, the gaugings were off by 10 to 20% and, regarding acreage estimates, local ranchers "either did not know, or were determined not to give us any information upon the subject."<sup>18</sup> One local man, Ed Barlow, was cooperative and gave Ulrich the figures he ultimately used, though Ulrich believed the estimates to be too high.<sup>19</sup> The ditches of South Park, Ulrich wrote, "are, for the most part, very small and insignificant affairs - mere trenches

in some cases, ranging in width from one-half a foot to three feet. Few of them are more than a mile long, and many do not exceed one-half a mile in length."<sup>20</sup>

Ulrich noted that there was considerable co-mingling of water in South Park, where water spread over the land from one ditch was picked up by another ditch and used to irrigate additional acreage. The engineer also observed two diversions that took the entire flow of the stream, but the immediate return flows were so significant that just below the irrigated meadows the stream carried the same amount of water it did above the diversion. Ulrich's report concluded that most South Park ditches never carried the amounts of water decreed to them, and that ranch purchases and water transfers would yield significantly less water than preliminary figures would indicate.<sup>21</sup> Ulrich believed that South Park irrigation rights would not produce enough water to justify the expense of purchasing them. He thought the prices South Park ranchers were asking for their water rights were excessive.

Despite Ulrich's recommendations, the Denver Union Water Company continued to investigate South Park water rights. An exceptional document, a report by irrigation engineer James Armstrong describing a field trip to the high basin in early December of 1903, records the reaction of South Park ranchers to city enquiries,

From Garos we rode with Mr. Spurlock, a son-in-law of Mrs. Guiraud, one of the largest land owners in the Park, and also one of the earliest and largest appropriators of water. We were informed by him, and afterwards by Mr.

Henry L. Guiraud her son, that the old lady, (she is seventy-five years old) was quite cranky on the question of selling out, and that it would be of no use to call on her, to talk about it.<sup>22</sup>

The next morning the delegation from the city met with South Park rancher and pioneer Sam Hartsel, who evidently was willing to sell his land and water rights to the company if they would be willing to buy him out at his asking price.<sup>23</sup> Armstrong found other ranchers willing to sell: George Parmelee and R.B. Shoemaker up on the headwaters of the South Fork of the South Platte River, the widow Hodgdon in the same area, Alfred T. Edmondson, Joseph Purcell, and David Miller on the Middle Fork - the list was seemingly endless.<sup>24</sup> Armstrong noted that many of the water rights available were too junior to have much value to Denver.

Armstrong was travelling in the company of J.C. Ulrich, who had been instructed to conduct the same type of study he had done six months earlier on the Tarryall. Ulrich's findings were essentially the same: ditches were decreed for substantially more water than they could carry, flood irrigation practices and patterns of reuse and return flows were the same on the Platte side as they were on the Tarryall side. Ulrich wrote,

The irrigation practice consists essentially in the flooding of these bottom lands, the flooding process beginning in the spring as soon as the streams begin to rise and continuing until the middle or latter part of July, when the water supply begins to fail. No effort is made to graduate the application of water to the actual requirements of the grass crop, but it is permitted to stand on and flow over the irrigated areas continuously as long as the streams furnish the supply. As a result of this practice, and because of the proximity of the irrigated areas to the streams, the latter are constantly

re-inforced by the return water from the flooded areas, this water reaching the stream by both percolation and surface drainage or "run off." Part of it is returned directly to the stream before being used a second time, other portions being intercepted before reaching the river by lower ditches which distribute it over other lands... the water is used over and over again by different consumers before leaving the region and passing into the canon below.<sup>25</sup>

South Park ranching was thriving in 1903 (Figure 5-1).

According to Ulrich,

Most of the ranches which we examined bore unmistakable evidence of thrift and prosperity. The houses were generally commodious and comfortable; the barns, out-buildings and fences being unusually numerous, substantial and well maintained.<sup>26</sup>

None the less many South Park ranchers were willing to sell their land and water rights to the city. Apparently no coercion was involved. Ulrich ended his report by recommending the city get accurate measurements of irrigated acreage and ditch capacity before proceeding further. He also suggested that a team of negotiators be sent to the park to arrange the sales, if that indeed was what the company wanted to do.

Nothing materialized. In 1914 J.B. Lippincott (of Owens Valley fame)<sup>27</sup> was hired as a consultant by the Public Utilities Commission in Denver. He was charged with preparing an estimate for an independent water supply and new distribution system for the city. Lippincott noted in the opening pages of his report that "it is not feasible from a humane standpoint, to take waters away from areas where they are being beneficially used to a marked degree."<sup>28</sup> He advocated securing water "from areas where the use is extravagant and the returns inadequate." South



**Figure 5-1.** The town of Hartsel, with freshly mown hay in the meadows in the background, n.d. L.C. McClure, photographer (Courtesy, Denver Public Library, Western History Collection).

Park, with its use of flood irrigation to grow fodder crops, was perceived to be just such an area. On the eve of World War I the population of South Park was sparse (Table 5-2). There was little mining activity, and ranching and hay raising formed the backbone of the area's economy. Lippincott noted that many South Park ditches had no headgates, and that water ran wastefully over an estimated 40,000 acres of haylands.<sup>29</sup> He believed the city could put the water to much more beneficial use.

In order to take full advantage of South Park irrigation rights, the city needed storage. Antero Reservoir, on the South Fork of the South Platte River, was in the process of being acquired, but Lippincott's report identified another potential site on Michigan Creek, four miles south of Jefferson. His report recommended the city "proceed immediately with the obtaining of title to old ditches by the purchase of meadow lands both above the Michigan and Antero sites."<sup>30</sup> He concluded, "The city ultimately should control all of the South Platte and operate it for the harmonious maximum development of its available water and power."<sup>31</sup> After examining a range of other supply alternatives, Lippincott urged the city to turn its attention to the mountain meadows of South Park. He estimated that water was left to stand on these meadows for 60 to 90 days every summer, in order to produce a single cutting of hay. He believed more water evaporated from South Park meadows under these conditions than was consumed by the city of Denver in the

POPULATION BY PRECINCTS, PARK COUNTY, COLORADO, 1890 - 1950

	<u>1890</u>	<u>1900</u>	<u>1910</u>	<u>1920</u>	<u>1930</u>	<u>1940</u>	<u>1950</u>
Jefferson	141	180	164	176	138	211	174
Borderville				34	57		
Como	857	504	423	135	121	183	75
- town	(374)	(407)	(411)	(121)	(80)	(95)	(39)
Tarryall	91	30	32	107	92		
Hartsel	186	131	93	98	220	355	176
Gero	80	76	91	25	36		
Salt Works	113	74	53				
Buffalo Springs				50	54		
Weston Pass		4	23				
Humbert	109	46	74	76	107		
Glentivar					40		
Fairplay	1,050	406	311	222	283	935	588
- town	(301)	(319)	(265)	(183)	(211)	(739)	(476)
Alma		380	401	176	210	714	201
- town	(367)	(297)	(301)	(127)	(110)	(469)	(149)
Mosquito		47	23				
Horseshoe		41	53				
Total (South Park)	2,627	1,919	1,741	1,099	1,358	2,398	1,214
Percent of County	74	64	69.9	55.6	70.2	73.3	64.9
Percent Increase		- 26.9%	- 9.3%	- 36.9%	+ 23.6%	+ 76.6%	- 49.4%
Total (Park County)	3,548	2,998	2,492	1,977	2,052	3,272	1,870

**Table 5-2.** Population by Precincts, Park County 1890-1950. The table shows population by precinct for South Park, and the percentage increase or decrease in population over time. South Park population is also shown as a percent of Park County's population (Source: U.S. Bureau of the Census).

same span of time.<sup>32</sup> "The question of the water rights and the area in South Park," he wrote, "is of such importance that, notwithstanding the preliminary investigations that have been made, thorough field studies should be immediately taken up."<sup>33</sup>

In the 1920s the newly formed Denver Water Department returned to South Park to repeat, essentially, the studies Ulrich and Armstrong had conducted at the turn of the century. They inventoried water rights, measured the capacity of ditches, and estimated irrigated acreage. Studies by George M. Bull confirmed Lippincott's preliminary findings.<sup>34</sup> Water use in South Park was inefficient. Decreed capacity of ditches exceeded actual capacity. Bull looked in some detail at the immediacy of return flows to the river from South Park meadows.<sup>35</sup> Like other engineers before him, he concluded that once water saturated South Park meadows in the spring, very little water was consumed. For most of the irrigation season, water simply coursed across the surface of the meadows, and settled in low spots to evaporate. Most of this water returned to the stream.

As such, George Bull perceived that very little water could be transferred for municipal use, since to use more than had been consumed by hay operations would substantially disrupt the regime of the river, injuring downstream interests including the city itself.<sup>36</sup> Bull thought the benefit from purchasing South Park ranches would accrue to downstream users, not the city, and suggested the city reach agreements with downstream senior

appropriators before proceeding with the purchase of South Park hay lands and water rights. In a 1926 report he argued that "under no conditions should scattered ranches be purchased."<sup>37</sup> Due to the extent of reuse, he recommended that purchases proceed from the lower reaches of the Platte and the Tarryall, up, to avoid claims of damage by other irrigators.<sup>38</sup>

By the time of Bull's report, this strategy was beginning to be implemented. Two years earlier, the city had finally resolved disputes in the transfer of Antero Reservoir to municipal hands. Denver had also just purchased two ranches in South Park: the Ed Barlow ranch (the old Olney Borden ranch) on Tarryall Creek, and the Rogers Ranch, just above Eleven Mile Canyon on the South Platte. The city proceeded tentatively. Engineers and lawyers disagreed as to the advisability of developing water from South Park, but in the end Denver committed itself to developing direct-flow water rights and storage in the high mountain basin.

### **The First Municipal Acquisitions**

Antero Reservoir proved to be a figurative quagmire for the city of Denver. Conceived in the early 1890s, around the time J.D. Schuyler made a report to the Citizens Water Company, the reservoir was not built until 1909. Schuyler noted the flatness of the Antero basin, and recommended construction of a long, low earthen dam 36 feet high and 4,000 feet long.<sup>39</sup> His examination revealed some problems:

The whole floor of the reservoir is a bed of salt or alkali, covered with a white efflorescence like snow in dry weather, and this will impregnate the water for some time after it is flooded. Not a spear of grass or any living thing grows on this salty plain.<sup>40</sup>

A dam was built and water impounded for the first time in May of 1909.<sup>41</sup> In October of the next year the Antero and Lost Park Reservoir Company took over management of the High Line Canal,<sup>42</sup> a large irrigation ditch in the metropolitan area bearing a January 18, 1879 priority date. Due to the intermittent and insufficient nature of flows into the canal, the Antero project could be promoted and justified as regularizing the availability of water under the High Line Canal. Shares were sold to irrigators along the canal and, according to Charles Comstock, who served as the Colorado State Engineer from 1909 to 1913, the promoters

collected all they dared ask for reservoir rights in return for contracts which were so worded as to mislead the purchasers, they supplied the contract holders with as little water as possible, and they deliberately stole water which contract holders needed and had paid for, in order to divert and use it on lands belonging to the Antero and Lost Park Reservoir Company or its subsidiaries.<sup>43</sup>

The company brought the Antero Irrigation Canal into operation in June of 1913 with much celebration and fanfare. Theoretically, the project would open up an additional 60,000 acres in the vicinity of Brighton, northeast of Denver.<sup>44</sup> The project was highly speculative and drew investors from as far away as Wall Street.<sup>45</sup> When the canal opened, it was with water purchased from the Denver Union Water Company, not with Antero

Reservoir water.<sup>46</sup> The "opening" was merely a demonstration, and was an exercise in unabashed boosterism.

As early as 1914 problems were evident with the dam at Antero Reservoir. It was declared unsafe by a Park County Grand Jury, and in June the owners of the dam were indicted.<sup>47</sup> The original structure was a simple earthen dam. Later its facing was lined with cement, but the persistent action of waves created by westerly winds blowing across the reservoir's surface damaged the cement facing and exposed the earthen core. Park County residents reported a crack in the dam 150 feet long, filled with trunks, branches, baled hay, and other objects to "repair" the breach.<sup>48</sup> The Grand Jury found that the dam was a nuisance and a hazard to the people who lived downstream. The State Engineer concurred and ordered storage restricted to an amount that could be safely impounded. Though decreed for close to 85,600 acre feet of storage, it was eventually determined that Antero Reservoir could only hold slightly in excess of 15,000 acre feet of water.<sup>49</sup>

In 1915 the Public Utilities Commission (PUC) in Denver acquired Antero Reservoir. The city's expressed objective in buying Antero was to gain control of the watershed from which the supplies were drawn.<sup>50</sup> Immediately after the contract was signed and deeds turned over, lawsuits were filed against the PUC.<sup>51</sup> One suit, initiated by local residents, asserted that the PUC did not have the authority to make the purchase and pointed to problems involving clouded title. A separate suit,

filed in Brighton by irrigators under the Farmer's High Line Canal, claimed the waters of Antero Reservoir belonged to them. For the next nine years, the Antero purchase was entangled in the courts. In 1924 the city was finally able to resolve the disputes, and removed the only remaining roadblock, when it agreed to provide water to irrigators under the Farmer's High Line Canal until such time as the water was needed for municipal use.<sup>52</sup>

During this period the dam remained in poor condition. In 1917, Charles Comstock described it as follows: "The dam of Antero Reservoir is not in good condition. A large part of the concrete facing which was placed on the inner slope has been destroyed, and the remaining portion is entirely valueless as a permanent protection."<sup>53</sup> Seven years of litigation and neglect did not improve the situation, as the accompanying photograph shows (Figure 5-2), taken the year the city assumed functional control of the facility. The Denver Water Department made repairs, plans were made to raise the height of the water behind the dam, and finally the 15,000 foot figure was settled upon by Denver and the state. Storage at Antero was severely limited.

Continuing problems at Antero and an increasing need for storage led the city to look for other potential reservoir basins. One of the most suitable was located at the southeastern edge of South Park, where the South Platte River plunged into the pink and grey granite of Eleven Mile Canyon. Other sites were under consideration as well: the site of



**Figure 5-2.** Antero Dam, 1924 (Courtesy, Colorado State Archives).

Tarryall Reservoir, where the Colorado Department of Fish and Wildlife built a reservoir to enhance the fishery in the 1930s; and the Two Forks damsite, at the confluence of the North and South Forks of the South Platte River, close to Denver.<sup>54</sup>

After reviewing all proposals, in 1930 the Denver Board of Water Commissioners approved plans to construct a high concrete arch dam at the head of Eleven Mile Canyon. It was estimated the project would provide approximately 80,000 acre feet of storage for the city.<sup>55</sup> One consideration behind the project was that Antero Dam might break.<sup>56</sup> If engineered properly Eleven Mile Canyon Reservoir could capture these floodwaters, preventing damage from occurring downstream. The Eleven Mile damsite was geologically one of the soundest in the state. The river had carved its way through the Pikes Peak batholith, creating a deep chasm. At the damsite the canyon was narrow, the rock was hard, and signs of significant faulting were not in evidence. The city called for bids in July,<sup>57</sup> and construction began the following year with the cutting of foundation notches in the side walls of the canyon, the construction of a coffer dam and a flume to divert water around the damsite<sup>58</sup> (Figure 5-3). The dam was completed in 1932.

The project required the relocation of a major road that connected South Park with Colorado Springs. The road ran up Eleven Mile Canyon from Lake George, then followed the Platte to Hartsel. The new road was put over Wilkerson Pass, where a wagon road had been many years before. The town of Howbert and



**Figure 5-3.** Eleven Mile Canyon dam site at the time of construction, 1931 (Courtesy, U.S. Geological Survey).

a dozen ranches were also inundated by Eleven Mile Canyon Reservoir. For all intents and purposes Howbert was a ghost town by the summer of 1930, the year the city began systematically acquiring land in the reservoir basin. Once a railroad town on the Colorado Midland, Howbert was all but deserted in the wake of the railway's closure in 1924. On paper, many people owned property in Howbert, but in reality the town had only a handful of residents, a filling station, a post office and a schoolhouse.<sup>59</sup>

The city began to develop South Park acquisitions in earnest in the 1930s, once the legal conundrum of Antero Reservoir was resolved. When the city had acquired the Denver Union Water Company, it became successor in interest in two key ranches in South Park: the Ed Barlow Ranch on the Tarryall and the George A. Rogers Ranch on the South Platte,<sup>60</sup> purchased in December of 1915 and February of 1916 respectively.<sup>61</sup> The Barlow ranch carried the third priority in District 23: the Borden Ditch decreed for 8.7 cfs (cubic feet per second). The city went to court in 1933 and transferred 8.7 cfs from the Barlow Ranch to city intake, all of that under the Borden Ditch's May 1, 1866 priority. The remaining 51.14 cfs of water decreed to ditches on the property were abandoned to the stream in the transfer proceedings.<sup>62</sup>

The George Rogers Ranch was less valuable to the city for its water rights than for its location. Situated in what later became the Eleven Mile Reservoir basin, the ranch had only one

ditch with rights senior to the High Line Canal. In May of 1934, Denver transferred 4.02 cfs to city intake from the George Rogers ranch: 2.31 cfs from the Weed Ditch (priority number 42 and an 1875 water right) and 1.71 cfs from the Love and Raynor Ditch (priority number 139).<sup>63</sup> The remaining 24.08 cfs decreed to those ditches was abandoned to the stream in transfer proceedings, along with 4.5 cfs decreed to the Howbert Gulch and Perkins Gulch Ditches, both very junior water rights.

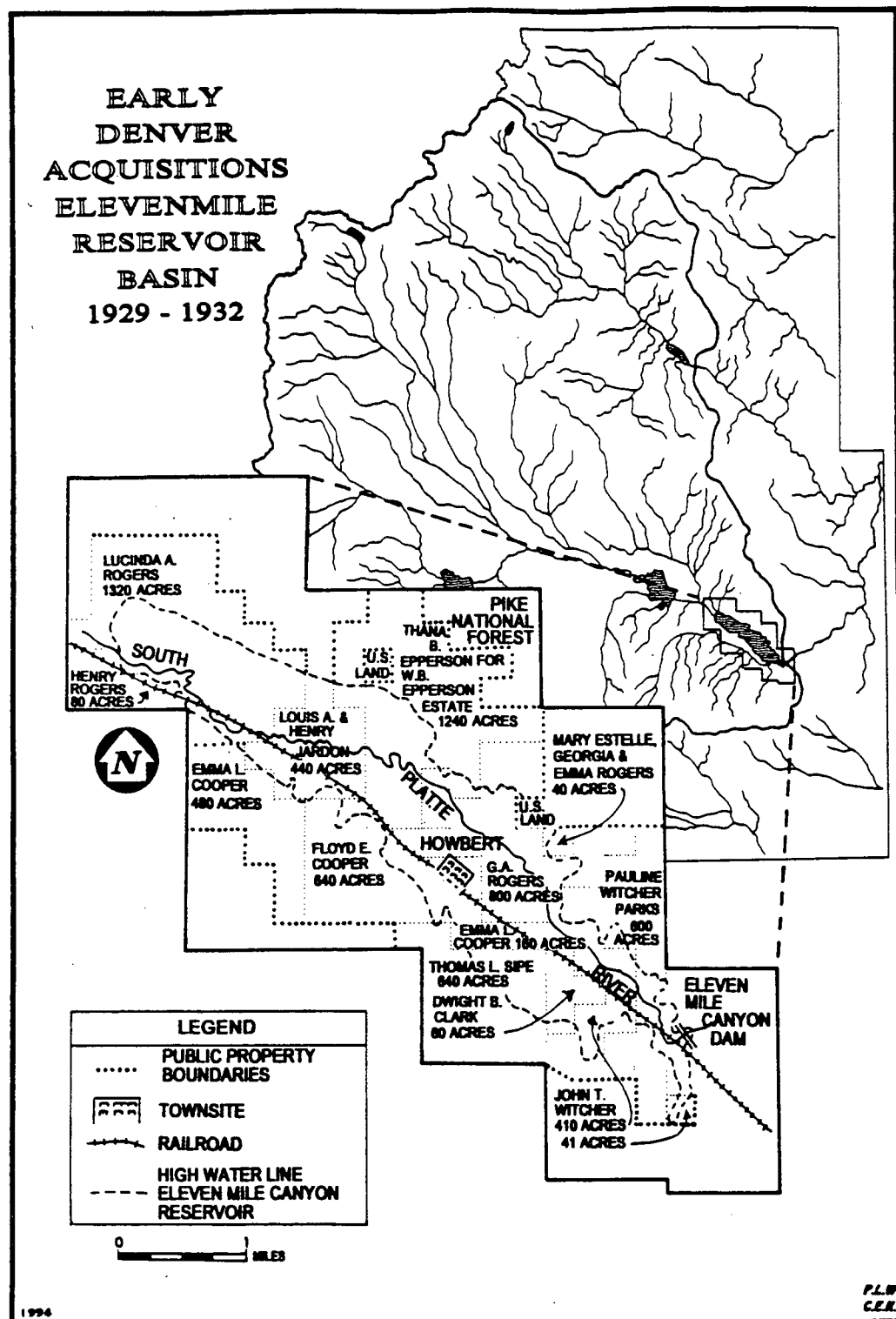
These ranches had been acquired by the Denver Union Water Company around the time of World War I. Apparently they were acquired with some subterfuge, local residents not knowing precisely with whom they were dealing. Arthur D. Wall, sent to South Park by Walter P. Miller and William P. Robinson of the Denver Union Water Company in 1915 and 1916 to investigate properties with valuable water rights, wrote, "These trips, so far as the 'natives' are concerned, are purely pleasure trips."<sup>64</sup>

Wall recommended the company purchase two or three more ranches with senior priorities, specifically, Fourmile Ranch with the Beery Ditch, the most senior priority in the district, and Henry Guiraud's ranch, with its Canon Ditch bearing a July 1867 priority date.<sup>65</sup> Clearly the company's interests were strategic. They were not proceeding with a wholesale acquisition of South Park water rights; they were attempting to purchase water rights that had the power to call out other South Park ditches. Concerning the value of the Barlow Ranch water

rights Arthur Wall noted, "every farmer in the South Park on Tarryall Creek or its branches will remember that his ditch has been shut down in times of scarcity of water to supply the prior rights of the Barlow ranch."<sup>66</sup> Herein lay the value of these small South Park ditches. If Denver interests could shut down South Park irrigation leaving more water in the river, their own less senior water rights were less likely to be subject to a river call.

The Barlow Ranch was purchased for \$20,000.<sup>67</sup> Half of that was payable in cash; the remainder in the form of two notes, one for \$6,000 held by Ed Barlow, the other for \$4,000 to Mary G. Borden,<sup>68</sup> the widow of Olney Borden, the original homesteader and irrigator on the 420 acre ranch. George A. Rogers sold his 300 acre ranch for \$15,000.<sup>69</sup> Wall noted in a letter, that the price was high, but that the price appeared justified because of the seniority of the Weed Ditch, the land's value as a reservoir site, and the ranch's location at the time on the Colorado Midland Railway.<sup>70</sup>

Development of these early ranch water rights did not take place until the 1930s. During the interim the ranches were leased and the water applied to irrigation.<sup>71</sup> Once state approval was granted for the construction of Eleven Mile Canyon Reservoir, Denver pursued the acquisition of lands in the reservoir basin aggressively (Figure 5-4), purchasing a dozen ranches between June 1930 and November 1932<sup>72</sup> (Table 5-3). The town of Howbert proved more problematic. Gus Fiedler, who owned



**Figure 5-4. Map: Early Denver Acquisitions, Eleven Mile Reservoir Basin, 1929-1932.**

TOTAL ACRES, SELECTED RANCHES  
EARLY DENVER ACQUISITIONS

<u>Transfer</u>	<u>City</u>	<u>Transfer Decree (Year)</u>	<u>Total Acres</u>
Borden (aka Barlow)	Denver	1933	420
Epperson	Denver	No Transfer	1,240
Jardon	Denver	1932	440
George Rogers	Denver	1934	300
Lucinda Rogers	Denver	No Transfer	1,320

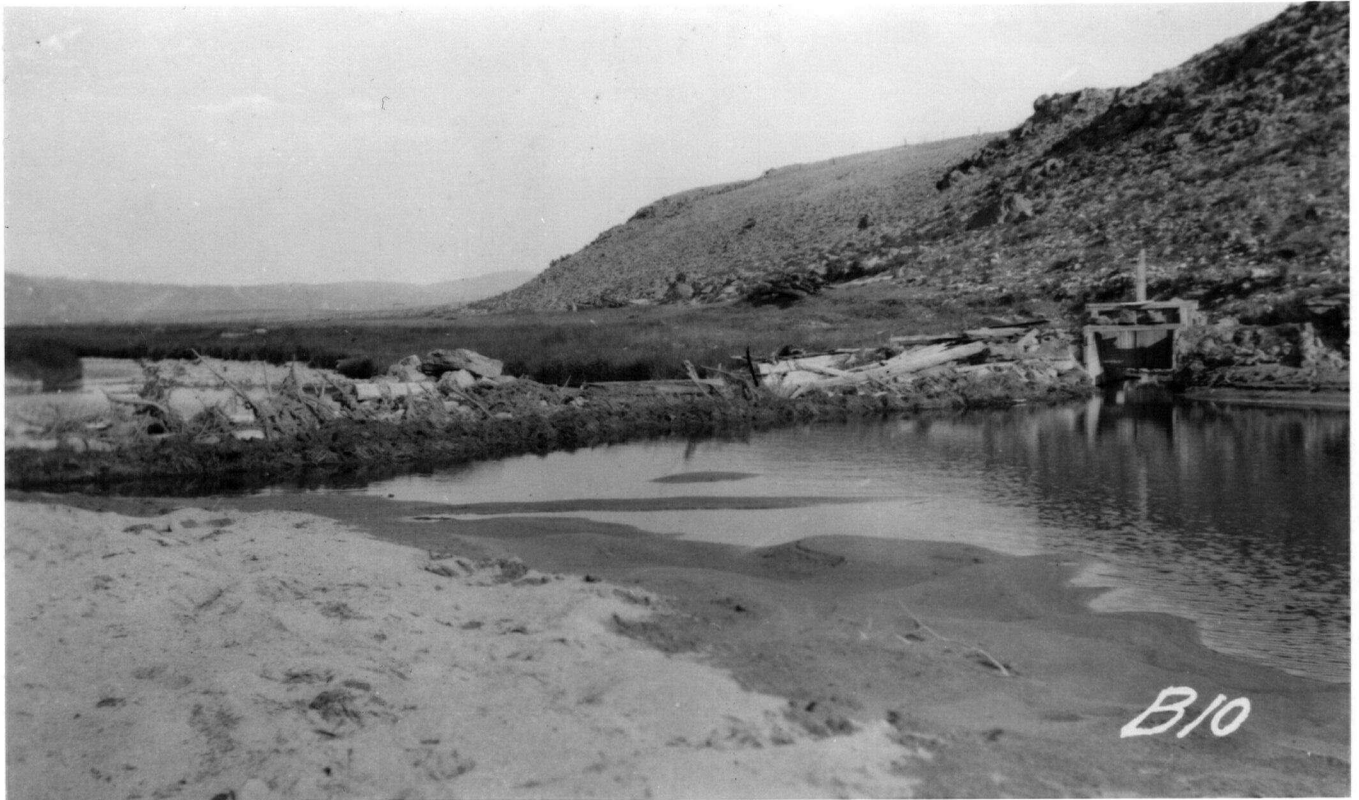
**Table 5-3.** Total Acres, Selected Ranches, Early Denver Acquisitions (Source: Denver Water Department).

30 lots in Howbert, did not want to sell to the city and condemnation proceedings were started against him.<sup>73</sup> Fiedler refused to remove his storeroom, dwelling, and a residence occupied by his children, even as the water crept toward his property. In February of 1933, an agreement was signed between Denver and Fiedler, in which Fiedler agreed to remove the improvements on his property at his own expense before the rising reservoir reached Howbert.<sup>74</sup> Fiedler retained his oil, gas, and mineral rights, though the city insisted he not drill through the reservoir bottom to exploit them.<sup>75</sup> With the disagreement with Fiedler resolved, problems still remained at Howbert. According to an inventory of title to Eleven Mile Canyon Reservoir lands completed by A.D. Wall in 1936, several lots still remained unpurchased, long after the town was under water.<sup>76</sup>

Several other ranches in the reservoir basin had water rights attached to them. Through the purchase of the Jardon

Ranch, a small ranch of 440 acres run by two brothers, the city acquired a full interest in the Island Ditch (priority number 201), and a half interest in each the Weed Ditch (priority number 102) (Figure 5-5) and the Little Channel Ditch (priority number 157).<sup>77</sup> These water rights were taken through the courts and transferred to municipal use in October of 1932 (Table 5-4). Out of 18.91 cfs of water decreed to Louie and Henry Jardon's ditches, 6.17 cfs were transferred to city intake for municipal use.<sup>78</sup> This was the highest percentage of water transferred in any of the early proceedings (Table 5-5). The Barlow transfer (more commonly called the Borden transfer) reaped less than 15% of the decreed water rights; the George Rogers transfer around 12% (Appendix B). The Jardon transfer was the first formal transfer of South Park direct flow rights, and set an important local precedent.

The Lucinda Rogers ranch, also in the Eleven Mile Reservoir basin, had three large ditches, all with relatively junior rights.<sup>79</sup> No formal transfer was made of the Rogers North, the Rogers South, or the Como Jim Ditches. A handful of other ditches in the Eleven Mile basin were treated in the same fashion as the Lucinda Rogers water rights and never formally taken through transfer proceedings.<sup>80</sup> In cases where rights were junior, or where historic use was difficult to demonstrate, it was not worth the city's time or money to take these matters to court.



**Figure 5-5.** South Platte River, diversion dam, and headgate of the Weed Ditch (priority no. 102), 1910. A half interest in the Weed Ditch was transferred to municipal use in 1932 in the Jardon transfer, the remainder was acquired by Denver when the city bought the Epperson Ranch, but was never formally transferred. In 1910 the diversion dam was made of stone, brush, and manure. This type of construction was quite typical in South Park (Courtesy, Colorado State Archives).

WATER RIGHTS AND PRIORITIES  
SOUTH PARK WATER TRANSFERS, 1932 - 1934

<u>Transfer</u>	<u>City</u>	<u>Transfer Decree</u>	<u>Water Rights Involved</u>	<u>Earliest Priority</u>	<u>Earliest Priority No.</u>
Jardon	Denver	1932	3	6/1/1879	102
Borden (aka Barlow)	Denver	1933	5	5/1/1866	3
George Rogers	Denver	1934	4	5/1/1875	42
Antero	Denver	No Transfer	2	10/10/1881	149
Elevenmile	Denver	No Transfer	4	7/1/1872	15
Epperson	Denver	No Transfer	2	6/1/1879	102
Lucinda Rogers	Denver	No Transfer	3	5/15/1879	99

**Table 5-4.** Water Rights and Priorities, South Park Water Transfers, 1932-1934 (Source: Denver Water Department).

WATER TRANSFERRED TO MUNICIPAL USE, 1932 - 1934  
SOUTH PARK WATER TRANSFERS

<u>Transfers</u>	<u>City</u>	<u>Amount (cfs) Transferred</u>	<u>Pre-1879 Water Rights Amount (cfs) Transferred</u>	<u>Total Decreed Amount (cfs) In Transfer</u>	<u>Percent Transferred</u>
Borden (aka Barlow)	Denver	8.70	8.70	59.84	14.54
Jardon	Denver	6.17	0.00	18.91	32.63
George Rogers	Denver	4.02	2.31	32.60	12.33
Antero	Denver	0.00	0.00	97.79	0.00
Elevenmile	Denver	0.00	0.00	8.00	0.00
Epperson	Denver	0.00	0.00	10.80	0.00
Lucinda Rogers	Denver	0.00	0.00	225.20	0.00

**Table 5-5.** Water Transferred to Municipal Use, 1932-1934 (Sources: Denver Water Department and Transfer Decrees).

A succession of dry years in the 1930s led Denver to seek water to lease. South Park, located at the headwaters of the South Platte River, was the most logical location. In 1933, Denver acquired contracts on all ditches in District 23 with priority dates in the 1860s.<sup>81</sup> Ranchers demanded a high lease price for their water rights. A passage in a letter from Arthur Wall to Malcolm Lindsey, an attorney, offers some explanation. Discussing Ely B. Johnston, a rancher down the Tarryall, Wall wrote:

Mr. Johnston's main reason for demanding a high rental was that all of the ranches in his neighborhood, including his own, as a rule, raise only sufficient hay to carry the stock belonging to the owners through the winter and that there was no hay in the neighborhood for sale. It would therefore be necessary for him to purchase baled hay in the Jefferson neighborhood and haul to his ranch for feeding, thus greatly increasing the cost to him.<sup>82</sup>

South Park ranchers got their price, and leases were acquired to the Beery, Sadler, Foster, Guiraud, Canon, and Small Ditches, among others. The city went to court to obtain temporary transfer decrees, good for the irrigation season only.<sup>83</sup>

Local reaction to water leasing, transfers, and ranch sales was mixed. When the Denver Union Water Company was first exploring the purchase of the Ed Barlow Ranch, a letter was received from Celsus P. Link, South Park rancher and local financier. Speaking for himself and his investment partner Ely Portis, Link wrote,

Both Mr. Portis and I are members of the South Park Ranchmans Protective Association and for us to agree that the purchaser will receive our support and assistance in an

action to transfer the water rights from [Barlow Ranch] would not be in harmony with our obligations to this organization.<sup>84</sup>

Others were less hostile to urban attention and interest. As early as 1916, offers to sell ranch lands and irrigation water rights were being received by the Denver Union Water Company. The heirs of Judge Wilkin, who ranched on the Tarryall, offered the company 2,420 acres of land and five water rights.<sup>85</sup> Though one of the ditches bore an 1871 priority date, the company did not buy the ranch. With their interest in the Borden Ditch, Denver already controlled the Tarryall.

Offers to sell abounded. Where ranchers and their heirs were not contacted directly by the city, they approached Denver themselves. A 1927 letter from May Paige, a relative of rancher Olney Paige provides a good example. Addressed to Mayor Stapleton of Denver, Paige writes,

I have been reading a great deal about the water situation for the City of Denver and would like very much to have you look into the Tarryall Creek proposition... Denver already owns what was formerly the Barlow Place and water rights some three and a half miles up the creek from here... we would like to dispose of the place direct. It is my belief the Paige Reservoir and the dam at Bonis Bridge, could be erected very economically and afford a splendid supply of pure mountain water for the Valley and the City below.

Our Ranch consists of 710 acres of land most of which would be covered with water. We have three good water rights the oldest of which dates back to 1876.

The Reservoir would be about five miles in length and one mile in width in places and of considerable depth. It is almost a natural reservoir - the outlet being very narrow.

We are only asking \$ 30,000 for our holdings which I consider very reasonable indeed for what we have to offer.<sup>86</sup>

The site was never bought by Denver, but rather was acquired by the state for Tarryall Reservoir, decreed for fish culture, not for municipal storage. This was Paige's second attempt to sell her ranch and water rights to Denver. In 1923 she had penned a similar letter to the Denver Board of Water Commissioners. At that time she was asking \$ 5,000 more for her property.<sup>87</sup>

As time went on, South Park ranchers made greater use of brokers in marketing their water rights to the city of Denver.<sup>88</sup> Often, the water department was contacted through attorneys or through realtors and water brokers. Frequently letters of enquiry would be accompanied by a water rights assessment and preliminary survey of lands, done by the broker, the realtor, or an outside consultant. The city usually declined to purchase the properties, citing lack of funds on their part or the junior status of the water rights in question, as the reason.

The South Park water transfers were voluntary. Though city representatives were less than honest about who they were and what they were about when they first investigated water rights in the park in 1915 and 1916, there was no subterfuge writ large in this situation. Sales were made knowledgeably and for profit.

With Eleven Mile Canyon Reservoir built, Antero Reservoir in the process of repair, and strategic direct flow water rights transferred to city intake, Denver put the question of further South Park acquisitions in the hands of engineers and consultants. Transfer proceedings to date had only allowed the

transfer of what was presumed to be the amount of water consumptively used on South Park meadows. Early studies by Bull and others had tried to estimate consumptive use, and figures varied from 1 acre foot per acre to 1.7 acre feet per acre.<sup>89</sup> These figures substantially affected the value of South Park water rights. Also of concern to the city was lack of administrative control in South Park. The city feared junior ditch holders would continue taking water, despite Denver's senior claims. Engineer Henry Potts noted,

Owing to the fact that there are a great number of small ditches, many of which are far from a road or a trail, and being scattered over a large area, it is impossible to properly police the various streams and to rigidly enforce the water orders of the state engineer's office. Consequently, in many instances, the "Priority of Opportunity" seems to govern more nearly the amount of water diverted than does the "Priority of Date."<sup>90</sup>

Potts believed the only solution was for the city to begin purchasing water rights along the lower reaches of the Platte and the Tarryall, working their way upstream to the headwaters. In October of 1932 Potts and his team installed stream gauges, and commenced studies of South Park precipitation, streamflows, and return flows to the river from irrigation.

The city hired an outside consultant as well. In 1935 Fred Carstarphen submitted his report, similar in nature to the Potts report of 1934. Carstarphen advocated the drying up of South Park in its entirety, starting on the lower reaches of the rivers and working upstream.<sup>91</sup> He believed that the use of water in South Park was wasteful and that human activity in the area was fouling the waters. As Carstarphen conceived it,

Denver could buy the ranches, secure the water rights, then sell the land to the federal government creating a vast game preserve. But Carstarphen saw this as a temporary solution in terms of supply. South Park might fill immediate demand for water, but the development of transmountain diversions and the use of conservation were needed on the long term.<sup>92</sup> Carstarphen ended his report by urging the city to action:

It is the opportunity so long desired of controlling a large part of Denver's watershed. From the standpoint of sanitation it will be a splendid start in protecting the public health by removing the individual homes, out houses, cesspools, barnyard drainage, manure, wastage, and other sources of water contamination and pollution that have been endured for long in the South Park because it could not be cured.<sup>93</sup>

The city's consultant saw only valuable property rights and human settlement that seemed a nuisance. He did not see or appreciate the vibrant ranching culture that existed in South Park in the 1930s. Mining in Park County was in the doldrums, and ranching (though it struggled through the depression) was the life blood of the place. Ranchers filled key positions in the community, as county commissioners and as school board members. Their children filled the schoolhouses, their taxes filled county coffers. Indeed, as defined, water transfers could proceed without any regard for the area of origin or its people. Injury in water transfer cases was carefully circumscribed, legally occurring only to those people holding vested water rights. Legally there was no need to compromise private property rights with questions of social justice or the common good.

### Developments in the Mid-Twentieth Century

The early water transfers removed 453.14 cfs in decreed water rights from the books in District 23, less than 10% of the water adjudicated in 1889 (Appendices B and C). On the ground, much less was taken out of irrigation because decrees were excessive. Only 18.89 cfs were formally transferred to municipal intake (Appendix B). A number of ditches bearing large decrees were never taken through transfer proceedings: the Chubb Ditch and the Drake Ditch beneath Antero Reservoir, in combination bearing 97.79 cfs in decreed water (Appendices B and C); and Lucinda Rogers' ditches decreed for 225.2 cfs (Appendices B and C). The actual capacity of these ditches was certainly much less, and their rights too junior, or the city would have transferred them as well. In terms of numbers, a dozen ditches were submerged under the rising waters of reservoirs, and half a dozen others transferred to municipal use. The total acreage removed from the county assessor's books was in excess of 7,700 acres by the end of the 1930s.<sup>94</sup>

Not all the people who sold to the city were removed from their land. Lucinda Rogers leased from Denver what remained of her ranch after the water rose, until the time of her death in 1953.<sup>95</sup> Her son Henry also leased from the city. The town of Howbert was underwater, but it had been in decline since the last train passed over the tracks in 1924. A dozen or so ranches were covered by Eleven Mile, Antero, and Tarryall reservoirs. According to the census there were 394 ranches and

farms in Park County in 1930; by 1935 the number jumped to 483 with a rush by dryland homesteaders. By 1940 there were 306 left, and by 1950 the number dropped to 190.<sup>96</sup> A decade later there were 120.<sup>97</sup> Most Park County ranches were located in South Park, so, though not precise, these figures reflect the general patterns.

Ranching in South Park survived the depression and the first water transfers. In the 1940s however, tensions between local irrigators and the city increased. South Park ranchers believed that their water rights were being called out more frequently since the city had built its reservoirs and transferred direct flow rights to intake. In 1941, 14 ranchers filed suit on behalf of all District 23 irrigators, naming Denver and a number of companies in the South Platte Valley in which Denver had an interest.<sup>98</sup> The suit charged the city with illegally impounding water in Eleven Mile Reservoir, and wanted gauging and monitoring of municipally controlled facilities improved. The language accused Denver of "unlawful and nefarious practices"<sup>99</sup> and "illegal manipulations,"<sup>100</sup> and accused water officials of "connivance and consent"<sup>101</sup> in depriving District 23 water users of an estimated 35,000 acre feet of water a year.<sup>102</sup>

Under the influence of improving state administration and the city's presence, the regime of the river was changing. In their suit South Park irrigators argued that since water coursed across their land, much of it returning immediately to the

stream, that shutting down their ditches was of limited utility to the city. Water left in streams was absorbed into the banks, they argued. Without irrigation water spread across the land consistently through the summer until haying season, then returning to the stream through percolation, the regime of the river as South Park ranchers had known it was changed in ways that caused specific problems. Where return flows from irrigation had percolated slowly and steadily back to streams with minimal diurnal fluctuations, releases from reservoirs were short and sudden. Instead of water flowing gradually into their ditches over a matter of hours, irrigators downstream from dams had to capture the extra amount of water when the swell passed their headgates. Ranchers argued they did not get the full amount this way, and that what they got was not as beneficial to their grass.<sup>103</sup>

The lawsuit sought damages, monetary compensation for tons of hay lost, and some assurance that proper gauges would be installed at all South Park reservoirs and that storage would be monitored more closely by the state.<sup>104</sup> The plaintiffs asked the court to regulate river runs and make the city stand evaporation and conveyance losses.

The suit proved unsuccessful. In the early 1950s, the Upper South Platte Water Conservancy District was formed to address these same concerns again.<sup>105</sup> Clearly the water situation was changing in South Park in ways that were not beneficial to local ranchers. They could not irrigate in the manner they once had.

In the context of an economy taxed by World War II and subject to marked fluctuations in the price of beef, many marginally profitable operations became unprofitable; some failed completely. Other ranchers, those holding senior water rights and controlling extensive areas of bottomland, survived this period and in some cases expanded their holdings by acquiring land from less prosperous neighbors.

The impact of the contracting railroad network cannot be underestimated either. South Park ranchers had long depended on the Colorado Midland and the Denver and South Park lines to carry their cattle to markets in Denver and Omaha (Figure 5-6). By the eve of World War II, both railroads were closed. Ranchers had to use trucks, to get their stock to market. During the 1940s, 50s, and 60s, South Park ranchers increasingly adopted mechanized cutting, baling, and rolling in haying. Again, the more marginal operations could little afford to purchase machinery and, as their neighbors did so, marginal operations became even less able to compete. Improving state administration, and persistent calls on the river by the city and other downstream appropriators, made life in the high park more difficult.

In the 1950s, other cities along the Colorado Front Range began to show an interest in South Park. In 1951, the city of Englewood (a suburb of Denver) acquired rights to the Boreas Ditch, a small interbasin transfer ditch, built by Celsus P. Link. The city purchased the ditch from Elizabeth Link, his



**Figure 5-6.** The Colorado Midland Railway yard at Hartsel, with the meandering South Platte River and the Hartsel hot springs resort on the right, n.d. L.C. McClure, photographer (Courtesy, Denver Public Library, Western History Collection).

widow. The ditch diverted a small amount of water from the headwaters of the Colorado drainage.<sup>106</sup> The city of Colorado Springs also turned its eyes to South Park and many years later became involved in a complicated and abortive attempt to purchase the Marcott Ranch, which carried the prized Beery Ditch, the number one priority in South Park. In the end, Denver acquired the rights to the Beery Ditch, and Colorado Springs settled for using South Park as a conduit, never transferring direct flow rights from the park itself.

Colorado Springs, like Denver, had turned to the western slope to develop its water supply. The city owned rights on the Blue River. In the mid-1950s, it constructed Montgomery Reservoir at the head of the Middle Fork of the South Platte River. The reservoir was part of an elaborate network of pipelines, pumping stations, and storage facilities. Water was diverted from the headwaters of the Blue River, immediately north of Hoosier Pass. The water was carried through the Hoosier Pass Tunnel to Montgomery Reservoir, where it was conveyed into an underground pipeline which took it across South Park and on to Colorado Springs.

In the 1960s the Homestake Project was initiated, involving the construction of another large pipeline across South Park (Figure 5-7). Homestake was a joint project in which the cities of Colorado Springs and Aurora (another Denver suburb) developed water from the western slope in the vicinity of Aspen. The water was piped through the Continental Divide and into Twin

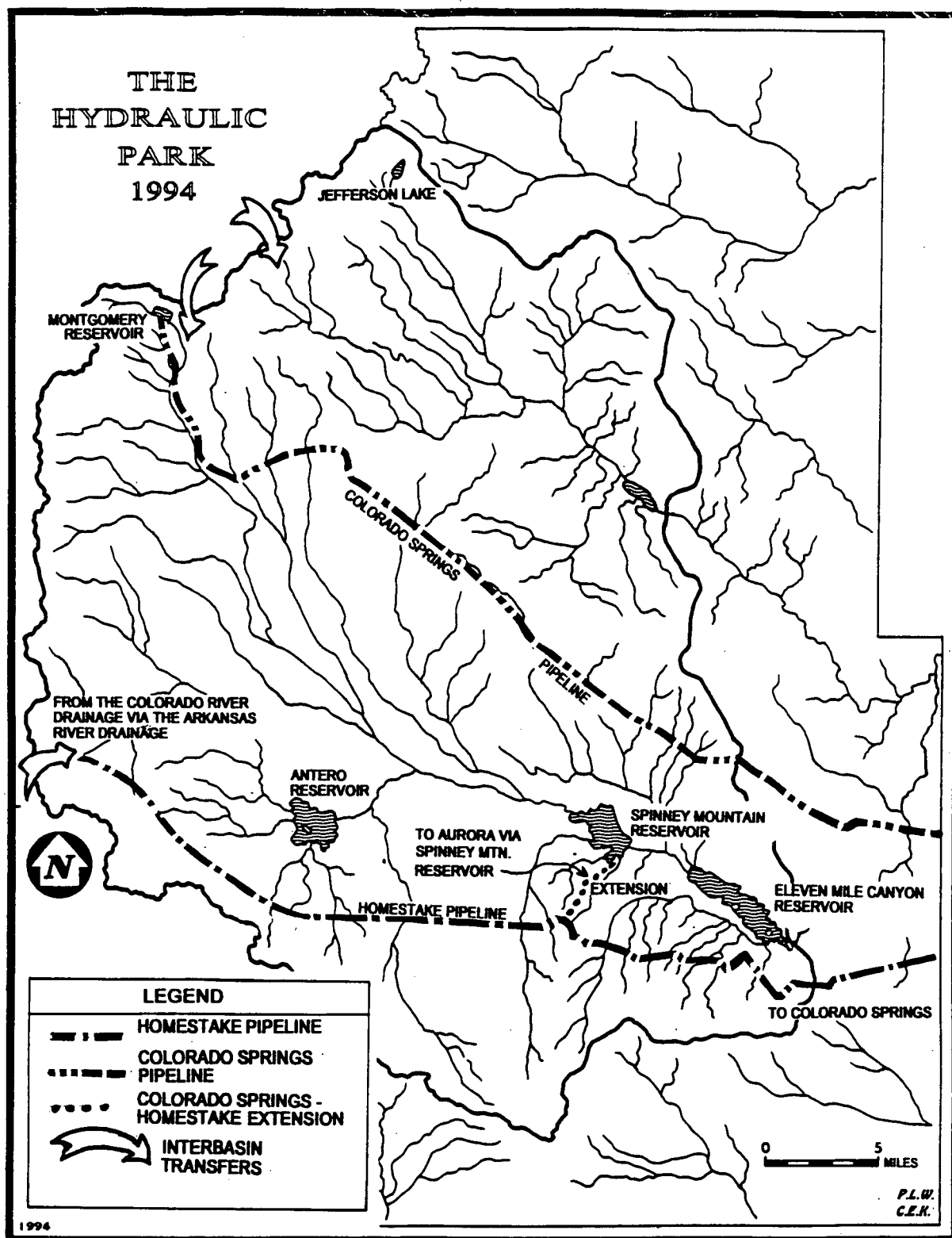


Figure 5-7. Map: The Hydraulic Park, 1994.

Lakes. From there it flowed in natural channels down the creek to the Arkansas River and the Otero pumping station. The water was then piped up into South Park, across the basin, and to a point where the Colorado Springs and Aurora shares of the water were divided. The Colorado Springs portion was carried on by pipeline to the city. The Aurora portion was diverted into the South Platte River above Eleven Mile Canyon Reservoir.

Though grand hydraulic schemes had etched themselves across South Park's surface, the direct impact of pipeline construction was minimal. South Park ranchers also had one more municipal reservoir to contend with (Montgomery). But these engineering feats had removed no ranchland from production and retired no water rights. The impact on agriculture was minimal.

The archaeologist E.B. Renaud described the park in 1944 during field work for his survey of native sites in the area and a decade after the early Denver water transfers. The park was verdant. As yet the water transfers had had minimal impact in terms of reducing ranching in South Park. Renaud wrote,

At the foot of a high and very steep slope an immense grassy carpet, of deep emerald green color, spreads for miles in the clear mountain air. It is edged on the east by wooded hills, the tall pines forming an uneven border of dark green on that side. To the west the majestic summits of the continental divide outline their snow capped heads against the pure blue sky, or hide them in rolling masses of heavy clouds. On that western side the grass invades the upper valleys and makes vast bays of green vegetation between the gray and yellow rocks of the slopes... According to the season the tall grass of the often marshy meadows reaches up to the knees or even the bellies of the cattle and horses grazing peacefully in that glorious landscape. At other times the land is dotted with the bulky hay stacks casting their shadows like dark spots of a free pattern. The first time I came upon that section of

South Park it was covered with a million small, pale and fragrant wild irises. This year, later in the season, everywhere immense fields of little wild flowers of all shades, rose, pink, red, blue, purple, orange, or yellow, spread generously their delicate pastel shades all over the landscape in every direction.<sup>107</sup>

Wildflowers bloomed, the grass grew tall, and ranching survived. The first agricultural to municipal water transfers did little to change the rhythms of life in the park. They involved a relatively small amount of water and left the infrastructure and scale of ranching in South Park essentially intact. However, early transfers had established municipal interests in South Park. Denver was now directly involved in water matters in District 23 and strategically controlled Tarryall Creek. Plans had been articulated for drying up the entire basin, but these plans were not implemented by Denver, and they were not carried out until the last three decades of the twentieth century.

#### Chapter Notes

1. Mosley, 1966, Chapter I; and Milliken, 1988, pp. 333-339. The Mosley manuscript is a truly exceptional document. Earl Mosley was the manager of the Denver Water Department for many years, and upon his retirement began work on a detailed history of Denver's water system. Work was cut short by Mosley's death in 1966. The manuscript was never published.
2. Milliken, 1988, p. 337.
3. Mosley, 1966, p. 199.
4. Mosley, 1966, p.200.
5. Mosley, 1966, pp. 157-158.

6. Denver Times, August 13, 1875, p. 1.
7. Sampson, 1929, p. 2.
8. Mosley, 1966, p. 279.
9. Mosley, 1966, Chapter IV. Mosley's entire chapter deals with events leading up to the consolidation, as well as the details of the Denver Union Water Company's formation and early years.
10. Milliken, 1988, pp. 338-339.
11. Mosley, 1966, p. 342.
12. Mosley, 1966, pp. 643-754.
13. Mosley, 1966, pp. 633-634.
14. For a more thorough discussion of this landmark case, see Vranesh, 1989 and Dunbar, 1986.
15. Colorado State Engineer, 1882-1946. J.P. Maxwell, 1893, p. 14.
16. Colorado State Engineer, 1882-1946. Michael C. Hinderlider, 1925, p. 214.
17. Denver, Denver Water Department, 1892-1993. J.D. Schuyler, 1892. "Report on the Water Supply for 1892 and 1893, and the Way to Secure It." Unpublished report prepared for the Citizen's Water Company.
18. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, June 1903, "Report of J.C. Ulrich to Walter P. Miller", pp. 1-2. Unpublished report prepared for the Denver Union Water Company.
19. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, June 1903, p. 2.
20. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, June 1903, pp. 2-3.
21. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, June 1903, p. 6.
22. Denver, Denver Water Department, 1892-1993. J.J. Armstrong, 1903, "Report of J.J. Armstrong to Walter P. Miller," pp. 1-2. Unpublished report prepared for the Denver Union Water Company.

23. Denver, Denver Water Department, 1892-1993. J.J. Armstrong, 1903, p. 2.
24. Denver, Denver Water Department, 1892-1993. J.J. Armstrong, 1903, pp. 2-5; and J.C. Ulrich, December 1903, "Report of J.C. Ulrich to Walter P. Miller," pp. 5-12. Unpublished report prepared for the Denver Union Water Company.
25. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, December 1903, pp. 2-3.
26. Denver, Denver Water Department, 1892-1993. J.C. Ulrich, December 1903, p. 4.
27. Or infamy as it were.
28. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, "Preliminary Report for a New Water Supply for the City of Denver", p. 3. Unpublished report prepared for the P.U.C. in Denver.
29. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, p. 4.
30. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, p. 11.
31. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, p. 23. The report went on to explore other alternatives as well.
32. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, p. 51.
33. Denver, Denver Water Department, 1892-1993. J.B. Lippincott, 1914, p. 54.
34. Denver, Denver Water Department, 1892-1993. George M. Bull, n.d. and 1926, "Memorandum Regarding the Problems of Obtaining Additional Water For the City Through the Purchase of Hay Land in South Park." Unpublished report prepared for the Denver Water Department. The 1926 version and the undated version are the final and preliminary drafts of the same report. The contain slight differences.
35. Denver, Denver Water Department, 1892-1993. George M. Bull, n.d., pp. 4-9.
36. Denver, Denver Water Department, 1892-1993. George M. Bull, n.d., pp. 8-9.

37. Denver, Denver Water Department, 1892-1993. George M. Bull, 1926, pp. 9-10.
38. Denver, Denver Water Department, 1892-1993. George M. Bull, 1926, pp. 9-10.
39. Denver, Denver Water Department, 1892-1993. J.D. Schuyler, 1892, "Report on Mountain Reservoirs and Water Storage," p. 9. Unpublished report prepared for the Citizens Water Company.
40. Denver, Denver Water Department, 1892-1993. J.D. Schuyler, 1892, p. 9.
41. Comstock, 1917, p. 27.
42. Comstock, 1917, p. 5.
43. Comstock, 1917, p. 8.
44. City of Denver, June 28, 1913, p. 13.
45. Doherty and Company of New York. Denver Republican, May 21, 1913, p. 9.
46. Denver Times, August 27, 1915, p. 1.
47. Denver Times, August 27, 1915, p. 1.
48. Denver Times, August 27, 1915, p. 1.
49. Denver, Denver Water Department, 1892-1993.
50. Denver Municipal Facts, May-June 1924, p. 10.
51. Municipal Facts, November-December 1920, p. 12.
52. Municipal Facts, May-June 1924, p. 10. By the time the city decided to settle the lawsuits, there were 10 separate suits pending against them.
53. Comstock, 1917, p. 15.
54. Municipal Facts, January-February 1929, p. 4. Note: The Two Forks Project was vetoed by the Environmental Protection Agency in the early 1990s. Denver and the other Front Range cities involved in the project still hope to reverse that decision.
55. Rocky Mountain News, April 10, 1930, p. 1.
56. Rocky Mountain News, June 1, 1930, p. 5.

57. Rocky Mountain News, July 19, 1930, p. 4; and Denver Post, July 19, 1930, p. 4.
58. Denver Post, April 10, 1940, p. 11.
59. The description of Howbert as comprised of a filling station, school, and post office comes from Denver Post, April 10, 1930, p. 11.
60. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Walter P. Miller, August 31, 1915.
61. Denver, Denver Water Department, 1892-1993. Letter from Gerald Hughes and Clayton Dorsey to E.S. Kassler, May 18, 1917.
62. Park County District Court, 1889-1970. Civil Action 1974.
63. Park County District Court, 1889-1970. Civil Action 1936.
64. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to W.P. Robinson, August 18, 1916.
65. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to William P. Robinson, August 18, 1916.
66. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Walter P. Miller, August 31, 1915.
67. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Walter P. Miller, August 31, 1915.
68. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Walter P. Miller, August 31, 1915.
69. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Walter P. Miller, August 31, 1915.
70. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to John Evans, December 28, 1915.
71. Denver, Denver Water Department, 1892-1993.
72. Denver, Denver Water Department, 1892-1993. A.D. Wall, 1936, "Real Estate Inventory - 1936 - Eleven Mile Canon Reservoir Lands." Unpublished report prepared for the Denver Water Department.
73. Denver, Denver Water Department, 1892-1993. File 605.003: Gus W. Fiedler.

74. Denver, Denver Water Department, 1892-1993. File 605.003: Gus W. Fiedler.
75. Denver, Denver Water Department, 1892-1993. A.D. Wall, 1936, p. 15.
76. Denver, Denver Water Department, 1892-1993. A.D. Wall, 1936, p. 1.
77. Denver, Denver Water Department, 1892-1993. A.D. Wall, 1936, p. 3.
78. Park County District Court, 1889-1970. Civil Action 1942.
79. Denver, Denver Water Department, 1892-1993. A.D. Wall, 1936, p. 12.
80. For a list of ditches never formally transferred, refer to Appendix C, and see entries under the Lucinda Rogers, Epperson, and Elevenmile transfers. Some of these ditches ended up on the abandonment list in later years; some remained on the books in District 23 into the early 1990s.
81. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Malcolm Lindsey, February 18, 1933.
82. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to Malcolm Lindsey, February 18, 1933.
83. Park County District Court, 1889-1970. Civil Actions 1973, 1975, and 1976.
84. Denver, Denver Water Department, 1892-1993. Letter from C.P. Link to John Evans, November 23, 1915.
85. Denver, Denver Water Department, 1892-1993. Letter from A.D. Wall to William P. Robinson, July 1916.
86. Denver, Denver Water Department, 1892-1993. Letter from May A. Paige to Mayor Benjamin Stapleton, June 8, 1927.
87. Denver, Denver Water Department, 1892-1993. Letter from May A. Paige to the Denver Board of Water Commissioners, November 5, 1923.
88. Denver, Denver Water Department, 1892-1993. Offers to Sell, 1923-1993. Offers to sell water rights, coming from South Park and other parts of the state, fill several file cabinets in the records division of the Denver Water Department.

89. Denver, Denver Water Department, 1892-1993. H.L. Potts, 1934, "Report of South Park Investigations for 1933," pp. 1-2. Unpublished report prepared for the Denver Board of Water Commissioners.
90. Denver, Denver Water Department, 1892-1993. H.L. Potts, 1934, p. 3.
91. Denver, Denver Water Department, 1892-1993. Fred C. Carstarphen, 1935, "Report on Enlarged Source of Water for Denver's Metropolitan Area through Cessation of Irrigation in South Park, Colorado." Unpublished report prepared for the Denver Water Department.
92. Denver, Denver Water Department, 1892-1993. Fred C. Carstarphen, 1935, p. 23.
93. Denver, Denver Water Department, 1892-1993. Fred C. Carstarphen, 1935, p. 55.
94. This figure is derived by adding up the acres reported in A.D. Wall's 1936 real estate inventory, and including figures for the Barlow and Rogers ranches from city files. The Antero Reservoir basin is not included in this calculation because no reliable figure could be found. Also see Appendix B.
95. Denver, Denver Water Department, 1892-1993. Memo from Charles C. Fisk to R.B. McRae, October 23, 1958.
96. U.S. Bureau of the Census, 1864-1989.
97. U.S. Bureau of the Census, 1864-1989.
98. Park County District Court, 1889-1970. Civil Action 3139.
99. Park County District Court, 1889-1970. Civil Action 3139, Complaint, p. 13.
100. Park County District Court, 1889-1970. Civil Action 3139, Complaint, p. 5.
101. Park County District Court, 1889-1970. Civil Action 3139, Complaint, p. 5.
102. Park County District Court, 1889-1970. Civil Action 3139, Complaint, p. 6.
103. Park County District Court, 1889-1970. Civil Action 3139, Complaint.
104. Park County District Court, 1889-1970. Civil Action 3139.

105. Upper South Platte Water Conservancy District, 1953-1993.
106. Link, 1969. This is the same Elizabeth Link encountered at the beginning of Chapter III.
107. Renaud, 1945, p. 3.

## CHAPTER SIX

### DRY UP

#### Expanding Demand

In the aftermath of World War II the population of the Colorado Front Range exploded. Rapid suburbanization powered a dramatic expansion in the demand for water as returning soldiers took up tract houses at ever greater distances from downtown Denver. Nuclear families in single-family dwellings, surrounded by small plots of grass - dishwashers humming, washing machines gurgling, sprinklers spewing water into the dry air like private fountains - it was a style of life that required municipal water on an unprecedented scale.

When the census takers canvassed Denver in 1940, they counted 322,412 people; a decade later the city had over 90,000 more.<sup>1</sup> In the suburbs the rate of growth was even more rapid (Table 6-1). In the same period, Aurora, located just east of Denver, grew from a population of 3,437 to 11,421, an increase of 232%. In 1950, the first time the Bureau of the Census reported figures for the Denver metropolitan area, the city and its suburbs had just under half a million people. By 1970 the population had topped a million, and as the twenty-first century approaches, the metro area is reaching two million people.<sup>2</sup>

As early as the 1920s, Denver turned to the western slope of the Rockies for its water, expanded holdings on the headwaters of the Colorado River, and developed western slope

GROWTH OF CITIES, 1860 - 1990

	<u>Denver</u>	<u>Aurora</u>	<u>Thornton</u>	<u>Denver Metro Area</u>	<u>Colorado Springs</u>
1860	4,749				
1870	4,759 (+ 0.2%)				
1880	35,629 (+ 648.7%)				4,573
1890	106,713 (+ 199.5%)				12,928 (+ 182.7%)
1900	133,859 (+ 25.4%)	202			23,999 (+ 85.6%)
1910	213,381 (+ 59.4%)	679 (+ 236.1%)			33,411 (+ 39.2%)
1920	256,491 (+ 20.2%)	983 (+ 44.8%)			30,105 (- 9.9%)
1930	287,861 (+ 12.2%)	2,295 (+ 133.5%)			33,237 (+ 10.4%)
1940	322,412 (+ 12.0%)	3,437 (+ 49.8%)			36,789 (+ 10.7%)
1950	415,786 (+ 29.0%)	11,421 (+ 232.3%)		498,743	45,472 (+ 23.6%)
1960	493,887 (+ 18.8%)	48,548 (+ 325.1%)	11,353	803,624 (+ 61.1%)	70,194 (+ 54.4%)
1970	514,678 (+ 4.2%)	74,819 (+ 54.1%)	13,326 (+ 17.4%)	1,047,311 (+ 30.3%)	135,059 (+ 92.4%)
1980	492,365 (- 4.3%)	158,588 (+ 112.0%)	40,343 (+ 202.7%)	1,352,070 (+ 29.1%)	215,150 (+ 59.3%)
1990	467,610 (- 5.0%)	194,342 (+ 22.6%)	55,031 (+ 36.4%)	1,848,319 (+ 36.7%)	281,077 (+ 30.6%)

**Table 6-1.** Growth of Cities, 1860-1990. The table shows the expansion of population along the Colorado Front Range, focusing on cities with interests in South Park (Source: U.S. Bureau of the Census).

storage.<sup>3</sup> By 1963, the city was deriving half its supply from the other side of the continental divide<sup>4</sup> (Figure 6-1). Into the 1940s Denver steadily increased its service area, providing water to nearby municipalities and suburbs outside the city's boundaries. In the early 1950s Denver drew the infamous "blue line," demarcating the maximum reach of the city's service. Developing communities outside the blue line, and municipalities already within the system that anticipated significant growth outside Denver's service area, were forced to develop their own supplies. The result was fragmentation of the metropolitan water supply and heightened competition for water.<sup>5</sup> By 1975, 67 separate water supply agencies served the metropolitan area,<sup>6</sup> though Denver had erased the Blue Line 15 years before. In this context, the growing suburbs of Aurora and Thornton turned to South Park, implementing plans Denver engineers had articulated at the turn of the century: to acquire virtually all the irrigation water rights from the windswept basin at the headwaters of the South Platte.

Other issues complicated relations between the Denver Water Department and suburban municipalities. Until 1959, the city charter limited service contracts outside of Denver to a period of one year.<sup>7</sup> Renewal was uncertain. Further, the city charged differential rates to customers inside and outside the City and County of Denver. Customers in Aurora paid half again as much for their water as did Denver residents.<sup>8</sup> There was no limit on rate increases. The instability of the supply and

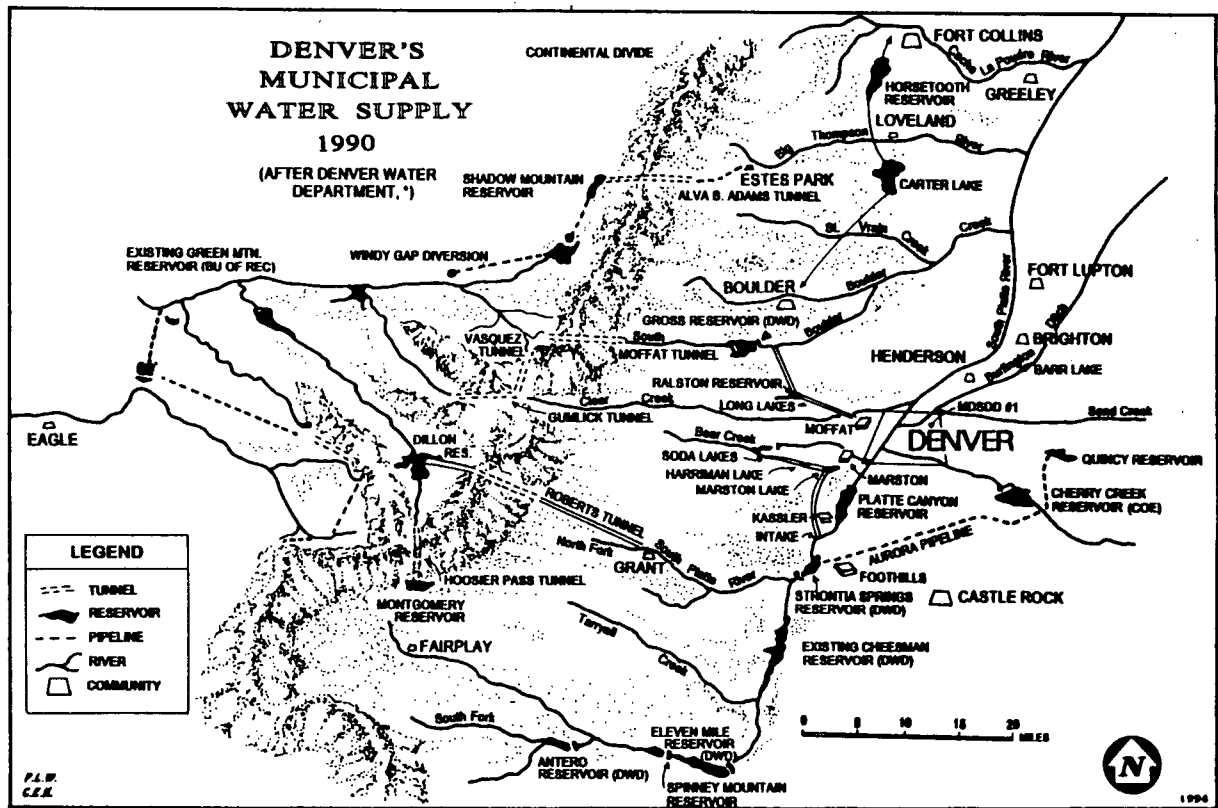


Figure 6-1. Denver's Municipal Water Supply, 1990.

unpredictability of the costs led the city to develop an independent water system.<sup>9</sup> In 1949, Aurora established its own water department. The city turned to groundwater, to irrigation water rights on the South Platte and the Arkansas rivers, and to interbasin transfers from the western slope to provide a municipal supply.<sup>10</sup> In 1967, when interbasin transfer water from the Homestake project became available for the first time, Aurora ended its dependence on the Denver Water Department and severed all ties.<sup>11</sup> By the mid 1980s, the city had assembled a system and supply that was sufficient to permit it to compete with Denver to serve the residential subdivisions and industrial parks that continued to ooze out onto the plains and extend north and south along the Piedmont (Figure 6-2).

Aurora began as the small town of Fletcher, established in 1891. The town was renamed after the founder, Canadian-born speculator and real estate investor Donald Fletcher, left in the wake of the crash of 1893 and saddled local residents with bond payments for a non-existent water system.<sup>12</sup> Aurora remained small and rural in character until the 1930s, when the federal government infused large amounts of money into the metropolitan area's economy.<sup>13</sup> Fitzsimmons Army Hospital, Lowry Air Force Base, Buckley Field, the Rocky Mountain Arsenal, all federal military facilities, were constructed within close proximity to Aurora's core.

Unlike the city of Denver, which was increasingly confined by its suburbs, Aurora's situation presented the possibility for

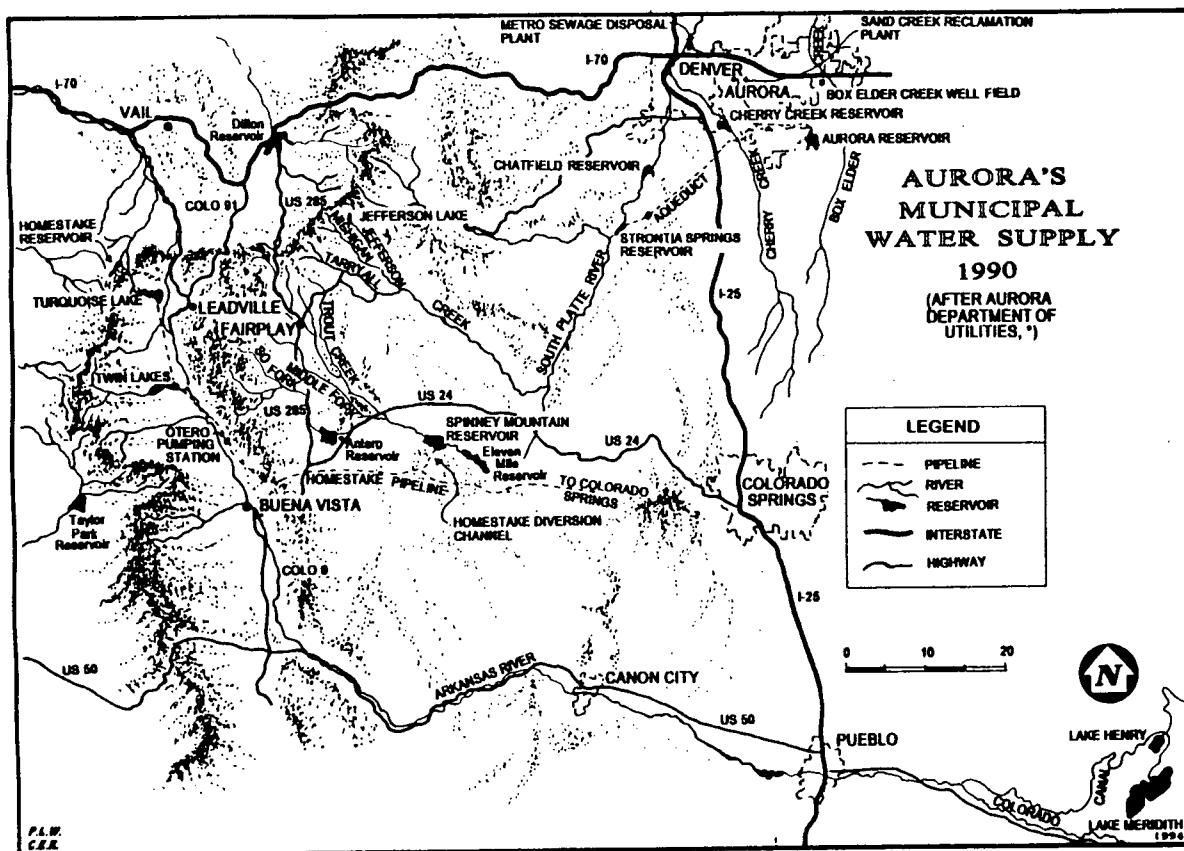


Figure 6-2. Aurora's Municipal Water Supply, 1990.

virtually unlimited growth. Vast, grassy plains extended east to the Kansas border from the edge of the city. In recent decades, Aurora has pursued an aggressive policy of annexation - east, south, and north from its nucleus.<sup>14</sup> In the 1970s, the city ranked as one of the fastest growing municipalities in the country.<sup>15</sup> By 1980 it had become the third largest city in the state.<sup>16</sup> Economic recession in the 1980s slowed growth for a time, but in the 1990s the population and the regional economy are entering another phase of expansion. Douglas County, just south of Aurora, is now the fastest growing county in the United States.<sup>17</sup> The construction of a massive new airport - the financially and technically troubled Denver International Airport - to the north promises further expansion and development in that direction as well.

Thornton, the other major player in the South Park water transfers, is located on the northeastern edge of the metropolitan area (Figure 6-3). It too will benefit from the removal of Denver's airport to the plains, and like Aurora, has virtually unlimited potential for expansion. Already the city has formulated plans to annex lands to the north.<sup>18</sup> Established in 1953, Thornton was a prime example of mid-century planning and development based on affordability.<sup>19</sup> Lot sizes were small, houses were modest and reasonably priced. Trailer parks were not only permitted but encouraged.<sup>20</sup> The result was a more densely packed form of suburbanization than found elsewhere in the metropolitan area. In more recent years that pattern has

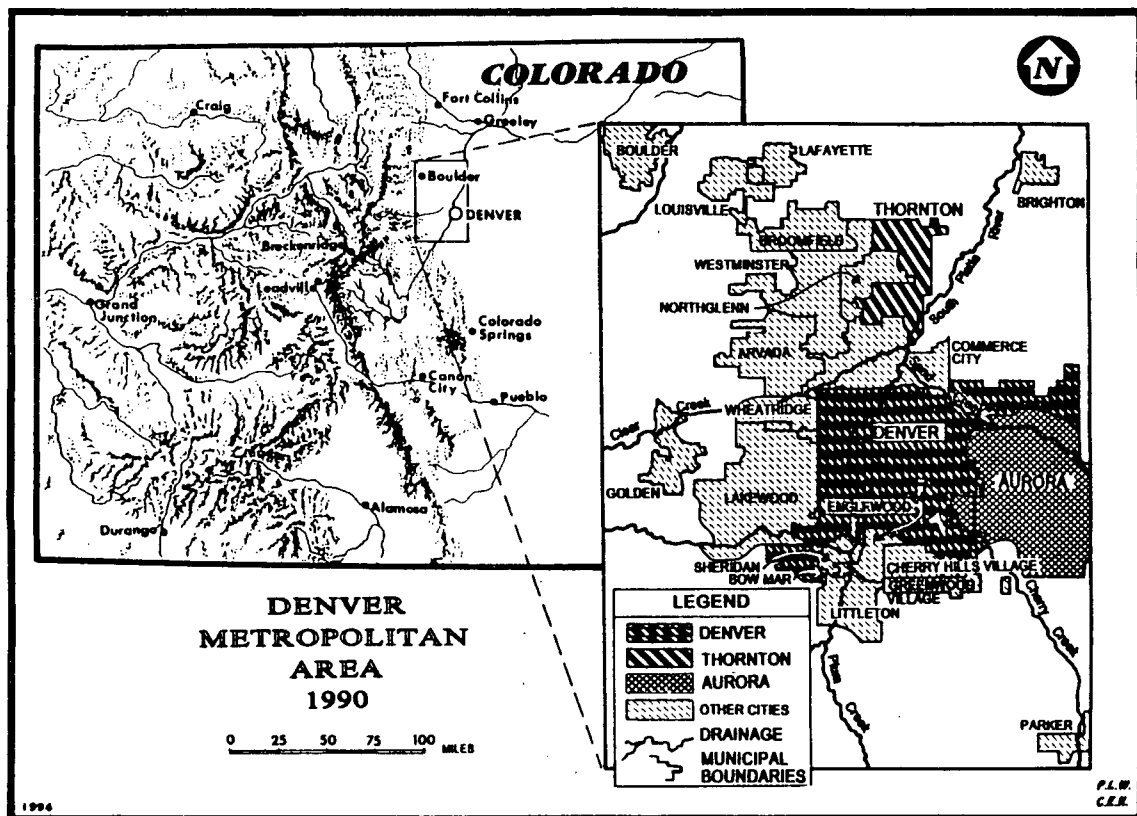


Figure 6-3. Map: The Denver Metropolitan Area, 1990.

changed. The city now seeks to attract more affluent residents. North of Thornton's core, recent development has focussed both on condominiums and on subdivisions with larger lots and more spacious homes. A golf course has also been developed. The character of Thornton is changing.

In comparison to Denver, the municipalities of Thornton and Aurora are relatively small. Their potential for growth is enormous however, and on that basis both cities have aggressively pursued water rights acquisitions. As Denver had found half a century earlier, South Park was a logical place to expropriate supplies. The South Platte River provided a natural conduit, carrying water by gravity from the headwaters to the cities. Though amounts of water were small, the cities could justify South Park acquisitions strategically. As well, the cities were addressing their water supply problems in the mid-to-late twentieth century, by which time the options for supply were severely limited. The extent of over-appropriation on the eastern slope was well known, and water rights were much harder and more expensive to come by. Even small amounts of water were valuable.

In the late 1960s, the sale and transfer of the Augustine Ranch water rights inaugurated a new period of water transfers in South Park, which persists to the present. The irrigated meadows described by Elizabeth Link in 1907 and Etienne Renaud in 1944 are being dried up. Water no longer courses across the surface or shimmers in the bright sunlight, except in isolated

spots. The park more nearly resembles the place encountered by explorer John Charles Fremont in 1844: a vast brown expanse, broken by lightly forested ridges and patches of green. The delicately balanced system of ranching developed and maintained for over a century is disappearing, along with the people and the culture that accompanied it (Figure 6-4).

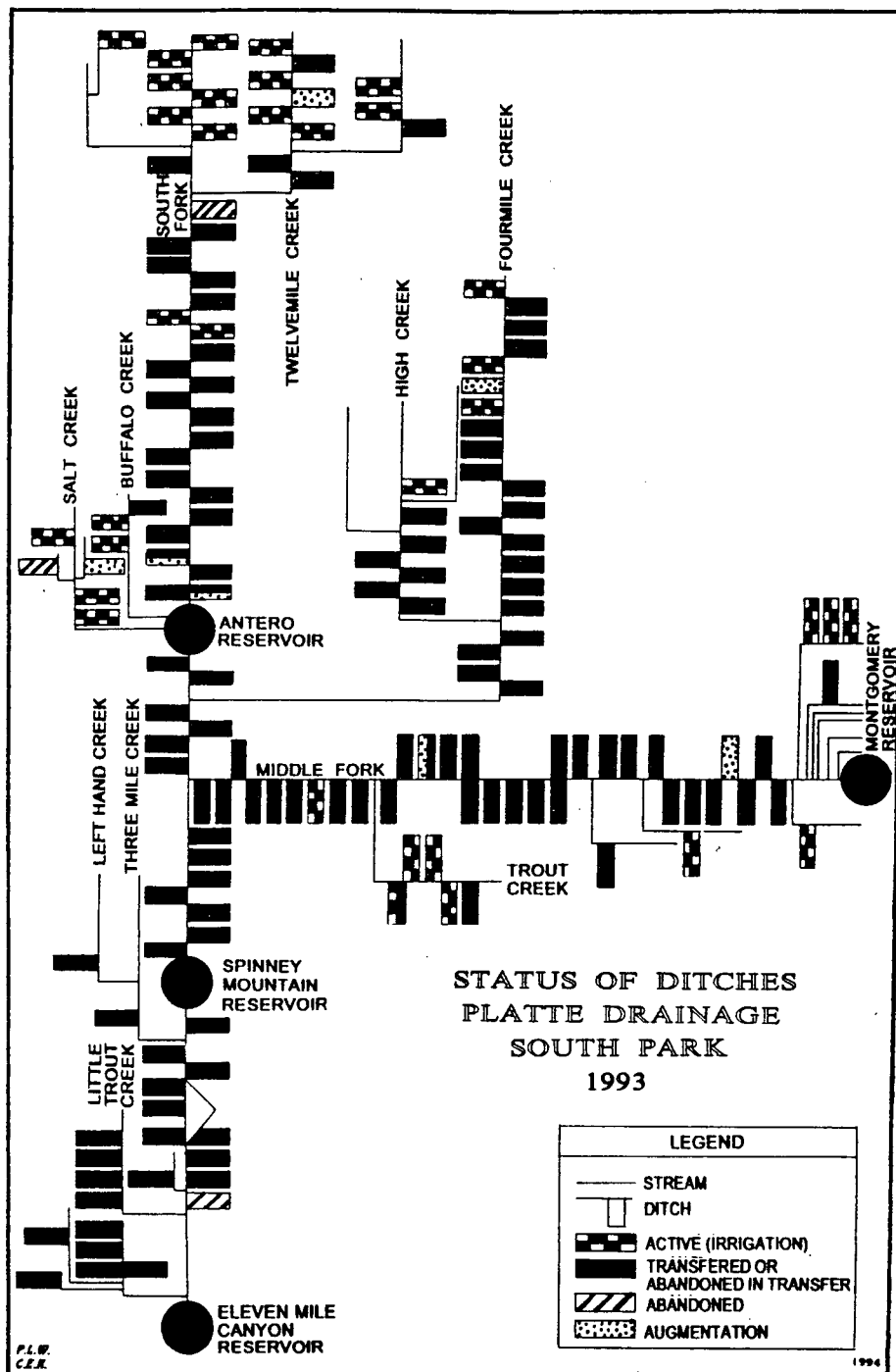
### **The Beginnings of Wholesale Expropriation**

Since the time of the Augustine transfer, close to 40,000 acres of hay meadows have been removed from production; approximately 500 cfs (cubic feet per second) of flow have been transferred downstream to municipal intakes; and over 250 separate water rights have been retired from irrigation in South Park (Figures 6-5 and 6-6 and Appendix B). Only a handful of working ranches still remain: the late Albert Wahl's ranch on Jefferson Creek; the late Freda Wahl's ranch on Michigan Creek; Alex Ebel's place over on Trout Creek; Rod and Sandy Ansley's spread on the upper reaches of the South Fork of the South Platte; J.C. Green's ranch on Jefferson Creek, and several others.

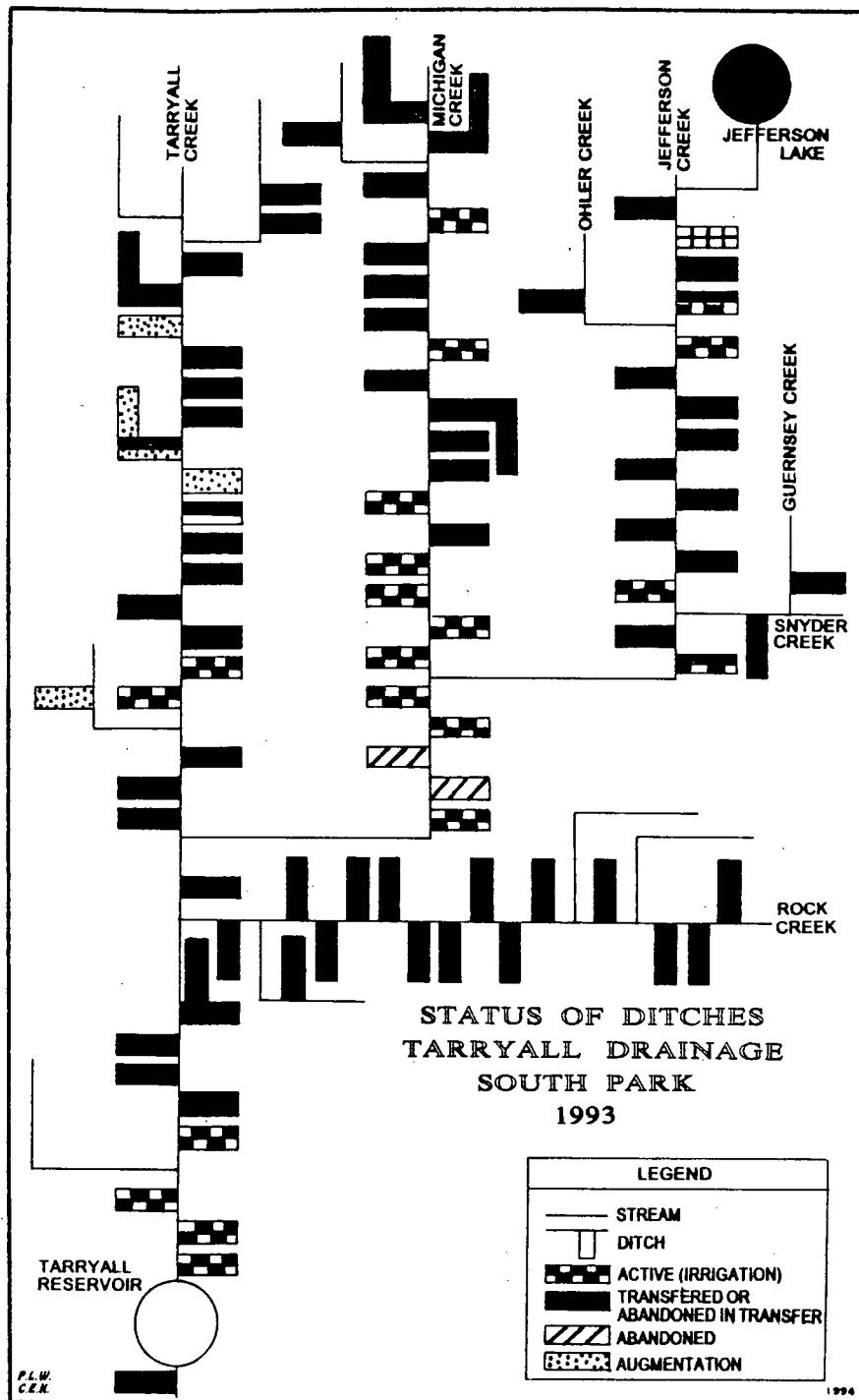
The Augustine transfer was the last to be handled through District Court in Fairplay. The following year the Water Rights Determination and Administration Act was passed, removing water court to Greeley. The ditch rights to the 4,760 acre Augustine ranch were purchased by Aurora in June of 1967.<sup>21</sup> The next month the city applied to the court for a temporary change in



**Figure 6-4.** Haying in South Park, Fall 1993.



**Figure 6-5.** Status of Ditches, Platte Drainage, South Park, 1993. Ditches in this set of line drawings are differentiated according to whether they remain active in irrigation, were abandoned, or had rights transferred in municipal transfer proceedings, were transferred for augmentation, or were abandoned in transfer proceedings.



**Figure 6-6.** Status of Ditches, Tarryall Drainage, South Park, 1993.

the point of diversion,<sup>22</sup> similar to the temporary transfers made by the city of Denver in the 1930s. In 1968 Augustine and the city applied for a permanent transfer. Within the rubric of the law, a small percent of the water rights were changed in their use and point of diversion. More significantly, the 1968 decree specified "dry up" on 500 of the ranch's formerly irrigated lands.<sup>23</sup> In the decree Judge Howard Purdy defined the term,

An area shall be considered to have been dried up... only if the ground water table shall have been permanently lowered far enough below the soil gravel interface to prevent the replenishment of soil moisture by capillary action and all surface water sources which could replenish soil moisture, other than natural precipitation, shall have been permanently cut off.<sup>24</sup>

In other words, the judge was requiring consumptive use to cease. To comply with the terms of the decree, Aurora implemented the controversial practice of trenching,<sup>25</sup> described in an article in the Denver Post,

Man-made trenches crisscrossing Colorado's South Park gulp thousands of gallons of water. They are part of an effort to dry up the valley floor and divert valley water - and underlying groundwater - into the South Platte River system. South Park residents - reacting to the ditches, which are from three to four feet deep and ten feet wide - claim trenching is raping their land and robbing them and their children of a future.<sup>26</sup>

Park County residents and the Soil Conservation Service alike were concerned that the long term effects of artificial drainage would be detrimental.<sup>27</sup> It was not known at that time how long formerly irrigated hay lands would take to make the transition from wetland species of plants to dryland species. The prospect seemed real that the park could be turned into a dustbowl.

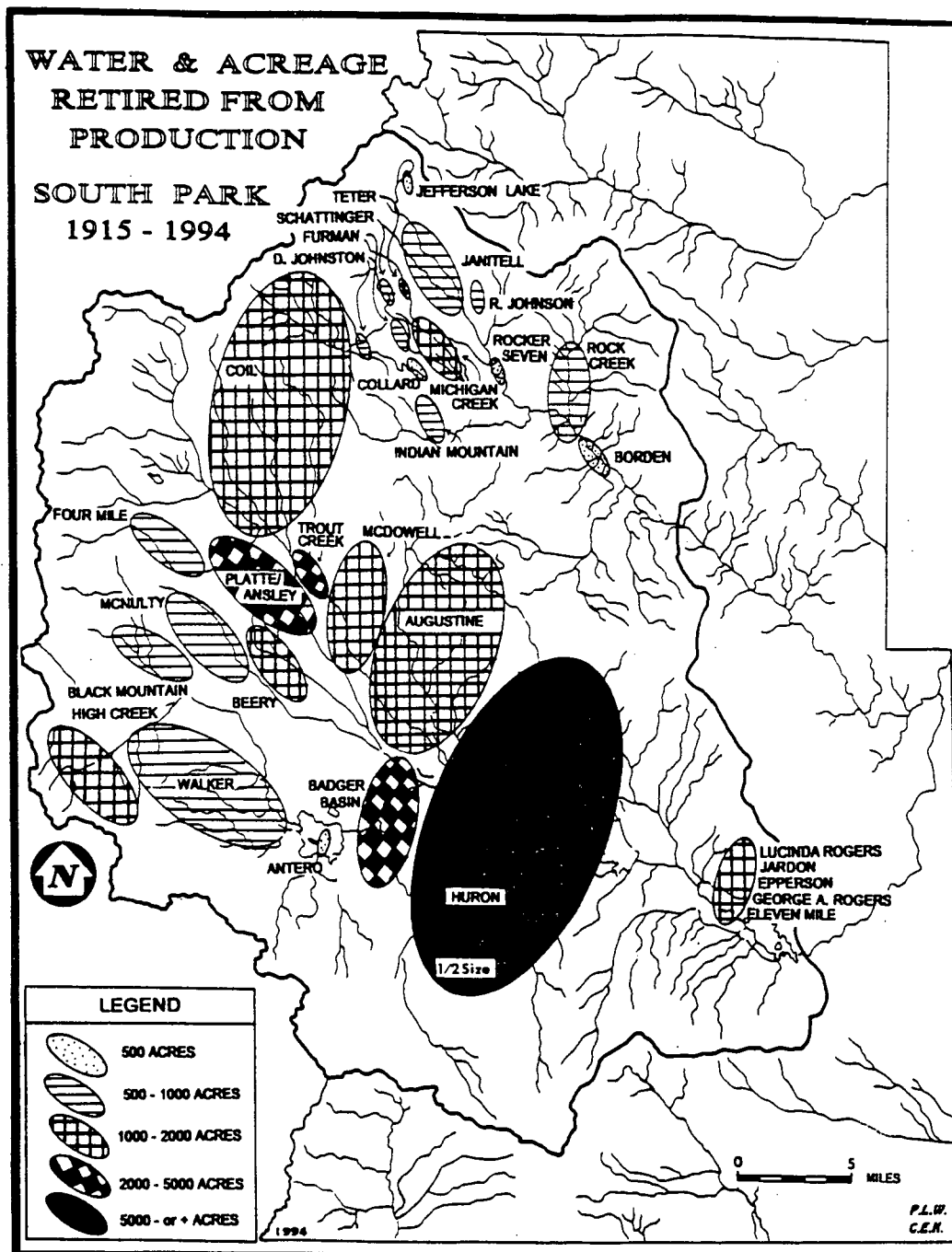
In the decree Aurora was given the opportunity to claim an additional amount of water if a designated 500 acre parcel of subirrigated land could be dried up.<sup>28</sup> The city was given five years to accomplish the task. Trenching began in June of 1969. The city did not seriously consider other alternatives.<sup>29</sup> A 1969 report by consultants indicated that trenching was the most cost effective. By 1972 a network of large trenches and smaller drainage ditches extended throughout the Augustine meadows.

The city returned to court (this time in Greeley) to claim more water in direct proportion to the amount of subirrigated land dried up. Aurora claimed dry up on 428.3 of the 500 acres.<sup>30</sup> Denver disagreed. In 1976 the city's consultants, W.W. Wheeler and Associates, did their own studies on the Augustine Ranch. Their findings suggested that dry up had only occurred on 237 acres.<sup>31</sup> The Augustine case dragged on long past the five year period originally suggested by Judge Purdy. The original transfer was not as complicated as were subsequent attempts by the city to claim additional water. In the latter, numerous objectors took active part in trying to claim injury to their water rights and to block Aurora's claim to further surface diversions based on lowering the water table.<sup>32</sup> The objectors ranged from South Park ranchers to large downstream interests like Denver and other municipalities, and the large mutual ditch companies.

The practice of trenching proved so controversial that the city of Aurora abandoned it.<sup>33</sup> In terms of public relations,

the policy proved disastrous. The practice also attracted numerous costly and time consuming lawsuits. Legal decisions in the mid-1970s, as well, seemed to be going against the practice. In 1974 the case of Southeastern Colorado Water Conservancy District, et. al. v. Shelton Farms, Inc. was appealed and a prior grant of additional water rights based on the destruction of cottonwoods in a riparian area was reversed.<sup>34</sup> In all future South Park transfers, the city of Aurora settled for constructing smaller drainage ditches to aid in drying out the land. The net result was the same: the lowering of the water table and a change in plant species.

Though C.F. Augustine had received only 500 dollars an acre foot for water transferred from his land, other South Park ranchers saw the opportunity for economic gain. Water rights were offered for sale on numerous South Park ranches,<sup>35</sup> and the city of Aurora obtained options on several of them. Speculators such as the Huron Investment Group, Wendell Cheek and Associates, and the Janitell brothers readily made deals with the city. Rancher James McDowell Jr. sold to the city of Thornton. All the sales were voluntary economic transactions. Some of these sales proved controversial because of the size of the acreages and the amounts of water involved (Figure 6-7). The Huron transfer and the Janitell transfer were most notable in this regard. Other sales moved swiftly and relatively painlessly through the courts. One such case was the McDowell transfer, decreed by the court in 1976.



**Figure 6-7.** Map: Water and Acreage Retired from Production, South Park, 1915-1994. This map shows the South Park water transfers, representing each with an ellipse that is scaled or sized according to the amount of water (cfs) originally decreed to ditches involved in the transfer, and screened or coded according to the amount of the irrigated acreage retired from production.

James McDowell Sr. had purchased the old Guiraud Ranch in the early 1940s from a bank in Denver.<sup>36</sup> The property had gone into foreclosure when Harry Johns declared bankruptcy. Johns had inherited the ranch from his wife, Mildred Guiraud, whose family had homesteaded the place.<sup>37</sup> The ranch had some of the oldest water rights in the South Park, the Guiraud, Small, and Canon Ditches, all bearing priority dates in the 1860s (Table 6-2 and Appendix C). James McDowell Jr. took over operation of the ranch after he returned from the war.<sup>38</sup> In the years that followed the younger McDowell expanded his holdings, acquiring the Santa Maria Ranch, immediately to the south, in 1964 and extensive summer range in an area now known as the Elkhorn. The Santa Maria Ranch added the Fehringer Ditches to McDowell's property, with some valuable pre-1879 water rights. In all, he assembled 15,944 deeded acres, and held leases on close to 5,000 more<sup>39</sup> (Figure 6-8).

McDowell was an innovator. In an attempt to improve hay yields from his meadows, he worked closely with agronomists on what came to be known as the Mountain Meadows Research Project.<sup>40</sup> In the 1950s he experimented with fertilization and pasture improvements, increasing hay yields by approximately a quarter of a ton per acre.<sup>41</sup> He applied for and received transfer decrees to redistribute water from his largest, most senior ditches, to areas with junior water rights that were seldom in priority.<sup>42</sup> In this manner he spread his entitlement from the river more productively over his land. Despite these

WATER RIGHTS AND PRIORITIES  
SOUTH PARK WATER TRANSFERS, 1932 - 1993

<u>Transfer</u>	<u>City</u>	<u>Transfer Decree</u>	<u>Water Rights Involved</u>	<u>Earliest Priority</u>	<u>Earliest Priority No.</u>
Jardon	Denver	1932	3	6/1/1879	102
Borden	Denver	1933	5	5/1/1866	3
George Rogers	Denver	1934	4	5/1/1875	42
Antero	Denver	No Transfer	2	10/10/1881	149
Elevenmile	Denver	No Transfer	4	7/1/1872	15
Epperson	Denver	No Transfer	2	6/1/1879	102
Lucinda Rogers	Denver	No Transfer	3	5/15/1879	99
Augustine	Aurora	1968	14	8/1/1868	10
Beery	Denver	1976	5	6/1/1861	1
Janitell	Aurora	1978 & 1991	20	10/1/1874	33
McDowell	Thornton	1979	8	7/1/1867	6
High Creek	Aurora	1979	8	8/31/1873	22
Four Mile	Denver	1982	7	6/1/1868	9
Badger Basin	Aurora	1983	13	6/1/1874	25
Coil	Aurora	1983	8	5/23/1873	18
Huron	Aurora	1983	35	6/15/1874	30
Walker	Aurora	1983	10	6/25/1873	20
Platte Ansley	Thornton	1986	9	7/1/1879	104
Trout Creek	Thornton	1986	5	7/1/1862	2
McNulty	Aurora	1986	8	9/1/1873	23
Rocker Seven	Thornton	1987	5	4/25/1875	39
Rock Creek	Thornton	1987	33	5/15/1871	11
Schattinger	Thornton	1987	6	5/15/1875	46
Dixon Johnston	Thornton	1988	7	5/15/1872	13
Teter	Thornton	1988	3	4/12/1875	37
Indian Mountain	Aurora	1988	3	5/20/1878	86
Furman	Thornton	1991	3	5/1/1882	154
Michigan Creek	Thornton	1991	6	3/15/1880	110
Black Mountain	Aurora	1991	7	8/1/1878	92
Collard	Aurora (75%) Thornton (25%)	1991	2	4/5/1876	55
Ralph Johnson	Aurora	Pending	5	6/1/1875	51

**Table 6-2.** Water Rights and Priorities, South Park Water Transfers, 1932-1993 (Source: Transfer Decrees).



**Figure 6-8.** Formerly irrigated hay meadows on the Middle Fork of the South Platte River, McDowell Ranch, 1993. The McDowell water rights, some of the most senior in South Park, were transferred to the city of Thornton in 1979.

changes the McDowell Ranch was barely breaking even. Long winters, an abbreviated growing season, high costs, and heavy reliance on hay made ranching marginal.<sup>43</sup>

The McDowell water rights were assessed and offered for sale to Denver, Aurora, and several other municipalities. Thornton prevailed and gained important strategic water rights, as well as its first South Park holdings. In an interview James McDowell described the process of reaching a sale agreement as more complicated than the transfer itself. He recalls little controversy and relatively few objections.<sup>44</sup> He anticipated that his water rights would sell first, but unable to reach agreement with Denver or Aurora, he sold the land first. It was sold in one transaction to a Minneapolis based development company. Much of the land was sold on partial release, meaning that no title was conveyed until the property was paid for in full. In this manner, though the sale went through in 1971, the rancher continued to receive payments into the 1980s.<sup>45</sup>

Unlike many others who transferred their water rights, McDowell retained a small but senior portion of his rights under the Guiraud 3T Ditch.<sup>46</sup> These rights were transferred for augmentation purposes, which meant they could be used to augment stream flows, compensating for groundwater withdrawals in residential subdivisions from South Park to Denver. James McDowell subsequently sold his augmentation water and realized a reasonable profit.<sup>47</sup> Today he runs a cattle operation in Milliken, Colorado, located close to Greeley on the rolling

piedmont. With less land, McDowell can support more cattle. Losses to brisket (high altitude disease) have been eliminated, weights of livestock improved, and overheads lowered.

In 1976, the McDowell water rights were transferred to municipal use. Of 168.48 cfs in water decreed to eight ditches, 71.79 cfs were transferred.<sup>48</sup> The remaining 96.69 cfs were abandoned to the stream (Appendix C). The McDowell transfer removed 1,813 acres of irrigated land from production<sup>49</sup> and was accompanied by the sale and subdivision of rangeland. Without water and hay, the critical components in South Park ranching, great expanses of rangeland were of limited value for raising livestock. In the 1970s and 1980s extensive tracts of land were sold to developers and subdivided for residential use. Only some of the subdivisions succeeded. Most have remained sparsely populated, especially those located in the dry, treeless sections of South Park.

In 1973, the Huron Investment Company acquired the Eleven Mile Grazing Association lands and water rights. In the early 1960s, most of the vast A.T. McDannald Ranch had been purchased by two local cooperatives controlled by ranchers: the Eleven Mile and Badger Basin Grazing Associations. The former held approximately 77,500 acres of land<sup>50</sup> (Table 6-3) of which 9,410 were irrigated.<sup>51</sup> Thirty-five ditches served the association's hay meadows and pastures, including seven with pre-1879 water rights (Appendix C). The city of Aurora financed the Huron Investment Company's six million dollar purchase on the

TOTAL ACRES, SELECTED RANCHES  
SOUTH PARK WATER TRANSFERS

<u>Transfer</u>	<u>City</u>	<u>Transfer Decree (Year)</u>	<u>Total Acres</u>
Beery	Denver	1976	5,600
Borden	Denver	1933	420
Coil	Aurora	1983	8,180
Collard	Aurora (75%) Thornton (25%)	1991	1,840
Epperson	Denver	No Transfer	1,240
Furman	Thornton	1991	1,080
Janitell	Aurora	1978 & 1991	16,317
Jardon	Denver	1932	440
Johnson	Aurora	Pending	1,900
McDowell	Thornton	1979	20,929
Michigan Creek	Thornton	1991	2,520
Rock Creek	Thornton	1987	2,331
Rocker Seven	Thornton	1987	2,406
George Rogers	Denver	1934	300
Lucinda Rogers	Denver	No Transfer	1,320

Total: 66,823

**Table 6-3.** Total Acres, Selected Ranches, South Park Water Transfers (Sources: Offers to Sell and Engineering Reports).

condition that the water rights be sold to the municipality for \$800 an acre foot on an estimated 5,680 acre feet of yield transferred.<sup>52</sup> The city also acquired the site for a reservoir.

The initial agreement between Huron and Aurora was concluded in July of 1973. Transfer proceedings were initiated in January of 1974. Objections were vociferous, and the case, due to a panoply of legal and financial complications, remained in the courts for nearly another decade before a decree was issued.<sup>53</sup> During that time Aurora engaged in negotiations with Denver, the major objector in the case.<sup>54</sup> As in most other transfer cases, before and since, the issue was injury. Denver made its own studies and observations in cases, because it had to ensure that applicants in transfer proceedings were not

overestimating consumptive use. If the applicants were, they might claim more water than had historically been used, disturbing the regime of the river, as the objectors and other users knew it, and disrupting the pattern of use.

Huron had big plans: a 54,680 acre subdivision, part to be divided into 1000 parcels of approximately 40 acres and the remainder in lots of other sizes.<sup>55</sup> The company called it the "High Chaparral," and remnants survive today, even though Huron Investments filed for bankruptcy under Chapter XI of the National Bankruptcy Act in June of 1976. Six months later, Aurora concluded an agreement regarding gravel, payment of interest, and other details and problems arising from Chapter XI.<sup>56</sup> A key element to the agreement was that Huron had to clear the title to the city's planned Spinney Mountain Reservoir site and title to the water rights. The city did not want to foreclose and become a large landowner in South Park, particularly because of liability and the fact that High Chaparral sales were not brisk.<sup>57</sup>

On August 26, 1983, 94.3 cfs of the Huron water rights were transferred to Aurora's municipal system.<sup>58</sup> That same day, three other decrees were issued by the water court in Greeley, transferring an additional 69.59 cfs from South Park ditches to the sprawling city at the edge of the plains.<sup>59</sup> Local newspaper editor Richard Hamilton called it one of the darkest day's in Park County's history.

Also on that day, the water rights from the Badger Basin Grazing Association lands were changed in their point of diversion and in their use.<sup>60</sup> The association retained most of its acreage for dryland grazing but sold its water to Aurora. There were 13 ditches involved, and they irrigated close to 2,500 acres of meadows and pastures above and below the town of Hartsel. Shortly after irrigation ceased under the Thompson and Main (or Hotel) Ditches, wells in the town of Hartsel declined in quality and quantity. Many of the wells in town were hand dug and shallow. Residents complained of a foul odor, a bad taste, and increased staining and accumulation on fixtures.

The city of Aurora hired Blatchley Associates, consulting engineers, to conduct a study of Hartsel's groundwater situation and determine "the effect, if any, of the termination of irrigation on water table levels in Hartsel."<sup>61</sup> The study concluded,

It appears that the water rights transfer and subsequent drying up of the Thompson and Main or Hotel irrigation ditches have dried up enough of the land in the area and reduced recharge to the tributary surficial aquifer, that some shallow hand-dug wells may have been affected through a drop in water levels to the point of having little or no productive capacity.

It was concluded but not with certainty that some of the deeper wells which have been completed in the gravel may also be affected by the drop in the water level...

Nothing is to be implied in this study by suggesting solutions to low water level problems of the residences in Hartsel. The responsibility of the parties ceasing to irrigate lands in the area is not an engineering determination or the subject of this study. The question as to who has the responsibility to maintain the efficiency of the Hartsel wells as points of diversion should be investigated by legal counsel.<sup>62</sup>

The report explored four potential solutions, none of which were implemented in the final settlement.<sup>63</sup>

The application for a change of water rights was filed May 4, 1978.<sup>64</sup> Under Aurora's management, use of the water rights was ceased. Numerous objectors filed appearances in the case, including the Upper South Platte Water Conservancy District. As the Badger Basin transfer was set to go to court, the people of Hartsel wrote a letter to the clerk in an eleventh hour attempt to obtain standing in the case.<sup>65</sup> Forty-two people who lived in and around Hartel signed the petition. Aurora sought to keep the people out of the case and filed a motion to strike entry of appearance.<sup>66</sup> Apparently Aurora's motion was granted. In obtaining the transfer decree the city agreed to study the Hartsel water problems.<sup>67</sup> The judge required a 10 year period of continuing jurisdiction in which further objections could be filed.<sup>68</sup> In 1986 the people wrote to Judge Behrman in Greeley asking once again to enter the case.<sup>69</sup> The judge responded, suggesting they get a lawyer.<sup>70</sup>

In the end the Upper South Platte Water Conservancy District struck a deal with the city of Aurora in which \$48,000 would be spent to install Culligan water systems for 33 wells in the town of Hartsel.<sup>71</sup> In the agreement the local water conservancy district was granted 37 acre feet of storage in Spinney Mountain Reservoir, constructed on the Huron transfer lands. Legally, the situation was resolved.

### **The Janitell Transfer**

Another controversial transfer involved the Janitell water rights on the upper reaches of the Tarryall drainage.<sup>72</sup> The city of Aurora purchased the Janitell rights in 1974.<sup>73</sup> Sixteen thousand acres of land and 20 water rights were acquired by Ralph and Richard Janitell and their partners with the specific intent of selling the water to Aurora. The sale of what had previously been known as the Anschutz holdings was concluded on August 1, 1973; the next day the Janitells and their partner H.J. Bleakley signed an agreement with the city of Aurora.<sup>74</sup>

The Janitells were able to make a quick conversion because the water rights had already been engineered and developed to their fullest extent by the previous owner, the South Park Cattle Company, controlled by millionaire Phillip Anschutz. In 1969, consulting engineer Charles C. Fisk of Denver advised Anschutz on steps that could be taken to maximize the value of his South Park water rights. Fisk wrote, "the basic objective is to take whatever steps are necessary in order to apply the maximum amount of water available under your water rights to irrigation consumptive use."<sup>75</sup> Work was done on ditches, Parshall flumes were installed, and diversion records were kept by the ranch foreman in preparation for sale to the city of Aurora.<sup>76</sup> Anschutz never concluded an agreement with the city, but chose instead to sell out to the Janitell interests for 5.5 million dollars.<sup>77</sup>

Like the Huron developers, the Janitells had plans for the land that never materialized. They too became involved in bankruptcy proceedings a short time after purchasing the property. Aurora was forced to take over the mortgage in 1976 in order to prevent a default.<sup>78</sup> Despite the problems, Aurora was able to bring the transfer case to trial more quickly than in the case of the Huron transfer.

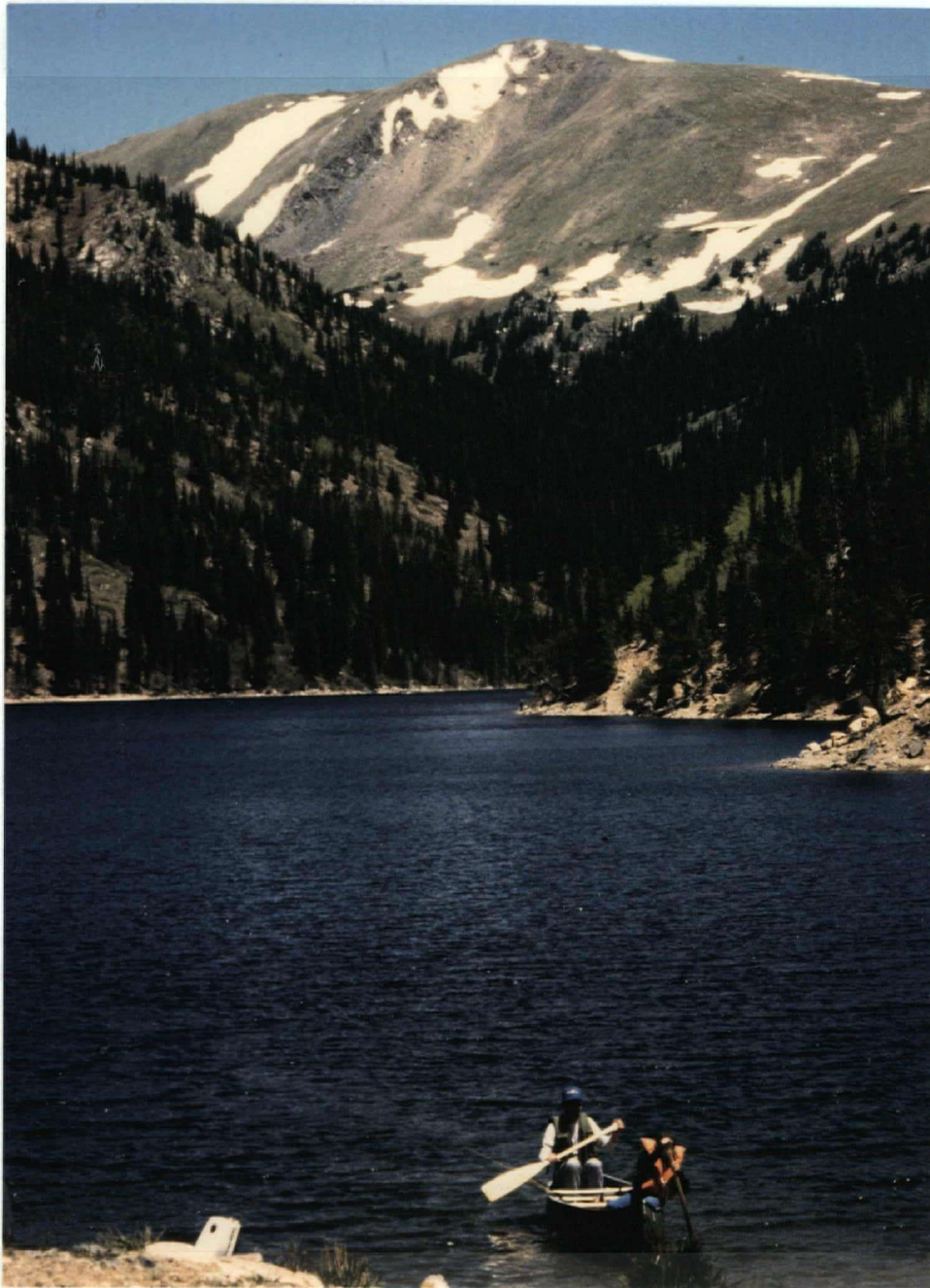
There were numerous objections in the Janitell case.<sup>79</sup> What concerned the objectors was the potential to injury to their water rights. Denver, as the most powerful objector, took the lead in the case. Many of the reasons stated were fairly standard: the application was too vague, the amounts claimed were excessive, some of the rights might prove to be abandoned. Others reasons were quite specific. Denver was most concerned about phrasing in the application that referred to "new" water that could be developed through the drying out of subirrigated land.<sup>80</sup>

The state made formal entry into the case as well.<sup>81</sup> In a letter to Judge Carpenter in Greeley, Division Engineer W.G. "Dugan" Wilkinson expressed their concerns,

the amount of water to be transferred... is based upon the acreage alleged to have been irrigated historically with either a full or nearly adequate supply of water available to those lands at all times....

I believe the proposed decree is deficient in several respects.... The primary problems are the overestimation of historic consumptive uses, the failure to recognize and provide the necessary protection against injury to other water rights and the absence of administrable criteria for daily determination of the amount of water available to the various water rights considered for change.<sup>82</sup>

The case went to trial in December of 1976 and continued for a year and a half before an interlocutory transfer decree was issued.<sup>83</sup> This decree, intended to be temporary, remained in force for another 13 years, at which time a consent decree was finally granted.<sup>84</sup> In October of 1977, the city of Aurora filed a brief in support of the proposed transfer. The city was advancing a novel theory, one not based on volumetric averages.<sup>85</sup> Under the proposed decree, Aurora would be able to divert water at new points of diversion only to the extent that water was available at the old point of diversion. In other words, with proper gauging, it would be possible to determine how much water was flowing past the old headgates of the transferred ditches. Water could then be taken in direct relation to physical availability. With the use of lysimeters, Aurora suggested that measurable consumptive use could be monitored and water taken only at times when the water would be consumptively used. The city argued that its method would lead to less injury than the use of volumetric averages. It maintained the system would account for daily conditions, and for precipitation, in a way that volumetric averages simply could not. The Aurora proposal also included a plan to mimic return flows. Since the Janitell purchase had provided the city with interests in Jefferson Lake, an irrigation reservoir at the headwaters of Jefferson Creek (Figure 6-9), Aurora suggested that return flows be stored there, then released on a daily



**Figure 6-9.** Jefferson Lake, 1993. Originally built by South Park irrigators in the 1890s, the reservoir is now owned by the city of Aurora. Shares were acquired by the city in a complex of different transfer proceedings and individual transactions.

basis. Again, the idea was to try to closely approximate historic conditions.

The proposal was intriguing but met with vociferous opposition from Denver.<sup>86</sup> Months of wrangling and 27 days in court had produced extreme irritation. Aurora's attorney, John Musick, filed a second brief in response to Denver's arguments:

Like the neophyte woodsman, unable to see the forest for the trees, the objectors' closing statement loses sight of the purpose of this proceeding, and the Applicant's innovative proposal for achieving that purpose, in a forest of unrelated bits of information and snatches of conflicting evidence.<sup>87</sup>

Aurora prevailed and in February of 1978 Judge Carpenter signed the interlocutory decree giving Aurora temporary permission to implement its plan.<sup>88</sup> Both Aurora and Denver petitioned the court for a revision of the decree, based on experience during the one irrigation season it was in effect. The petitions were lodged that September, and a hearing scheduled for a couple months later before newly appointed Water Judge Robert Behrman. Due to the complexities involved in the Janitell case, both the applicant and the objectors agreed it was preferable if Judge Carpenter could hear the case.<sup>89</sup> By an order of the Supreme Court of Colorado, the retired judge was re-assigned to the case. Trial was set for the June of 1979. Aurora took water under the terms of the interlocutory decree. The cities continued to negotiate. Meanwhile engineers, soil scientists, range scientists, and other specialists conducted studies to determine if Aurora's method was accurate and fair. In 1983 Judge Behrman inquired about the case, noting it should have

been resolved four years before. Denver's new attorney, Michael Walker, responded that the city saw no need to hold a hearing at that time, "preferring instead to work with the city of Aurora in reconciliation of the differences which have occurred."<sup>90</sup>

The tone was less adversarial. Though the two cities still had substantial differences, many issues had already been resolved. According to Walker's brief, Denver and Aurora had already reached agreement on the nature of the field work and facts needed to resolve the case.<sup>91</sup> Denver had gained the necessary access so studies could be made. What remained was arriving at a set of mutually agreeable figures and, specifically, determining what limitations were necessary to prevent injury. In 1991 the cities completed their negotiations and a consent decree was issued.<sup>92</sup> The city of Aurora obtained 31.21 cfs, the remaining 84.3 cfs were abandoned to the stream. The transfer had retired 4747.3 acres of irrigated land (Appendix B).

The Janitell case was significant in that it helped to establish the process and procedures for agricultural-to-municipal water transfers from mountain meadows. The transfer established certain conventions that influenced all the transfers that followed, including the Huron and Badger Basin transfers discussed earlier in this chapter. The water transfer process had long been within the domain of the courts, with planning and specific details entrusted to engineers. There was a professionalization of the discourse in the late 1970s that

fundamentally changed the process and access to it by water users, residents of the area of origin, and other lay people.

In the Janitell case, science was put on trial. The vast majority of the witnesses called were professionals: water engineers, range management specialists, soil scientists, agronomists, surveyors, and technicians. Aurora called its engineers and consultants, and Denver put its set of specialists on the stand to rebut their findings, question their methods, and assert a different scientific reality. The cities argued about the extent of dry up that had been achieved, the capacity of ditches, the amount of consumptive use, the historical pattern of use, the comingling of waters and its impact on the accuracy of estimates of the amount of irrigated acreage under a certain ditch.<sup>93</sup> How hard or soft were the numbers? Was one method of calculation more accurate than another? Were the studies confounded by anything? Basically, which city's engineering and science were better?

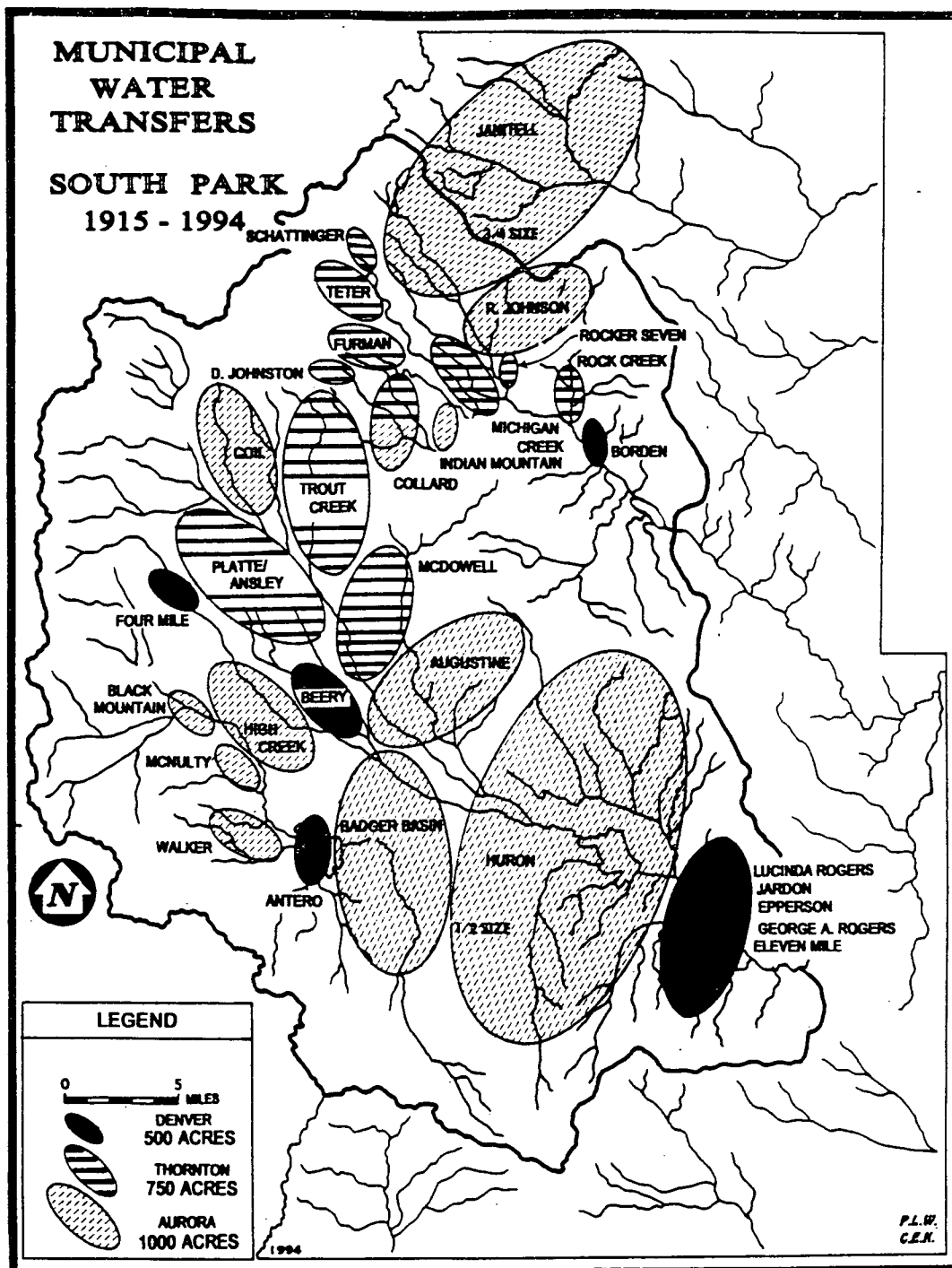
While admitting testimony from South Park ranchers, ranch managers, and others with local knowledge, the court gave more weight to the testimony of the engineers and scientists. Historical use was determined through scientific methods, not through testimony from people who had worked the land. In this professionalized discourse, their knowledge became secondary and suspect. Indeed they could testify to dates of irrigation, and the extent of irrigation in various areas and under changing conditions, but the court was interested in the scientific

evidence supporting these claims. Local knowledge was increasingly peripheralized and discounted.

### **The Transfers**

The Augustine, McDowell, Huron, Badger Basin, and Janitell transfers removed 1386.52 cfs in decreed irrigation water from the books in District 23 (Appendix B). The transfers retired an estimated 20,126.3 acres of hay meadows from production and affected far in excess of 120,000 acres of ranchland (Appendix B). They represented a beginning.

Between 1968 and 1993, a total of 22 ranches sold their water rights to municipal interests, retiring 39,283.3 acres of hayland, removing more than 3110.7 cfs of decreed water from irrigation in the district and transferring, in all, 480.83 cfs to municipal use (Appendices B and C). Three cities were involved: Aurora, Thornton, and Denver (Figure 6-10). The cities adopted different strategies. Denver continued its policy of strategic acquisitions. In 1976, the city muscled out Colorado Springs in a bid to gain control of the Beery Ditch, the number one priority in the park.<sup>94</sup> Denver transferred 20.00 cfs to municipal use, all under the 1861 priority (Table 6-4). In 1982, the city purchased the Four Mile Ranch water rights, adding the number nine priority in South Park to its holdings.<sup>95</sup> In each case Denver sought only to transfer the most senior water right. The remaining ditches were abandoned in the transfer proceedings. The city already controlled the Tarryall



**Figure 6-10.** Map: Municipal Water Transfers, South Park, 1915-1994. This map shows the South Park water transfers, representing each with an ellipse that is scaled or sized according to the number of irrigated acres taken out of production, and screened or coded according to the city acquiring the water rights.

WATER TRANSFERRED TO MUNICIPAL USE, 1932 - 1993  
SOUTH PARK WATER TRANSFERS

<u>Transfers</u>	<u>City</u>	<u>Amount (cfs) Transferred</u>	<u>Pre-1879 Water Rights Amount (cfs) Transferred</u>	<u>Total Amount (cfs) In Transfer</u>	<u>Percent Transferred</u>
Huron	Aurora	94.30	32.20	678.88	13.89
McDowell	Thornton	71.79	71.79	168.48	42.61
Janitell	Aurora	31.21	11.27	115.51 +	27.02 +
Badger Basin	Aurora	29.46	6.00	183.20	16.08
Coil	Aurora	24.28	13.21	287.05	8.46
Trout Creek	Thornton	22.20 +	22.20 +	62.00 +	35.81 +
Indian Mountain	Aurora	20.13	4.97	58.32	34.52
Beery	Denver	20.00	20.00	102.59	19.50
Platte Ansley	Thornton	17.80	0.00	156.85	11.35
High Creek	Aurora	16.62	10.12	126.40	13.15
Walker	Aurora	15.85	11.25	199.02	7.96
McNulty	Aurora	15.08	14.12	66.59	22.65
Augustine	Aurora	14.98	14.98	240.05	6.23
Black Mountain	Aurora	14.44	2.20	105.23	13.72
Furman	Thornton	13.90	0.00	36.60	37.98
Michigan Creek	Thornton	10.50	0.00	81.36	12.91
Schattinger	Thornton	9.79	4.20	21.65	45.22
Rock Creek	Thornton	9.40	4.40	112.30	8.37
Borden	Denver	8.70	8.70	59.84	14.54
Teter	Thornton	8.00	5.10	16.00	50.00
Four Mile	Denver	7.00	7.00	96.89	7.22
Jardon	Denver	6.17	0.00	18.91	32.63
Dixon Johnston	Thornton	5.31	1.61	18.46	28.76
Collard	Aurora (75%) Thornton (25%)	5.09	3.66	25.00	20.36
George Rogers	Denver	4.02	2.31	32.60	12.33
Rocker Seven	Thornton	3.70	1.40	21.84	16.94
Ralph Johnson	Aurora	-----	-----	32.24	-----
Antero	Denver	0.00	0.00	97.79	0.00
Elevenmile	Denver	0.00	0.00	8.00	0.00
Epperson	Denver	0.00	0.00	10.80	0.00
Lucinda Rogers	Denver	0.00	0.00	225.20	0.00

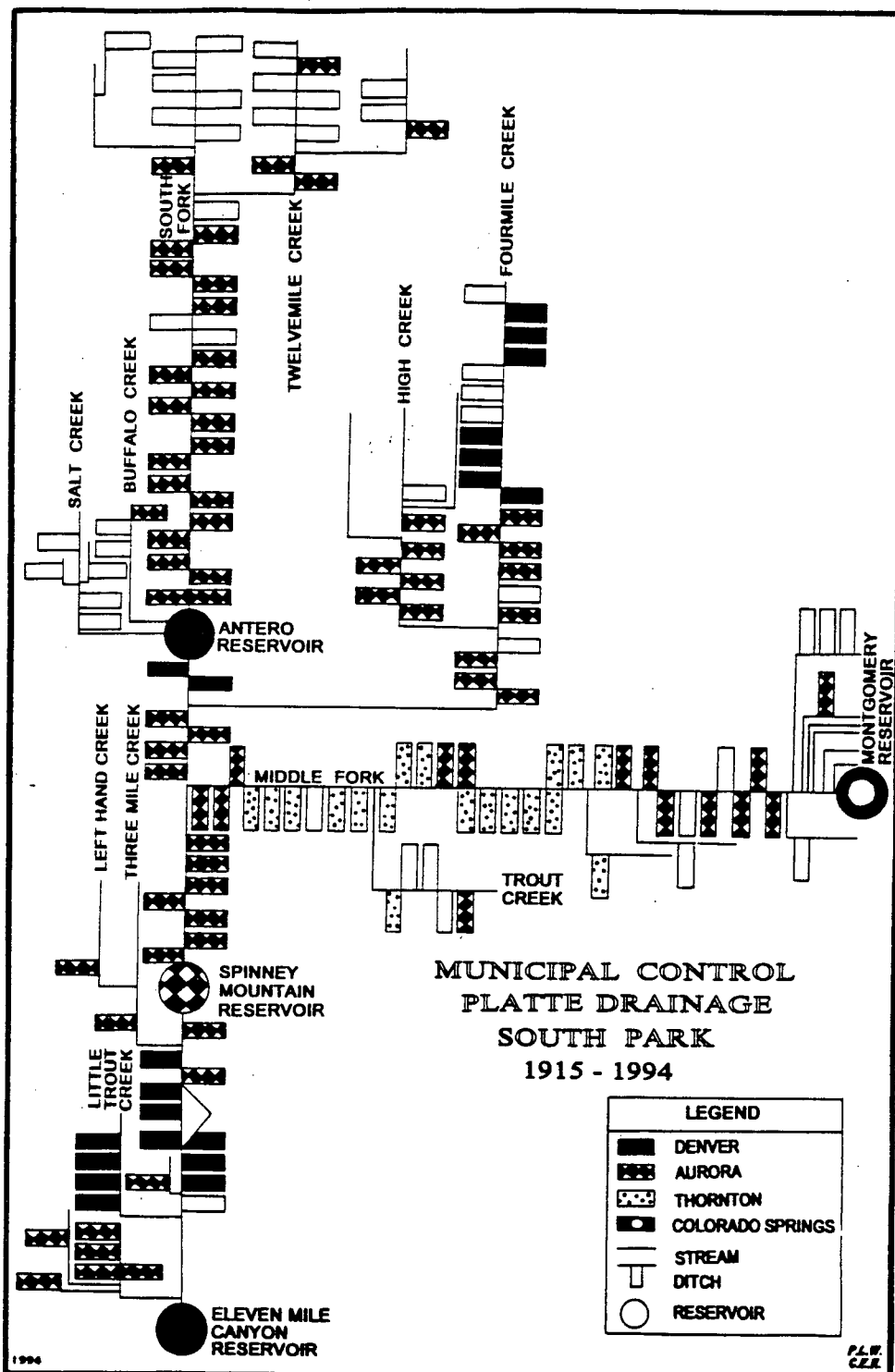
+ = plus the entire flow of a particular small creek, or a portion of that flow.

**Table 6-4.** Water Transferred to Municipal Use, 1932-1993  
(Source: Transfer Decrees and State Alpha List).

with the acquisition of the Borden Ditch. Now the city had gained control of the Platte side of South Park and small but senior water rights within the division as well.

Aurora and Thornton did not have the luxury of adopting such a position. They needed to obtain supplies. South Park rights were being offered up for sale, and a process had been articulated that made many of the later transfers fairly routine. Aurora and Thornton competed with each other both strategically and geographically. Each sought the most senior and plentiful rights, and neither would allow the other complete control of a drainage. Both cities purchased rights on the Tarryall and the Platte (Figures 6-11 and 6-12). Acquisition of adjacent properties was often advantageous because it facilitated dry up and reduced the potential for lawsuits, so clusters of holdings emerged. If the ranch above was no longer irrigating, then seepage would not keep meadows moist. If ranches above or below were removed from production, then claims of injury might be fewer in number.

In some cases the cities bought the land as well as the water rights (Appendix B). The reasons for this varied. Sometimes the rancher would refuse to sell on any other terms. In the Furman transfer the city of Thornton purchased very junior water rights and 1,080 acres of land.<sup>96</sup> The Furman Ranch was located in the middle of other Thornton holdings, and Furman's irrigation had the potential to interfere with the city's efforts to dry up formerly irrigated meadows on adjacent



**Figure 6-11.** Municipal Control, Platte Drainage, South Park, 1993. Coding only ditches involved in transfer proceedings, this set of line drawings differentiates ditches according to the city acquiring the water rights.

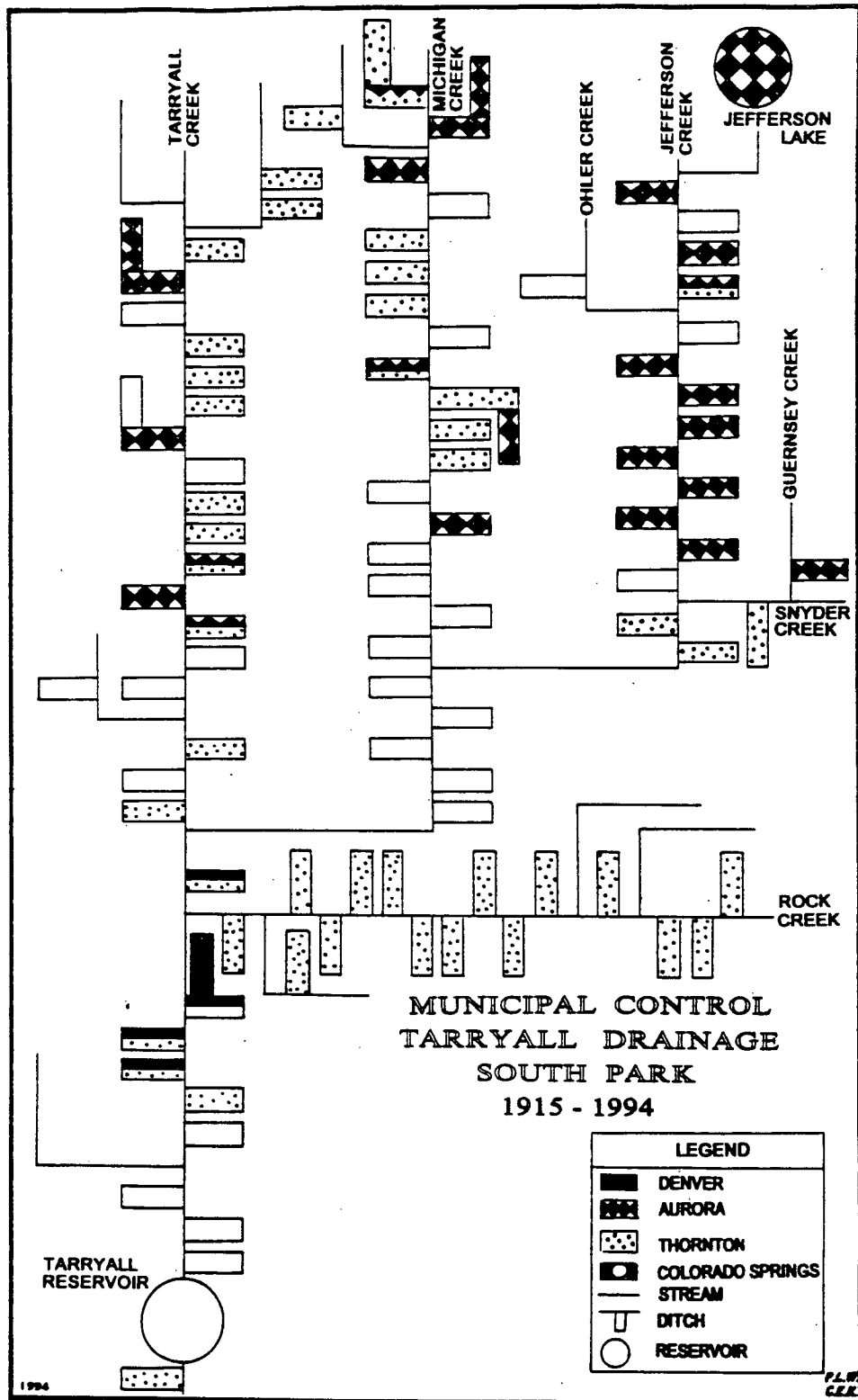


Figure 6-12. Municipal Control, Tarryall Drainage, South Park, 1993.

properties. Wes Furman evidently knew this and was able to obtain a good price for his ranch and his water rights. It was to Thornton's advantage to pay him the going rate for water and dry up his ranch.<sup>97</sup> Furman took the money and found a new spread in Montana.<sup>98</sup>

Another reason cities chose to acquire ranch properties was due to access problems experienced during the Janitell transfer. Engineers and scientists in the employ of Aurora and Denver had trouble getting onto the land to perform their studies and monitor dry up. Some current property owners objected to their presence, particularly to city employees allegedly leaving gates open and cutting fences. This allowed cattle to move into other sections of the range.<sup>99</sup> The property owners staunchly maintained the city had no right to be there, and the matter had to be resolved in court. The city prevailed, but that did not eliminate the possibility that similar problems could arise again.<sup>100</sup> In all, six ranches, including both land and water rights, were acquired in the process of the later transfers (Appendix B).

Patterns emerged as the transfers proceeded. Over time the price of water became more expensive (Table 6-5). The Augustine water rights, bearing the number ten priority in the park, were purchased by Aurora for \$500 an acre foot of yield transferred. By 1993, the Ralph Johnson water rights, with the earliest priority in 1875, were worth \$3,000 an acre foot. The price

PRICE PAID PER ACRE FOOT TRANSFERRED  
AURORA AND THORNTON PURCHASES, 1968 - 1993  
SOUTH PARK WATER TRANSFERS

<u>Transfer</u>	<u>Transfer City</u>	<u>Amount Paid per Decree</u>	<u>Acre Foot (\$ US)</u>
Augustine	Aurora	1968	\$ 500
Huron	Aurora	1983	\$ 800
Platte Ansley	Thornton	1986	\$ 950
McDowell	Thornton	1979	\$ 1,200
Badger Basin	Aurora	1983	\$ 1,250
Janitell	Aurora	1978 & 1991	\$ 1,350
High Creek	Aurora	1979	\$ 1,350
Coil	Aurora	1983	\$ 1,350
Walker	Aurora	1983	\$ 1,350
McNulty	Aurora	1986	\$ 1,350
Trout Creek	Thornton	1986	\$ 1,350
Black Mountain	Aurora	1991	\$ 1,500
Schattinger	Thornton	1987	\$ 1,800
Rock Creek	Thornton	1987	\$ 2,000
Dixon Johnston	Thornton	1988	\$ 2,400
Teter	Thornton	1988	\$ 2,400
Furman	Thornton	1991	\$ 2,400
Indian Mountain	Aurora	1988	\$ 2,500
Collard	Aurora (75%) Thornton (25%)	1991	\$ 2,500
Michigan Creek	Thornton	1991	\$ 2,800
Rocker Seven	Thornton	1987	\$ 3,000
Ralph Johnson	Aurora	Pending	\$ 3,000

**Table 6-5.** Price Per Acre Foot, Aurora and Thornton Purchases, 1968-1993 (Sources: Mark Griffin Smith, and Cities of Aurora and Thornton).

paid depended more on the time they were sold than on their priority.

In terms of irrigated acreage retired, the largest transfers occurred between 1968 and 1986. Since 1986 no ranches with more than 1300 irrigated acres have been retired from year-round production.<sup>101</sup> And only since 1987 have the Front Range cities acquired ranches with fewer than 700 irrigated acres (Table 6-6). When considered together with Denver's early transfers in the 1930s, the later agricultural-to-municipal water transfers removed approximately 75% of the decreed water rights from irrigation in South Park (Appendix C). The cities gained control of three quarters of the ditches in a total of 27 transfers (Figures 6-13 and 6-14).

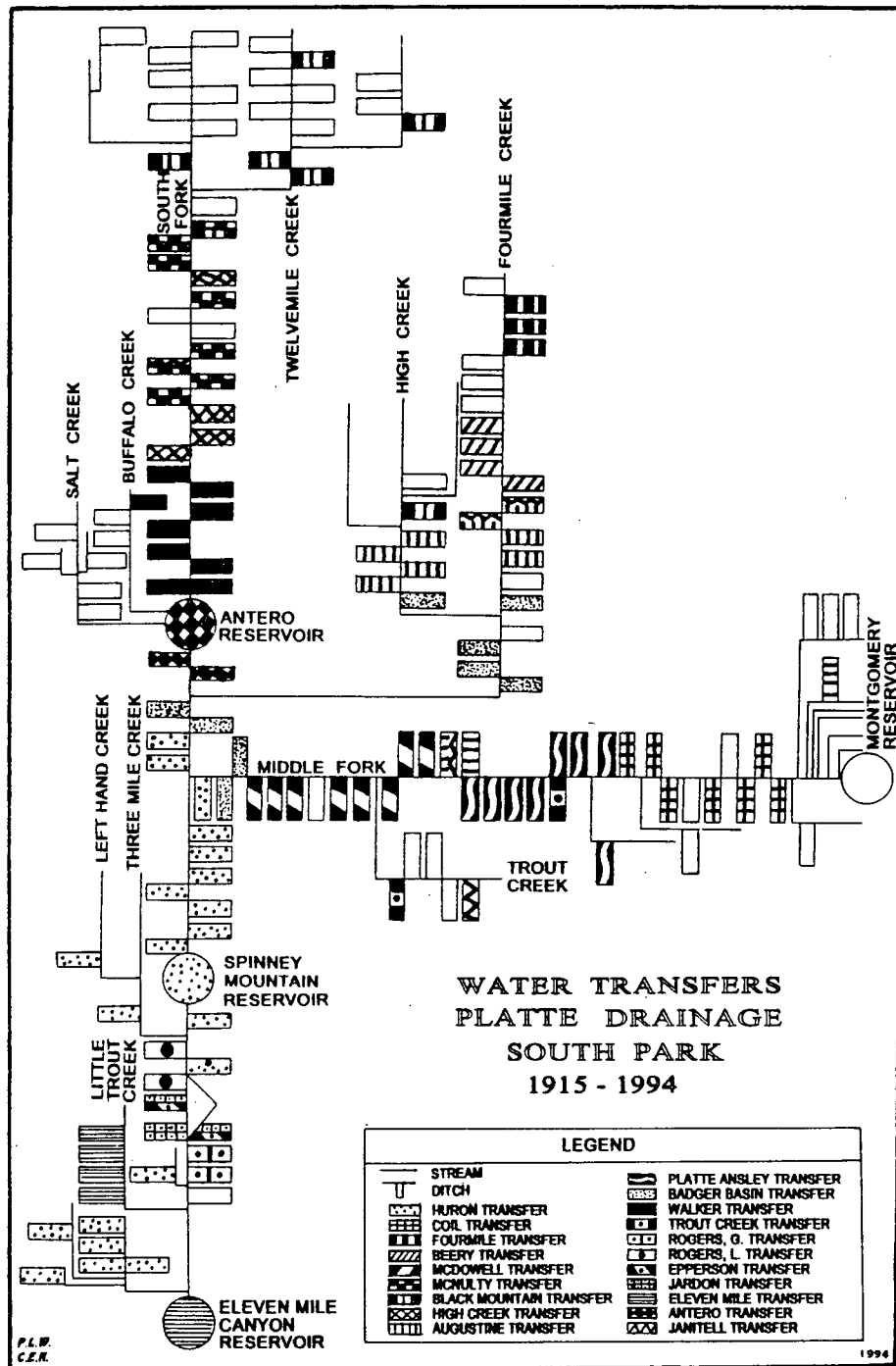
Acquisition of a ranch's water rights was based on a number of considerations: availability, priorities, irrigated acreage, and location - in a potential reservoir basin or in relation to other properties acquired for their water rights. Availability was often determined by the type of ownership at the time of transfer (Figure 6-15). Speculators, and frequently heirs, would sell their water rights. Local ranchers sold too, spurred on by economic conditions or by a sense of the writing on the wall. As time progressed and neighbors sold out, remaining ranchers found it harder to survive. Ranchers dependent upon seepage from meadows above them found it took more water to irrigate their haylands. As the cities became increasingly dominant and administration throughout the water division

IRRIGATED ACREAGE RETIRED, 1968 - 1993  
SOUTH PARK WATER TRANSFERS

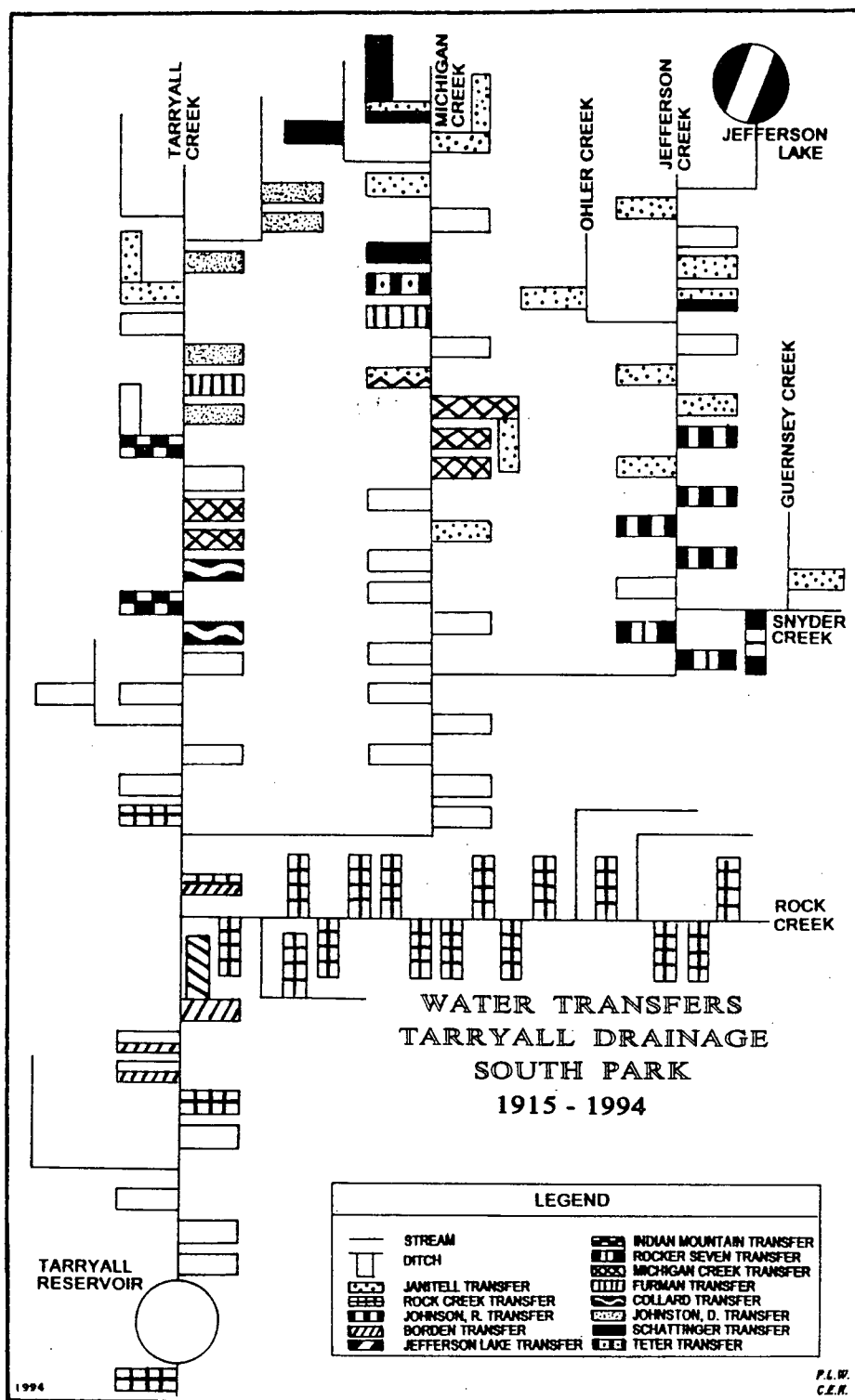
<u>Transfer</u>	<u>City</u>	<u>Irrigated Acres</u>
Huron	Aurora	9410
Janitell	Aurora	4747.3
Trout Creek	Thornton	2600
Badger Basin	Aurora	2456
Platte Ansley	Thornton	2270
McDowell	Thornton	1813
Augustine	Aurora	1700
High Creek	Aurora	1624
Coil	Aurora	1298
Michigan Creek	Thornton	1147
Beery	Denver	1125
Walker	Aurora	968
Furman	Thornton	860
Teter	Thornton	820
Rock Creek	Thornton	780
McNulty	Aurora	775
Four Mile	Denver	725
Dixon Johnston	Thornton	697
Black Mountain	Aurora	678
Ralph Johnson	Aurora	670
Schattinger	Thornton	660
Collard	Aurora (75%) Thornton (25%)	638
Indian Mountain	Aurora	511
Rocker Seven	Thornton	311

Total: 39,283.3

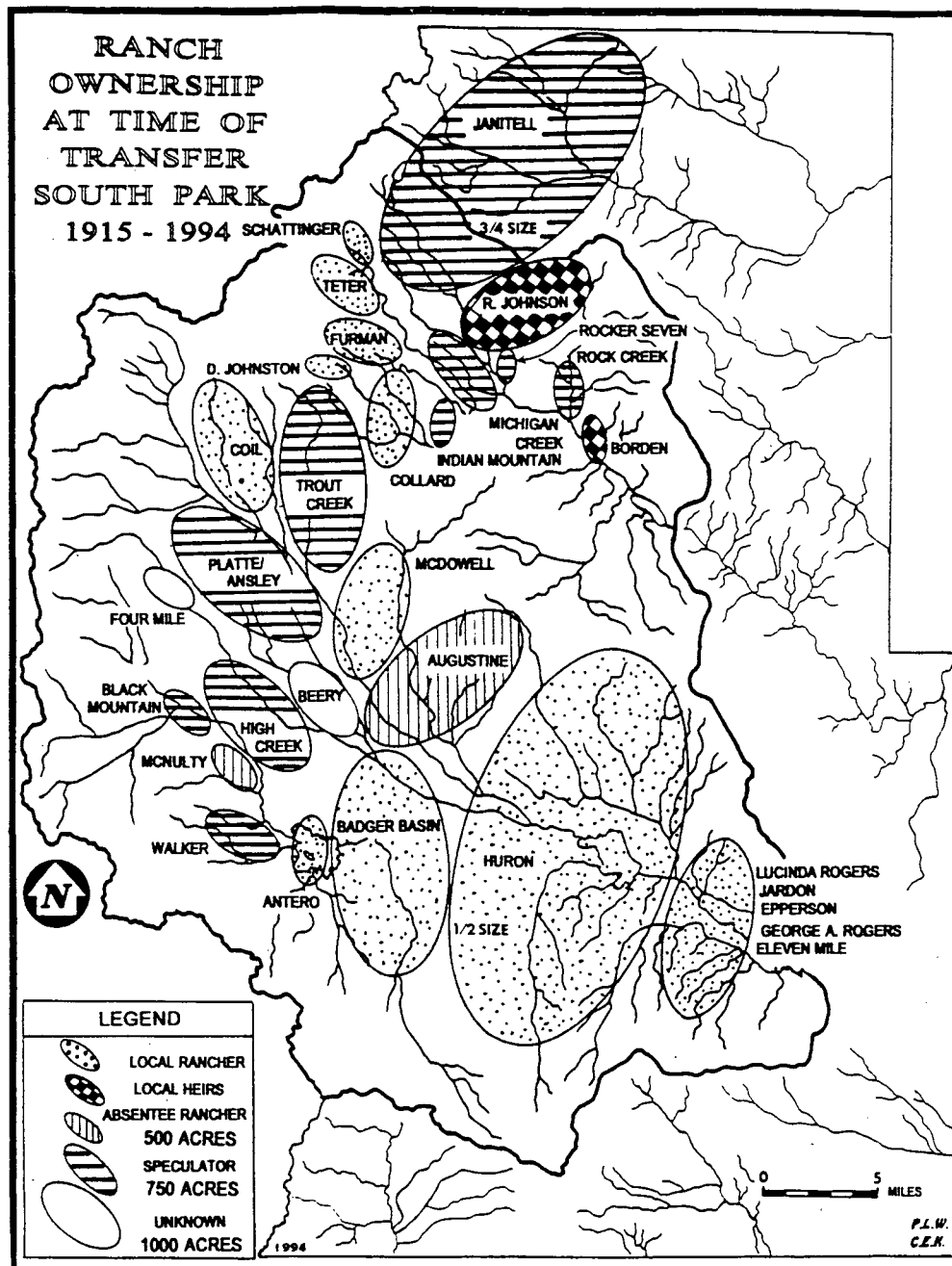
**Table 6-6.** Irrigated Acreage Retired, 1968-1993 (Sources: District 23 Water Commissioner and Transfer Decrees).



**Figure 6-13.** Water Transfers, Platte Drainage, South Park, 1993. In this set of line drawings the ditches are broken down by transfer.



**Figure 6-14.** Water Transfers, Tarryall Drainage, South Park, 1993.



**Figure 6-15.** Map: Ranch Ownership at Time of Transfer, South Park, 1915-1994. This map shows the South Park water transfers, representing each with an ellipse that is scaled or sized according to the number of irrigated acres taken out of production, and screened or coded according to what type of owner sold the water rights to municipal interests: ranchers, their heirs, absentee ranchers, or speculators.

improved, ranchers found their junior ditches called out with greater frequency and consistency. Gone were the economies of scale, the shared services like agricultural machine and implement dealers and farriers; gone were the hay crews from Larimer Street in Denver who might serve one ranch after another until the haying was done. Rancher dominance on county boards and in government declined. Park County lost its traditional economic base (Tables 6-7 to 6-10).

High country ranching had always been an economically marginal proposition. It entailed back-breaking labor and substantial investment in land, water, machines, and livestock. It involved a certain amount of risk. Cattle prices fluctuated considerably, making profits hard to predict and rely upon. As the industry became more technologically sophisticated overhead costs increased. Ranchers were caught in a cost-price squeeze.

In South Park other factors complicated the picture. In the high country hard winters could reduce herds. Losses occurred from exposure, and if winter feed ran short, an entire operation could be jeopardized. Water-short years, lower hay yields, diseases - all could have the effect of pushing an economically marginal operation to the brink of bankruptcy. The precariousness of the livestock industry created an environment in which the sale of ranch water rights and land could be quite attractive. Many ranchers and their heirs chose to sell.

Often ranchers could make a greater profit by selling land and water rights to cities and speculators than they could by

CHARACTERISTICS OF RANCHES IN PARK COUNTY, COLORADO, 1870 - 1987

	Total Number of Ranches	Average Ranch Size	Irrigated Ranches		Irrigated Acreage	Land in Farms	
			Number	Percent *		Acres	Percent **
1870					623 ***		
1880	134	670				89,771	
1890	171	705	136	79.5	24,015	120,567	
1900	220	967.3	172	78.2	39,861	212,801	
1910	194	934	162	83.5	64,824	181,199	12.8
1920	286	838.7	122	42.7	49,793	239,862	16.7
1925	219	1,532.5				335,608	23.4
1930	394	1,360	125	31.7	44,038	535,826	37.3
1935	483	1,061.2				512,552	35.7
1940	306	1,840.3	148	48.4	41,881	563,129	40.6
1945	194	3,271.4				634,658	45.8
1950	190	3,126.6	85	44.7	44,079	594,057	42.9
1954	159	3,939	58	36.5	10,202	626,303	45.2
1959	120	4,924.3	71	59.2	42,880	590,913	42.6
1964	96	5,307.1	61	63.5	28,843	509,486	36.8
1969	72	5,250	38	52.8	35,178	378,022	27.9
1974	80	4,579	42	52.5	32,642	366,281	26.5
1978	87	4,152	42	48.3	32,589	361,236	26.1
1982	146	2,773	65	44.5	18,842	404,910	28.9
1987	162	2,470	64	39.5	14,346	400,090	

\* = Irrigated ranches as a percent of all ranches

\*\* = Percent of Park county's total land area in farms

\*\*\* = Includes all improved acreage

**Table 6-7.** Ranch Characteristics, Park County, 1870-1987  
(Source: U.S. Bureau of the Census).

LIVESTOCK INVENTORY FOR PARK COUNTY, COLORADO, 1870 - 1987

	Horses	Mules and Asses	Cattle	Sheep	Swine	Goats	Oxen
1870	56	1	1,114	900	29		97
1880	987	100	20,861	2,205	146		102
1890	2,488	133	26,377	28,211	171		4
1900	3,646	182	20,579	23,189	164	24	
1910	2,382	147	17,114	16,890	85	843	
1920	2,998	257	23,677	39,194	527	60	
1925	2,316	84 *	16,446	69	260	34	
1930	2,741	113	14,581	53,807	133		
1935	2,802	92	22,512	46,061	164		
1940	2,598	111	16,554	39,396	212	164	
1945	2,002	68	17,898	18,052	161	19	
1950	1,503 **		21,241	12,948	155		
1954	1,021		27,306	17,327	112		
1959	790		23,333	20,246	46		
1964			20,910	16,735	13		
1969	470		9,878	2,295	13		
1974	383		16,177	158	10		
1978	511		11,285				
1982	813		10,578	727	36	43	
1987	1,014 ***		10,074	837	37		

\* = Mules only.

\*\* = From 1950 - 1982, figure includes horses, mules, and asses.

\*\*\* = Horses only.

**Table 6-8.** Livestock Production, Park County, 1870-1987  
(Source: U.S. Bureau of the Census).

HAY PRODUCTION FOR PARK COUNTY, COLORADO, 1870 - 1987

Total Hay Production			
	<u>Acres</u>	<u>Tons</u>	<u>Yield</u>
1870		281	
1880	6,178	4,708	0.8
1889	16,376	19,547	1.2
1899	31,758	25,878	0.8
1910	38,509	29,921	0.8
1920	40,536	31,856	0.8
1925	40,876	33,297	0.8
1929	41,955	32,047	0.8
1933	39,312	19,473	0.5
1940	40,326	24,884	0.6
1945	39,679	28,353	0.7
1949	45,767	39,784	0.9
1954	22,487	8,608	0.4
1959	39,022	22,701	0.6
1964	22,023	15,557	0.7
1969	20,516	16,578	0.8
1974	17,634	16,660	0.9
1978	16,088	12,784	0.8
1982	18,985	17,563	0.9
1987	15,871	16,636	1.0

**Table 6-9.** Hay Production, Park County, 1870-1987 (Source: U.S. Bureau of the Census).

POPULATION, PARK COUNTY, COLORADO, 1860 - 1990

	<u>Total</u>	<u>Percent Change</u>	<u>Male</u>	<u>Female</u>	<u>Density</u>
1860	11,610		11,506	104	
1870	447	- 96.2%	317	130	
1880	3,970	+ 788.1%	3,063	907	
1890	3,548	- 10.6%	2,337	1,211	
1900	2,998	- 15.5%	1,913	1,085	
1910	2,492	- 16.9%	1,537	955	1.1
1920	1,977	- 20.7%	1,181	796	0.9
1930	2,052	+ 3.8%	1,207	845	0.9
1940	3,272	+ 59.5%	1,857	1,415	1.5
1950	1,870	- 42.8%	1,032	838	0.9
1960	1,822	- 2.6%	964	858	0.8
1970	2,106	+ 15.6%	1,046	1,060	1.0
1980	5,333	+ 153.2%	2,740	2,593	2.5
1990	7,174	+ 34.5%	3,676	3,498	3.3

**Table 6-10.** Population, Park County, 1860-1990 (Source: U.S. Bureau of the Census).

remaining in ranching or by selling to ranchers.<sup>102</sup> Like ranchers elsewhere, those in South Park were interested in maximizing profits.<sup>103</sup> As sociologist and rancher Elizabeth Maret has noted, the beef cattle industry in the American West emerged from the simple premise that cattle bought in one place at one time, could be sold for a higher price in some other location at a later time.<sup>104</sup> Profits reflected the margin between the purchase and sale prices, less the cost of raising the livestock.<sup>105</sup> The expenses included feed, health maintenance, and all the overhead costs associated with running a ranch, including energy, equipment, maintenance, labor, taxes, and other expenses.<sup>106</sup> Western ranching required considerable capital, both for initial investments and continuing operating costs.<sup>107</sup>

The economic marginality of ranching powered water sales, even from the beginning. Ranch lands and water rights were being offered up for sale at the turn of the century because people were having trouble making a living. Letters offering to sell, contained in the files of the Denver Water Department, make it plain that some people badly needed to sell.<sup>108</sup> Conditions in the high park were harsh, as suggested by a letter penned in the 1950s by long time South Park resident Mabel Davidson.<sup>109</sup> She wrote to the Denver Water Department about renting the Lucinda Rogers Ranch above Eleven Mile Reservoir, then owned by the city. Mrs. Davidson had lived in South Park since 1917, and she and her husband ranched nearby. They had

insufficient land to carry their herd or raise enough hay for the winter. With livestock prices dropping they needed to increase the number of head in order to break even. Leasing the old Rogers Ranch was their only hope. In her letter she described how, by the middle of the twentieth century, large ranchers held most of the grazing rights on U.S. Forest Service, state, and other government land. In the Davidsons' case, oilman A.T. "Cap" McDannald, who had bought the old Hartsel Ranch and owned thousands of acres, held the leases in their part of South Park. If they could not lease the Rogers Ranch, the couple would be forced to sell, though they did not want to do so.<sup>110</sup> Clearly, they were operating at the economic margin. For the Davidsons and many others, selling land and water rights to a downstream city could be more profitable than continuing in ranching. The same holds true today.

The decision to sell also reflected social changes that extended well beyond South Park. In the United States, aging farm populations are associated with a national trend toward the disposal of agricultural lands, including ranch lands.<sup>111</sup> The number of young farm and ranch entrants is declining. Changes in family structure mean that working ranches no longer have the unpaid labor they used to have when children and members of the extended family lived on the ranch and shared in the work and responsibilities.<sup>112</sup> Mechanization has offset these changes in family structure somewhat, but not without raising energy costs. Increasingly, ranchers have had to turn to paid labor and

expensive machinery in order to continue operating. Investments in machinery, maintenance and energy, and the use of paid labor all impinge on profit margins.<sup>113</sup> For small operators ranching has the potential to become an economically irrational activity.

Why do people remain in ranching? Increasingly they do so for the "lifestyle." As Elizabeth Maret shows in her sociology of women in the Texas beef cattle industry, people who remain in ranching do so less for profit than for the intangibles.<sup>114</sup> They enjoy working outdoors and with animals. They seek a sense of continuity with the past, and enjoy participating in an industry they perceive to be an important part of the region's heritage. They are drawn by the image of the industry and its mystique. They enjoy living outside of town with an expanse of rangeland around them. Often, to make this dream or lifestyle choice possible, contemporary ranchers have other occupations. Some work outside the ranch to supplement ranch income and ensure that the operation breaks even. Some ranchers supplement their income by granting hunting and fishing rights on their property, or oil and gas leases.<sup>115</sup> Others view ranching as a second occupation. Some are hobby ranchers who own only a small number of livestock and small acreages, but others are the owners of larger, working ranches. According to Maret,

Ranching is no longer the sole or even predominant occupation for most ranchers. Ranchers are teachers, lawyers, physicians, extension specialists, contractors, small business owners. They are people who can afford to have and maintain ranches.<sup>116</sup>

The South Park ranchers who sold their water rights and in some cases their land to the Front Range cities were not such people. They had worked the range themselves, and ranching had always been their only occupation.<sup>117</sup> Roy Teter, Walter Coil, Jim McDowell, Wes Furman, Dair Schattinger - these people were ranchers. In other cases, South Park water rights and ranch lands were sold and removed from production by corporate ranching interests. The Janitells, the Anschutzses, and Cap McDannald - these ranch owners had other companies and investments in oil, gas, and real estate. For them ranching was a business. It was economically rational for these corporate owners to maintain an interest in ranching only as long as tax laws permitted losses to be written off and used as tax breaks. "Lifestyle" was irrelevant to the corporations.

Large corporate operations could better absorb winter stock losses, sudden rises in energy prices, and drought than smaller, individually-owned operations. The trade liberalization and the energy crisis in the 1970s,<sup>118</sup> plummeting cattle prices in the 1980s,<sup>119</sup> and changes in tax laws as they affected agriculture in the last decade and a half<sup>120</sup> all impinged on the profitability of ranching in South Park.<sup>121</sup> In some areas, as small ranchers went out of business, larger ranchers and corporate operations acquired their holdings.<sup>122</sup> In South Park, the waiting buyers were not agricultural interests, but city water departments and developers.

Changes in the American diet also had an impact on ranching.<sup>123</sup> In the 1980s and the 1990s, Americans became more health conscious and reduced their consumption of red meat, notably beef. The market for western beef shrank. A preference for lean meat also emerged.<sup>124</sup> As a result, cattle producers need to pay more attention to the quality of their stock. Increasingly ranchers are turning to breeding programs and biotechnology in order to produce a leaner, more marketable grade of beef.<sup>125</sup> All this comes at a cost, much of which must be born by the rancher. Contemporary ranchers rely on the services of professionals and specialists in herd health, reproductive efficiency, marketing and sales. Modern ranching often involves satellite communications and electronic markets, and the use of computers to track the weight of livestock, nutritional value of beef, market factors, and reproductive performance.<sup>126</sup>

The scale of traditional ranching operations in South Park was relatively small, and changes in the industry could not be easily absorbed. Rapid technological change was also producing a sense of future shock. The bustle of the traditional livestock sale, the earthiness of breeding bulls with cows, and the solitude of riding the range were fast becoming things of the past. For old-time ranchers, some changes in the industry were distasteful.

As ranching declined, a community was disappearing. The population was changing. The precise nature of these changes in

South Park is difficult to trace. After 1950, the U.S. Bureau of the Census changed the way it enumerated the large mountain county.<sup>127</sup> No longer did it count people by precinct. Instead, the census bureau divided the county in two, creating northern and southern enumeration districts. Since 1960, data from the fragments of South Park have been lumped together with data from the growing bedroom communities on the eastern edges of the county. The northern part of the park is included with Bailey; the southern part with Lake George. Lost in the redrawing of enumeration district boundaries is a view of the disappearing ranching community in South Park. The people who were a part of that community become statistically insignificant. What is happening to them is lost amid the aggregate patterns created by growing numbers of newcomers.<sup>128</sup> Economic decline and social dislocation in one geographic area are obscured by development and change in another.

These aggregate data appear to suggest that social conditions are improving in Park County, and have been over the period covered by the most recent water transfers. A declining percentage of people are below the poverty line, education and income levels are rising, and other indicators also suggest overall improvement.<sup>129</sup> For Park County as a whole, this is true. The county has grown in the past 30 years (Table 6-10). Those moving into the bedroom communities of Bailey and Lake George can afford to own or rent a single family dwelling situated on several acres. They typically hold jobs in a

metropolitan area - either Denver or Colorado Springs.<sup>130</sup> These are the people revealed in the census data. The people who become invisible are those west of Kenosha and Wilkerson Passes - the people of South Park. The aggregate census figures do not reveal the contraction of this population as ranching declined. They do not show that South Park's population began to expand again as residential development occurred and the county started to make the transition from ranching to a more diversified economy. The aggregate data do not show who is moving into the park, or how, over time, ranchers, miners, and others in traditional occupations are increasingly outnumbered by retired military men and women, ski lift operators, health care workers, office workers, craftspeople, and professionals.

Park County recovers economically, after passing through a period of transition. It grows in population and diversifies. But the county's traditional core - the reason for its name, the base of its economy, the heart of its older culture and character - South Park - fades into relative insignificance. Fairplay remains the county seat, but is no longer the seat of power. The county commissioners commute to Fairplay from the east side of Kenosha Pass. Park County is being reshaped by population change and economic change. New people and institutions, governmental and corporate alike, are gaining control of South Park's resources.

South Park had been transformed once by the application of irrigation water to the land. Dryland species gave way to

wetland species, water coursed over the ground, ditches were carved into bottomlands and hillsides, and ranches were established across South Park wherever water was available. In the late twentieth century that landscape, that form of economic and social organization, was being erased, this time through the removal of water and the drying up of the land. The process began in the 1890s when engineers in Denver turned their attention to the resources of the high park. Firm interests were established by the end the 1930s. In the 1960s and 1970s the expropriation process accelerated, and as the twenty-first century approaches it nears completion. One ecological mode of production has given way to another. Urban interests have achieved dominance, and local power appears to have been carefully circumscribed.

The transformation of South Park in the late twentieth century must be understood as part of a wider process, part of the peripheralization of rural areas, and part of the harnessing of key resources for use by the burgeoning urban core of the United States. South Park's development had occurred within the context of a world economy in which precious metals were extracted for the purpose of enriching urban investors and industrialists and furthering the development of a national economy. South Park's cattle industry had emerged to serve those interests and had been integral to the development of the Denver stockyards and other urban-based economic activities within the state of Colorado. What differentiated the latter

part of the twentieth century, however, was the direct expropriation of South Park's most vital resource: water.

Like the hydraulic societies that had taken shape in Mesopotamia, Latin America, and China, the hydraulic west was characterized by a concentration of power in the core. Control was extended outward - over territory, over people, and over natural resources. Increasingly, space was integrated in such a way as to serve urban interests and interests that represented the upper echelons of the hierarchy of power. In the case of Colorado, power was concentrated in the cities along the Front Range, and a key feature of that power was dominion over resources. Denver and its suburbs possessed the technology, expertise, capital, and the connections to the wider world economy needed to harness the agricultural water rights of rural Colorado.

Hydroagriculture, defined by Karl Wittfogel as involving small scale irrigation by individuals, families, and community groups,<sup>131</sup> gave way to larger, more complex arrangements. Water use, and the transfer of that use to the core, were increasingly bureaucratized and managed by the state. Effectively, by gaining control of South Park's most basic resource, the core placed limits upon economic activity and land use in the mountainous periphery. The traditional ranching culture and economy of South Park was marginalized. Urban influences revealed themselves in a variety of ways: in the subdivision of land and in residential development, in the

institution of zoning, and in changing population composition and distribution. Park County was losing its traditional landscape and character as it was integrated into the urbanizing world of the late twentieth century (Figure 6-16).



**Figure 6-16.** Abandoned ranch, South Park, 1993.

## Chapter Notes

1. U.S. Bureau of the Census, 1864-1992.
2. U.S. Bureau of the Census, 1864-1992. All the material in the preceding paragraph was drawn from the U.S. Census, and is contained in Table 6-1.
3. Denver, Denver Water Department, 1892-1993.
4. Milliken, 1988, p. 343.
5. Milliken, 1988, p. 339.
6. Denver Water Department, 1975, p. xv.
7. Milliken, 1988, p. 339.
8. Milliken, 1988, p. 342.
9. Milliken, 1988, p. 339.
10. Milliken, 1988, p. 342.
11. Mehls et al, 1985, p. 146.
12. Leonard and Noel, 1991, p. 350. The information that Fletcher was Canadian born comes from Mehls et al, 1985, p. 19.
13. Leonard and Noel, 1991, pp. 351-352.
14. Leonard and Noel, 1991, p. 355.
15. Leonard and Noel, 1991, p. 358.
16. Leonard and Noel, 1991, p. 355.
17. According to a television news report, station KUSA, Denver, May 13, 1994.
18. Leonard and Noel, 1991, p. 363-364.
19. Leonard and Noel, 1985, p. 363.
20. Leonard and Noel, 1991, p. 363.
21. Aurora, Department of Utilities, 1955-1993.
22. Colorado State Engineer, District 23 Water Commissioner, 1938-1993. Augustine Transfer File.

23. With over-appropriation of eastern slope water well known, the courts were apparently seeking ways to verify the cessation of irrigation. In this manner "double dipping" could potentially be avoided. As well, what was coming together was a formal system and almost formulaic approach to agricultural-to-municipal water transfers. As other municipalities besides Denver became increasingly active in this arena, the process became a sort of legal dance. Cities had the money to object in water transfer cases, effectively disputing amounts of water claimed, the extent of acreage retired and the like. Denver objected or intervened in virtually every water transfer case in the South Platte drainage system. In this context the courts began to address issues in a much lengthier, more detailed manner than they had previously.
24. Park County District Court, 1889-1970. Civil Actions 3684 and 3705, Transfer Decree, p. 15.
25. Trenching was introduced at this time in order to ensure dry up, which was mandated in the court decree. In addition, trenching held the potential to speed the process of dry up, enabling cities to divert water into municipal intakes at the earliest possible date.
26. Denver Post, April 30, 1975, p. 27.
27. Denver Post, April 30, 1975, p. 27 and p. 34.
28. Park County District Court, 1889-1970. Civil Actions 3684 and 3705.
29. Young, 1975, p. 134.
30. Aurora, Department of Utilities, 1955-1993. Hartzell - Pfeifferberger and Associates, 1973, "Results of Drainage Efforts on the Augustine-Turner Ranch...." Unpublished report prepared for the Aurora Department of Utilities.
31. Denver, Denver Water Department, 1892-1993. Letter from Raymond A. Hogan and Kurt A. Gretzinger to Sam Bryson, May 4, 1977.
32. Park County District Court, 1889-1970. Civil Actions 3684 and 3705.
33. Young, 1975, p. 154; and Douglas Kemper and Paul Flack (Aurora Department of Utilities), personal communication.
34. Young, 1975, p. 155.

35. Denver, Denver Water Department, 1892-1993. Offers to Sell.
36. McDowell, personal communication.
37. Title papers courtesy of Jim George at Park County Abstract and Title.
38. McDowell, personal communication.
39. Thornton, Water Resource Section, 1976-1993. Summary of South Park Water Transfers (Looseleaf Binder).
40. Siemer, personal communication; and McDowell, personal communication. Siemer is a noted agronomist whose work has focused on mountain meadows for the past three to four decades.
41. McDowell, personal communication.
42. Colorado, Division 1 Water Court, 1970-1993. Case W-8345-76.
43. McDowell, personal communication.
44. McDowell, personal communication.
45. McDowell, personal communication.
46. McDowell, personal communication.
47. McDowell, personal communication.
48. Colorado, Division 1 Water Court, 1970-1993. Case W-8345-76; Also see Appendices B and C.
49. Colorado, Division 1 Water Court, 1970-1993. Case W-8345-76.
50. Denver Post, November 1, 1973, p. 43.
51. Colorado, Division 1 Water Court, 1970-1993. Case W-7595-74, Decree.
52. Aurora, Department of Utilities, 1955-1993. Huron transfer files, Agreements, May 30, 1973 and July 13, 1973, and Addendum Contract, October 8, 1973.
53. Colorado, Division 1 Water Court, 1970-1993. Case W-7595-74.

54. Aurora, Department of Utilities, 1955-1993. Huron transfer files, Agreement, April 26, 1982.
55. Young, 1975, pp. 95-112.
56. Aurora, Department of Utilities, 1955-1993. Huron transfer files, Agreement, December 17, 1976.
57. Aurora, Department of Utilities, 1955-1993. Ray D. Nixon, 1976, "Report to the City of Aurora." Unpublished report prepared for City Manager Robert Semple.
58. Colorado, Division 1 Water Court, 1970-1993. Case W-7595-74. Decree.
59. The Badger Basin, Coil, and Walker transfers. See Appendix B.
60. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Decree.
61. Blatchley and Associates, 1983, p. 1.
62. Blatchley and Associates, 1983, p. 2.
63. Blatchley and Associates, 1983, pp. 2-3.
64. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Application.
65. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Letter, May 9, 1983.
66. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Motion, May 25, 1983.
67. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Order of Court, August 26, 1983.
68. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Decree.
69. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Letter, March 22, 1986.
70. Colorado, Division 1 Water Court, 1970-1993. Case W-9234-78. Letter, April 4, 1986.
71. Park County Republican and Fairplay Flume, December 24, 1993, p. 1.

72. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75.
73. Aurora, Department of Utilities, 1955-1993. Janitell transfer files, Purchase agreements.
74. Aurora, Department of Utilities, 1955-1993. Janitell transfer files, Purchase Agreements; and Memo from Tom Griswold to David A. Lincoln, September 10, 1976.
75. Aurora, Department of Utilities, 1955-1993. Janitell transfer files, Letter from Charles C. Fisk to Phillip L. Anschutz, February 25, 1969.
76. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Transcripts: Testimony of Max Arneson, December 8, 1976.
77. Aurora, Department of Utilities, 1955-1993. Janitell transfer. Purchase Agreements.
78. Aurora, Department of Utilities, 1955-1993. Janitell transfer files, Memo from Tom Griswold to David A. Lincoln, September 10, 1976.
79. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Statements of Opposition.
80. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Court Transcript, November 16, 1976.
81. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Case Files, June 30, 1975.
82. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Letter from W.G. Wilkinson to Judge Donald A. Carpenter.
83. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Case Files and Court Transcripts. Also see the Decree, February 2, 1978.
84. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Decree, March 6, 1991.
85. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Applicant's Supporting Brief, October 11, 1977. The remainder of the material in this paragraph is drawn from this legal brief.
86. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Opponent's Brief, November 28, 1977.

87. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Supporting Brief, December 1977.
88. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Decree, February 2, 1978.
89. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Case Files.
90. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Objector's Brief, August 25, 1983.
91. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Objector's Brief, August 25, 1983.
92. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Decree, March 6, 1991.
93. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Court Transcripts.
94. Colorado, Division 1 Water Court, 1970-1993. Case W-7739-74. Decree.
95. Colorado, Division 1 Water Court, 1970-1993. Case 80-CW-313. Decree.
96. Thornton, Water Resources Section, 1976-1993.
97. Thornton, Water Resources Section, 1976-1993.
98. Curry, personal communication.
99. Colorado, Division 1 Water Court, 1970-1993. Case W-7936-75. Case Files.
100. In a talk given in July of 1992, as part of a tour of South Park organized by the Colorado State University and the Mountain Meadows Research Center, Jeff Clark, then employed by Thornton, said that dry up was more easily monitored and obtained when the city controlled the land. This accounted for some of Thornton's purchases.
101. The figures are drawn, wherever possible, from the decrees. Where those figures were unavailable, acreage is drawn from engineering reports.
102. Coil, personal communication. For literature on surface water prices refer to Sloggett, 1982; and Morton et al, 1982.
103. Biswas et al., 1984, pp. 193-194.

104. Maret, 1993, p. 1. Also for a history of western ranching and the livestock industry refer to Billington and Ridge, 1982, pp. 611-628; Hine, 1984, pp. 138-153; and White, 1991.
105. Biswas et al, 1984; Maret, 1993, pp. 1-13; and Torrell et al, 1991. Also, as this thesis nears completion an article appears in the New York Times. Dateline: Casper, Wyoming, January 21, 1996. "Ranchers Hurt By Steep Drop In Beef Prices". Cattle prices are notoriously unstable.
106. Maret, 1993, pp. 3-4; Brompton, personal communication; Coil, personal communication; McDowell, personal communication; and Teter, personal communication.
107. Crowley, 1964, pp. 345-360; Maret, 1993, pp. 3-4 and p. 100; and Brompton, personal communication.
108. Denver Water Department, 1892-1993. Offers to Sell, 1923-1993. The Offers to Sell files contain offers from ranchers and farmers from South Park, the Western Slope, and other parts of the state of Colorado.
109. Denver, Denver Water Department, 1892-1993. Letter from Mabel Davidson to the Denver Board of Water Commissioners, October 14, 1953.
110. Denver, Denver Water Department, 1892-1993. Letter from Mabel Davidson to the Denver Board of Water Commissioners, October 14, 1953.
111. Gale, 1993.
112. Maret, 1993, p. 13.
113. Holechek et al, 1994.
114. Maret, 1993, p. 115; and Pope, 1988, p. 168.
115. Maret, 1993, pp. 3-4. Also see Martin et al, 1978 with particular attention to hunting.
116. Maret, 1993, p. 4.
117. Coil, personal communication; Curry, personal communication; McDowell, personal communication; and Teter, personal communication.
118. Castle, 1989; Holechek et al, 1994; On the subject of the regional impact of trade liberalization refer to Blandford, 1978.

119. Castle, 1989; and Holechek, 1994.
120. Maret, 1993, pp. 115-116; and Schmidt and Garrison, 1987.
121. For a discussion of other relevant factors to South Park refer to Bement, 1993; Cook and Redente, 1993; and Feuz and Kearl, 1987.
122. Castle, 1989; Menkhaus et al, 1981; and Smith et al, 1987.
123. Lokey and Wilson, 1985, p. 39; and Maret, 1993, p. 5.
124. Maret, 1993, p. 5.
125. Curry, personal communication; and Maret, 1993, pp. 98-108.
126. Coil, personal communication; Curry, personal communication; and Maret, 1993, pp. 98-108.
127. U.S. Bureau of the Census, 1864-1992. The change occurred between the decennial censuses of 1950 and 1960.
128. For discussion of newcomers and their impact on rural communities refer to Sorensen, 1977. For literature on changes in agriculture (including consolidation and decline) and their impact on rural communities refer to Barkley, 1983; Carruthers et al, 1977; Sorenson, 1977; and Tweeten, 1983.
129. U.S. Bureau of the Census, 1864-1992. Material from the 1960, 1970, 1980, and 1990 censuses were published in 1961, 1973, 1982, 1991 and 1992 respectively. After 1950 the census becomes considerably harder to navigate. The Bureau of the Census begins publishing a wide variety of different kinds of data, and the material begins appearing in multiple volume collections. The way categories are defined varies widely between censuses. Entire categories disappear. The statistics include such things as median income, number of workers employed within the county, median years of education, and percent of persons in poverty versus families in poverty. Because the census now enumerates a "Fairplay District" and a "Lake George District", the aggregate data suggest a pattern of improving socio-economic conditions over time, from 1950 to the present.
130. I lived and worked in Park County at various times between 1980 and 1994. These observations and others contained in this section are confirmed by personal communication with ranchers and other South Park residents (See Bibliography).
131. Wittfogel, 1957, p. 2.

## CHAPTER SEVEN

### "MAKING WATER FLOW UPHILL:" LOCAL POWER AND THE UPPER SOUTH PLATTE WATER CONSERVANCY DISTRICT

#### Formation of the Conservancy District

As elsewhere, the expansion of municipal control over resources met with local resistance. In the early 1950s, South Park ranchers formed the Upper South Platte Water Conservancy District, intended to prevent or limit further encroachment by Denver and other urban interests.<sup>1</sup>

Initially, ranchers came together and formed a protective association, the precursor to the conservancy district. Their first action was to draft a letter to the state's Division Engineer, Ralph Owens, objecting to the manner in which water was being distributed and administered in South Park.<sup>2</sup> According to the members of the protective association's board, irrigators in South Park were being deprived of water to which they were entitled by decree. The reasons they stated involved what they perceived to be illegal storage of water in Denver's Antero and Eleven Mile reservoirs. They maintained that water supplies to these reservoirs and to Cheesman Reservoir, further downstream in the mountains, were not being adequately monitored, and that exchanges led to the shorting of senior South Park appropriators. Water was being taken illegally, they suspected, and was not getting through to senior appropriators downstream on the South Platte; South Park ditches were

therefore subject to more frequent river calls. The protective association also took issue with the state of Colorado's failure to charge Denver with evaporative losses on waters stored in its Upper South Platte reservoirs. The protective association requested that the State Engineer's Office investigate the situation to ensure proper and fair distribution of water in District 23.

The ranchers retained legal counsel and were advised to form a conservancy district under the provisions of Colorado Revised Statutes 1953, Chapter 149, Article 6.<sup>3</sup> The district was organized on the basis of a petition signed by local irrigators, owners of non-agricultural land, and townspeople.<sup>4</sup> No protests to the petition were filed. On October 17, 1955, the judge signed the order organizing the Upper South Platte Water Conservancy District and appointing the first board of directors.<sup>5</sup> This board included Walter J. Coil, Albert W. Wahl, and James L. Settele, all South Park ranchers, and Jesse B. Fitzsimmons and Ray Landis, ranchers from the Bailey and Lake George sides of Park County respectively. The district was defined as including South Park and the remainder of Park County and portions of Teller, Jefferson, Clear Creek, and Douglas counties that lay within the South Platte drainage.

In the first months after the district's formation, the board was occupied by details such as electing officers, hiring legal counsel, writing bylaws, and planning for taxation to support the district.<sup>6</sup> Numerous meetings were held and

priorities defined. Among the most pressing problems were issues concerning Denver's storage and the emerging problem of expanding use of groundwater in the lower parts of the South Platte river basin.<sup>7</sup> By 1955 Professor Harold A. Hoffmeister of the University of Colorado in Boulder and the U.S. Geological Survey believed that the pumping of groundwater was affecting senior surface water rights.<sup>8</sup> At this time, groundwater management and surface water management had not yet been integrated. This would come 14 years later with the passage of Colorado's Water Rights Determination and Administration Act of 1969. In 1955 the only recourse senior South Park appropriators had was to bring suit in court against well owners on the lower reaches of the river. Such intentions were stated by the board of the Upper South Platte Water Conservancy District in its December meeting, shortly after the formation of the district. Also high on the list of priorities was a meeting with the Denver Water Board to explore issues surrounding storage and evaporation losses from reservoirs.

Early in 1956 the Upper South Platte Water Conservancy District hired a consultant, an engineer who was charged with determining the extent and sources of water losses from the district. He determined that there were several dimensions to the problem: evaporative loss, administrative and transmission losses, water exchanges, and groundwater pumping.<sup>9</sup> In February the board travelled to Denver and met with Denver's mayor, who assured the ranchers that their two organizations could work

together.<sup>10</sup> The district's lawyer was less optimistic, particularly in regard to the city's standing evaporative losses, which the engineering consultant had determined amounted to 14,196 acre feet per year over the period 1950-1954, based on losses from Antero and Eleven Mile reservoirs and Cheesman reservoir outside the park.<sup>11</sup> Overall, the impact on the district was determined to be the loss of irrigation water for 4,000 acres of hayland.<sup>12</sup>

The district lacked the financial resources to pursue legal action on all matters of concern. Duane Bernard, the conservancy district's lawyer, suggested that the district work with in-state and out-of-state water users on the South Platte to initiate separate suits in regard to evaporation losses and groundwater pumping.<sup>13</sup> The advantage to working with irrigators from outside the state was that it would ensure that the case would be heard in federal court. Already the perception existed that the Colorado courts and the administrative system served interests in the core, not the periphery.

Regarding the issue of how much water was being impounded in municipal reservoirs, the district sought a straightforward solution: install measuring weirs to monitor reservoir inflow and outflow and proper gauges to monitor the height of water in municipal reservoirs.<sup>14</sup> By the middle of the 1950s Denver was not the only city with storage in South Park. The construction of Montgomery Reservoir at the headwaters of the Middle Fork of the South Platte gave the city of Colorado Springs a presence

there. Theoretically, this reservoir was constructed to impound interbasin transfer water from the Blue River, but South Park ranchers suspected that the city was drawing directly on the resources of the South Platte, diminishing the amount of water available for irrigation downstream.<sup>15</sup>

Politics made strange bedfellows. In May 1956, the conservancy district's lawyer, Duane Barnard, spoke with the Denver Water Department's lawyer, Glenn Saunders.<sup>16</sup> The two men agreed that their clients had common concerns regarding groundwater pumping. Saunders asserted that such pumping close to the river in the lower part of the basin was also hurting Denver. Further discussions revealed that while Denver was willing to supply legal and engineering support, the Queen City wanted the Upper South Platte Water Conservancy District to initiate the suit over pumping in the South Platte Valley.<sup>17</sup> This proved infeasible. Capitalized through taxes levied in rural counties, the district lacked the money to initiate such a suit. By fall the district had decided to wait for legislative action on groundwater pumping.<sup>18</sup> State senators Harry Locke of Hartsel and Ranger Rogers of Denver agreed to sponsor a groundwater bill whereby the State Engineer would issue pumping permits, and those permits would be subject to revocation if injury resulted to senior surface water rights.<sup>19</sup> The bill passed, but it was not until 1969 that ground and surface water would be managed in conjunction with one another.

In June of 1957, the city of Denver agreed to operate its reservoirs on an inflow-outflow basis.<sup>20</sup> Colorado Springs was somewhat less accommodating and it was not until 1961 that an agreement was signed between the Upper South Platte Water Conservancy District and the city regarding gauging.<sup>21</sup> Agreement and action were two separate matters however. The district lacked the funds to pay the lawyers and engineers necessary to ensure enforcement of the agreements. In the irrigation season of 1958, the board appealed to the State Engineer, J.E. Whitten:

We are intensely interested at the present time in the acute shortage of water in the Upper South Platte Water Conservancy District. As you know from the restrictions issued by your office, most of the ditches in the District are restricted in use. Upon examination by members of the Board, we find that most of the water from stream flow is being used to maintain water level in the reservoirs in Denver's storage system. We also find you have no measuring devices to determine the amount of water this is costing the users of the natural stream.

As you know, this problem has been discussed with your department before. We feel that now is the time some definite equitable action should be taken on this very serious problem. Serious to every owner of an appropriation on the South Platte watershed.

It is our hope and desire that you in your capacity as administrator of the water of the South Platte will consider our problem and designate to our use that part of the stream we justly deserve.

We would appreciate an immediate reply and your support in relieving the critical condition that is fastly approaching in our District.<sup>22</sup>

The following year concerns focussed on the city of Colorado Springs' Montgomery reservoir. The Upper South Platte Water Conservancy District secretary Walt Coil noted in the April 24 minutes that the city "had all the water shut off and was holding it in the Dam while it should be allowed to flow

through the dam and on down the Middle Fork South Platte River."<sup>23</sup> Board president Jim Settele sought the assistance of the editor of the Park County Republican to prevail on the Colorado Fish and Game Department to take an interest in the restriction of flows from the reservoir. The department declined, indicating that seepage from the dam was adequate to sustain fish in the stream and therefore it had no interest in the matter.<sup>24</sup>

With legal expenses mounting, the local organization tried to make better use of the media but was unable to get Denver papers to run stories on Montgomery Reservoir.<sup>25</sup> Once again the matter was turned over to the district's lawyers. Engineering consultant Clifford Jex pursued further investigations for the district.<sup>26</sup> He concluded that when downstream senior appropriators called out South Park ditches, water got through to them in some years, but in other years it did not, because it was captured in municipal reservoirs. When water failed to get through to downstream water users, calls were repeated, and as water became increasingly short downstream, earlier and earlier calls were initiated, closing down more ditches in South Park.<sup>27</sup>

Increasingly, the district's attention turned to state administration. In June 1960, secretary Walter Coil noted, "Mr. Jex suggested we try and find a man for water commissioner that would work with the District, whenever the present commissioner resigns, as he believes a local man who is interested in our problems could do us a lot of good."<sup>28</sup> The district continued

to be involved in the choice of the local water commissioner. Concerns persisted. The district's new consultant, Charles C. Fisk, met with Bill Mattern from the State Engineer's office in 1963 and lodged complaints regarding the water commissioner's administration of Montgomery Reservoir.<sup>29</sup> In a letter to James L. Settele, the president of the conservancy district, the consultant mentioned discussing with Bill Mattern "the general attitude of South Park appropriators towards the water commissioner."<sup>30</sup> He even suggested that Mattern himself come to South Park to monitor the situation, specifically night-time diversions, and to discuss ways to improve administration by the water commissioner with members of the board.

In April of 1961 an agreement was concluded between the Upper South Platte Water Conservancy District and the city of Colorado Springs regarding gauging at Montgomery Reservoir.<sup>31</sup> A year and a half later the district noted that despite the agreement, little had changed. According to engineer Charles Fisk,

Colorado Springs is still storing South Platte River water at Montgomery Dam and the state engineer will not make them administer the water according to law. The state engineer says he was not a party to the agreement the district has with the City of Colorado Springs so he will not make them abide by the agreement.<sup>32</sup>

Fisk also charged that "the division engineer does not always have to put on the water call that he does, but he favors the lower ditches because they are on his back all of the time and no one from up here [South Park] bothers him."<sup>33</sup> Meetings were set with the State Engineer's office in early March, and the

district resolved to pay Fisk to monitor the legitimacy of river calls during the 1963 irrigation season.<sup>34</sup>

In April it was finally agreed that measuring devices would be installed at Montgomery Reservoir, that the city of Colorado Springs would itself take the measurements themselves and transmit daily records to Charles Fisk, Walter Coil, and the State Engineer on a weekly basis.<sup>35</sup> Though this arrangement placed the fox in charge of the chicken coop, the state and the district had little choice. Lack of funding and personnel inhibited the ability of both organizations to administer and oversee such arrangements. The state also lacked the political will to reallocate funds and reorient the administrative system to adequately monitor municipal diversions and storage. To the present, similar practices persist in regard to municipal water transfers, exchanges, and releases. At present levels of funding and staffing, the state is at best able only to spot check municipal reservoir management, though figures are now phoned in daily to the local water commissioner. Satellite monitoring of streamflows and high-tech recording devices hold out the possibility that administration can be improved. Technology, however, is not infallible.

In its first years the conservancy district established itself firmly as a local institution whose purpose was to protect the interests of water users in South Park and other areas within the district. Clearly, irrigators in the headwaters basin did not trust the State Engineer's office or

the legal system to protect their interests. They did not trust the cities to equitably divide and share the common resource. They succeeded in establishing a local organization through which at least some measure of power could be exercised over resources. But these were the early years. By the late 1960s the organization was beginning to founder. It was faced with new challenges and fundamental conflicts of interest. Straightjacketed by limited funds, the Upper South Platte Water Conservancy became a flaccid organization.

### **The Challenge of the Water Transfers**

As time wore on, the Upper South Platte Water Conservancy District found itself unable to compete. With a limited tax base the district did not have the funds to match the cities' technical and legal expertise or support protracted legal battles. A discernable sense of frustration and powerlessness set in.<sup>36</sup> The board continued to expend money on attorneys and engineering consultants, but to little avail. It was never able to get Denver to stand evaporative losses on its reservoirs because of a document known as the 1941 Agreement, which stated specifically that the city was not obligated to do so.<sup>37</sup> The board was not able to exert control over the appointment of water commissioners. The appointment process became increasingly bureaucratized and separated from local control.

By the late 1960s, the district was facing the spectre of further water transfers. On December 4, 1967, immediately after

the meeting of the Central Colorado Cattleman's Association, the board of the Upper South Platte Water Conservancy District held a special meeting.<sup>38</sup> Many ranchers from the district were in attendance. At this meeting C.F. Augustine and his attorneys and engineers appeared to present their perspective regarding the impending sale and transfer of water rights to the city of Aurora.<sup>39</sup> Local ranchers were not persuaded. The board resolved to fight the Augustine transfer.

Very quickly it became evident that it would be impossible to block the Augustine transfer.<sup>40</sup> It had a firm legal basis. The best the conservancy district could do was enter into an agreement with the city of Aurora which essentially reflected the conditions of the transfer decree: abandonment of particular water rights, dry up of specified lands, and temporal limitations on the pattern of withdrawals.<sup>41</sup>

Both Park County and the Upper South Platte Water Conservancy District shared concerns regarding the impact of the Augustine transfer on the tax base.<sup>42</sup> According to the minutes of the March 18, 1970, district meeting, the Augustine lands would be assessed as irrigated lands for a period of five years. After that time, the level of assessment would drop to that appropriate for dry land, but the city of Aurora would pay the monetary difference to the county.<sup>43</sup> In an agreement between the city of Aurora and the Park County commissioners, it was agreed that,

In order to alleviate the ad valorem tax impact which will arise in the event that the District Court authorizes the

change in point of diversion of the Augustine water rights... Aurora would propose to contribute to Park County annually an amount equal to the revenue derived from the levy for county purposes and a special school levy... applied to the decrease in valuation on the Augustine-Turner ranches resulting from taking lands out of irrigation. Aurora would make up the deficiency from year to year until such time as the assessed valuation returned to the amount for which the lands were assessed in the year prior to the time the lands were taken out of irrigation...

In exchange for this offer, and as consideration for it being made, Aurora would expect the Board [of county commissioners] to spread on its minutes the fact that the offer does restore all revenue for levies made for county purposes and special school purposes which would otherwise be lost for ad valorem taxation purposes, and that the Board of County Commissioners does not oppose the proposed change of point of diversion.<sup>44</sup>

Aurora obtained the county government's silence.

District meetings became increasingly fractious. There was considerable turnover on the board, and there were calls for the district to become more active again in trying to intervene in city activities in South Park.<sup>45</sup> Part of the problem was that ranchers in the area, and even some of the board members, were beginning to take an interest in selling their own water rights. At a meeting in August of 1974, citizen Marie Chisolm suggested that zoning regulations might be used to protect local water rights and force water to remain on the land.<sup>46</sup> The minutes noted, "It was felt by the Board...that they should not try to tell anyone what they can do with their water and property."<sup>47</sup>

The local culture was highly individualistic - steeped in values that bestowed a certain sanctity on private property, individual rights, and choice. While we can speak of a local ranching community, in truth what that means is a collection (not a collectivity) of individuals - individuals carving out a

place for themselves in a harsh and challenging environment, pursuing their own dreams and objectives, and turning a profit through the fruits of their own hard labor. Perhaps one of South Park history's greatest ironies is that the very values that built the place were those that led to its transformation. Individual ranchers sold out to the cities one by one. In some cases it was their heirs; in others it was speculators like the Janitells or the Huron Investment Group; but in most cases it was the ranchers themselves who offered their water rights up for sale to the Front Range cities. Individual ranchers had the right to dispose of their private property, including both land and water rights, as they saw fit. Individual ranchers had the right to sell to municipal interests, regardless of the consequences to their neighbors and to the land they loved. Even an organization such as the Upper South Platte Water Conservancy District, which perhaps represented community interests more than any other organization in the area, was loathe to limit or curtail individual rights.

American values are pervaded by Lockean individualism, passed down through the writings of Thomas Paine and concretized in the actions of Thomas Jefferson and others who framed the United States Constitution and Bill of Rights. Individualism permeates American society and finds expression in the laws that govern it. Individualism is at the heart of local institutions and boards such as the Park County Board of County Commissioners and the Upper South Platte Water Conservancy District. These

organizations exist to protect the rights of individuals, not collective or communal interests.

Under pressure from local ranchers and residents, and under the advice of the conservancy district's attorney, the board filed statements of objection or opposition to municipal water transfers.<sup>48</sup> High Creek, Janitell, Badger Basin, and Trout Creek - all occupied the board's time and attention. By 1979, however, it became obvious that the district was depleting its money by filing futile objections to water transfers.<sup>49</sup> Little was left over for the construction of small storage projects, the purchase of water, or other actions which might serve to keep water in the district.<sup>50</sup> None-the-less, the district continued to pursue entry into transfer cases, though the nature of this entry changed substantially. In October of 1980 the board adopted the following resolution:

the Upper South Platte Water Conservancy District will enter an appearance in each and every transfer case filed in the Water Court in Water Division 1 of the State of Colorado, affecting transfer of waters from the South Platte River or any of its tributaries to be diverted at or used outside the boundaries of the District, but will enter said proceedings as a moderator and a conservator of the waters of the District, and not necessarily as an adverse or opposing party, but will enter said cases for purposes of ensuring maximum conservation of the water resources of the Upper South Platte Water Conservancy District.<sup>51</sup>

By defining its role in transfer cases as one of "a moderator and a conservator" and "not necessarily as an adverse or opposing party," the board effectively rendered itself impotent. It became an observer instead of an actor or defender. Having lost its sense of purpose and focus, the Upper

South Platte Water Conservancy District prepared to dissolve itself in the fall of 1984. The following resolution was unanimously adopted by the board:

that the purposes for which the Upper South Platte Water Conservancy District were formed, namely the conservation and preservation of agricultural irrigation waters utilized on irrigated land within the District, no longer appear to be feasible in nature since numerous metropolitan transfers have transferred irrigation waters for use of those waters in metropolitan areas outside the boundaries of the District and as a result thereof, numerous lands previously irrigated are now non-irrigated and further, that since most of the senior water rights located within the boundaries of the district have been so transferred making the purposes of the District ineffectual, mute and no longer a matter of general concern to the residents of the District, it is therefore Resolved that the Upper South Platte Water Conservancy District... should be dissolved and the question of dissolution should be submitted to the voters of said District...<sup>52</sup>

#### **Reorganization of the Conservancy District**

Before the matter could come to a vote, vociferous objections were raised to the district's dissolution. Concerned citizens and county officials came together to block the attempt by the seated board to do away with an important instrument of local power.<sup>53</sup> To Park County Treasurer Etta Everett and community activist Leona Nelson, two of the prime actors in this matter, the Upper South Platte Water Conservancy District did not simply serve agricultural interests. As the women perceived it, the organization served the headwaters region as a whole.

The county commissioners agreed. They recommended that the remaining members of the district board resign and that a new board be appointed. The new board would be charged with

assessing the purpose and the function of the conservancy district and evaluating the work of the old organization.<sup>54</sup> The intention here was to decide whether or not the Upper South Platte Water Conservancy District should continue to exist. In May of 1985 the judge ordered the appointment of Park County residents Neil Hickok, Leona C. Nelson, Vern W. Butler, and Stephen A. Spann to the board of the water conservancy district.<sup>55</sup> David B. Wissel, who later became county assessor, was appointed to the board in September of 1986.<sup>56</sup>

The new board was radically different from the old one. Gone were the local ranchers, the agricultural interests. The new board members represented a distinctly more recent and urban element of the population. Most were recent migrants to Park County.<sup>57</sup> Some owned second homes in the district. Two (Spann and Butler) brought engineering expertise and experience with the state's water administration system to the organization. In essence the composition of the board was diversified and professionalized.

The new board adopted significantly different objectives and priorities for the Upper South Platte Water Conservancy District. After months of review, the new board concluded "that the Upper South Platte Water Conservancy District had little power to influence every water right case that came before the water courts."<sup>58</sup> Money was scarce and the members of the board concluded they would have to be highly selective in terms of entry into water transfer cases.<sup>59</sup> They decided to invest part

of their funds in a study designed to determine the wants and needs of people in the district,<sup>60</sup> and to give a higher priority to augmentation and water quality issues.<sup>61</sup>

With a new pool of expertise to draw upon, the Upper South Platte Water Conservancy District became increasingly involved in water management. It made plans to acquire water supplies and storage to ensure the district's future development. The new board considered agricultural, residential, and recreational uses, as well as such issues as flood control,<sup>62</sup> and sought to educate the public in regard to the conservancy district's organization and functioning, and in regard to basic terminology and concepts in water resources management.<sup>63</sup> The new board members fully accepted the premise of establishing and maintaining a managerial relationship with nature. Where they parted company with the cities and with the state was in regard to who should direct and define that managerial relationship. The Upper South Platte Water Conservancy District board thought that responsibility should rest in local hands.

The new board's ambitions were great, but an attempt to raise the mill levy and increase the level of tax support was defeated.<sup>64</sup> In part this had to do with suspiciousness of the new board - distrust of newcomers, professionals, and people without strong ties to the land. In part this had to do with more general attitudes regarding adding yet one more layer to local government. The organization chose to continue its work with limited funds. Increasingly the emphasis was placed on

providing water for future development. A document dated May 17, 1986, expressed some of these concerns:

The loss of water and land to downstream metropolitan areas has been an issue for many years but seems to have intensified in recent months. Ways and means were discussed whereby the powers and authorities of the water conservancy district could be used to provide an alternative to sale of water rights outside the area....

The need to provide small quantities of assured water for economic development was brought out. Such water should be available whether for a bobsled run, opening of a small mine, starting a new business or developing a new recreational pursuit. Unless efforts are started now to develop a program whereby such water can be made available, more water will move toward the metro area and the economy of the South Park area will suffer.<sup>65</sup>

In the district's files can be found numerous clippings and scribblings indicating thoughtful consideration of the political, social, and economic climate in which the organization was operating.<sup>66</sup> The conundrum involved keeping water in the rural high country at a time when the government and the major water interests in the state were increasingly preoccupied with finding "ways to enable water to move to its highest economic use at the least cost while protecting public values."<sup>67</sup>

The new Upper South Platte Water Conservancy District hired consultants to draft reports that addressed water problems in conjunction with broader issues of economic and recreational development.<sup>68</sup> The new board turned attention to both legal matters and environmental issues, including wetlands, water quality, and the impact of municipal trenching.

One of the issues entangled in the changing waterscape of South Park was increasing pressure from environmentalists. The

board was forced to walk a tightrope, between local residents wanting to leave options open for future economic development, and environmental preservationists who would like to see designation of the upper reaches of the South Platte as a wild and scenic river, or as park of some kind. A report prepared for the Colorado Environmental Coalition concluded, "Besides the spectacular scenery, the wildlife habitat, and world class fishery the area possesses, the area provides an important recreational opportunity for our increasingly urban society to enjoy the wonders of the natural environment."<sup>69</sup> The board, resisting such pressure from Denver and Boulder based environmental groups, adopted a position favoring economic development with some modicum of environmental sensitivity.

In recent years the Upper South Platte Water Conservancy District has turned its attention to specific projects and plans. The board has managed to negotiate an agreement with the city of Aurora which provides the district with storage in the city's Spinney Mountain Reservoir.<sup>70</sup> This enables the conservancy district to implement a district-wide augmentation plan whereby water can be made available for residential and economic development throughout the area. The district-wide augmentation plan provides water supplies that can be assured, and that cannot be transferred to urban use. In this manner the Upper South Platte Water Conservancy District will play a critical role in the continued development of rural central Colorado.

The Upper South Platte Water Conservancy District has also participated in projects such as the construction of the dam at the Fairplay Beach, which will enhance recreational opportunities in the area.<sup>71</sup> The district has become involved in the Hartsel water situation<sup>72</sup> and helped local residents reach some form of agreement with the city of Aurora as to the solution of water quality and quantity problems that are connected with the Badger Basin water transfer.<sup>73</sup> Indeed the district board continues to monitor and follow water transfer proceedings in the courts, but rarely does the district become directly involved. With no power to block urban expropriation, and no desire to inhibit the rights of individuals to dispose of their property as they choose, the district perceives its role as being "to see that adverse impacts to the local area are kept to a minimum at least in the short run."<sup>74</sup>

Operating in the socio-political and economic climate of the late twentieth century, the organization increasingly seeks accommodating relationships with those controlling South Park water rights. Today the controlling interest is held by the cities, and in that sense some people in the district perceive the board to be compromised. However, it should be remembered that the original protective association and Upper South Platte Water Conservancy District sought close and accommodating relationships with those controlling South Park water rights at the time the district was formed. The principal differences were that, in the mid-1950s, control of local water resources

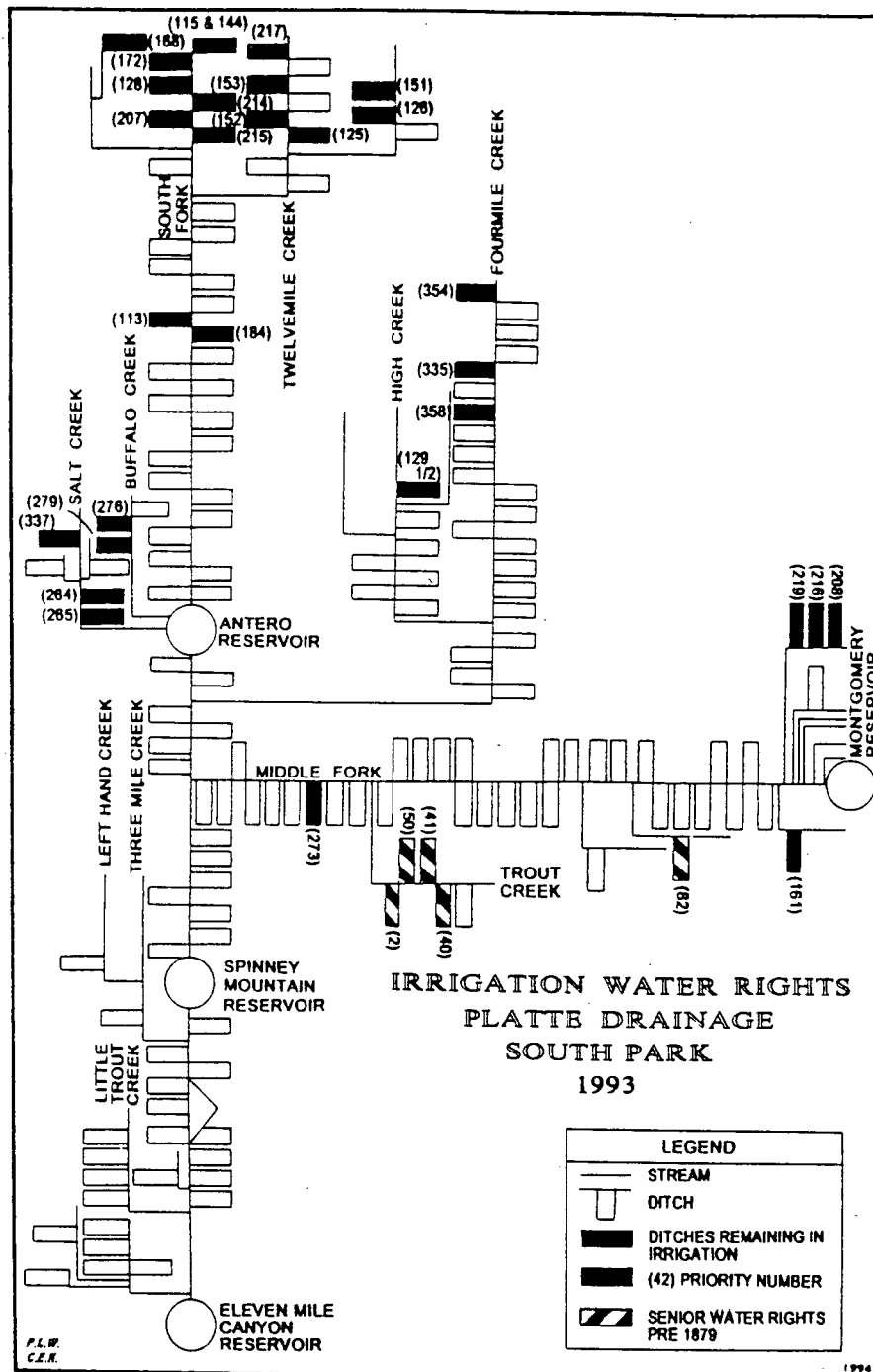
rested dominantly in local hands, and the water was used in agriculture. Today that is no longer true (Figures 7-1 and 7-2).

### **Local Protections**

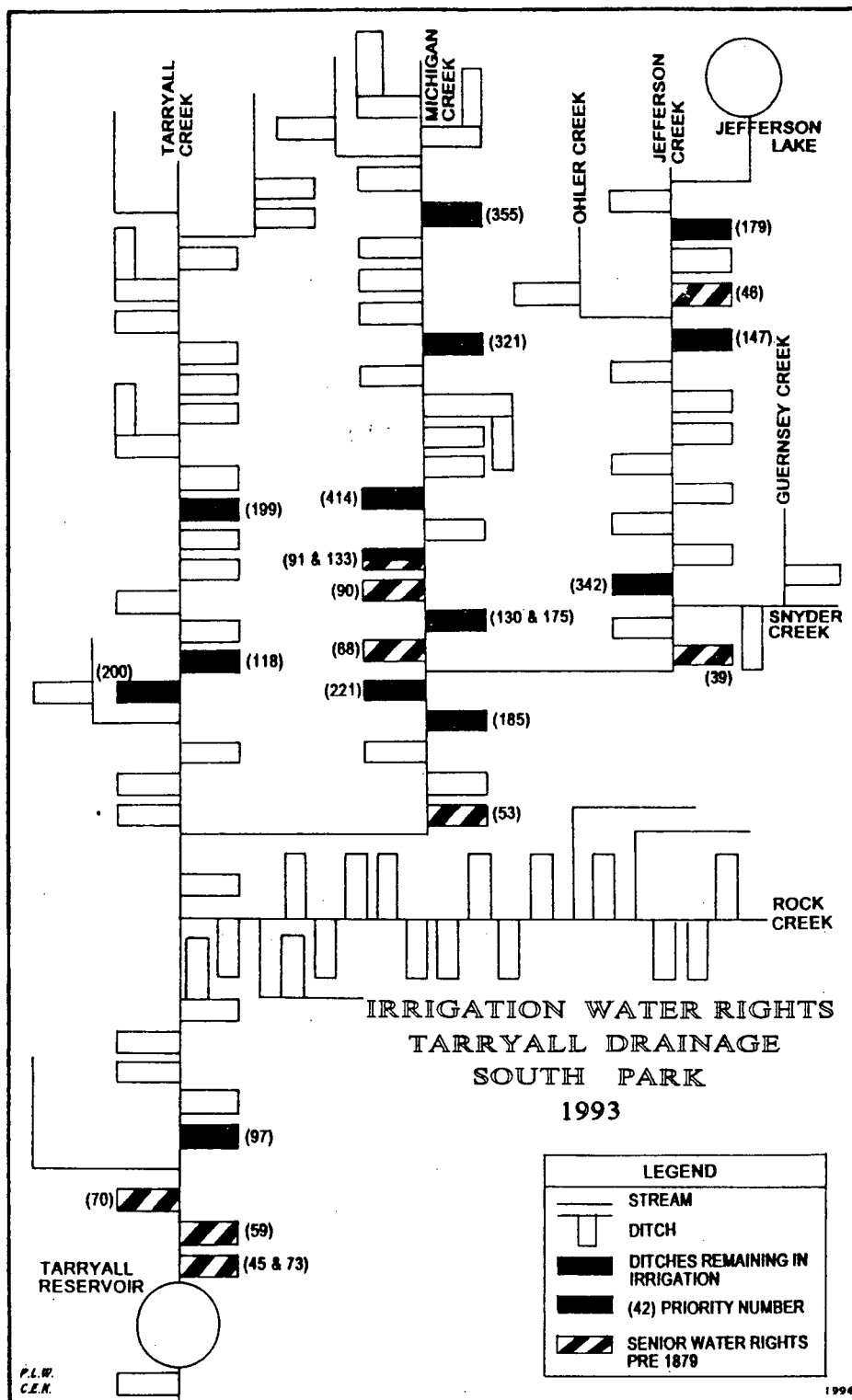
Theoretically, the people of rural Park County have two organizations that can protect their interests in the face of increasing water scarcity: the Upper South Platte Water Conservancy District and the Park County government, most specifically the board of county commissioners. Both organizations represent important instruments through which local issues can be addressed. Neither organization has the power to stop municipal water transfers or limit the construction of municipal reservoirs, but both can address the impact of urban expropriation.

In the simplest terms, urban expropriation limits the amount of water available for future development within the area of origin. The Upper South Platte Water Conservancy District is trying to address this issue by acquiring storage and water rights in order to implement a district-wide augmentation plan. The county government can address this issue through zoning and by permitting conservation-oriented land uses and industries that make efficient, beneficial use of precious water resources.

However, Park County and the Upper South Platte Water Conservancy District remain caught in a squeeze. Both are dependent upon tax revenues. The transfers have had an adverse



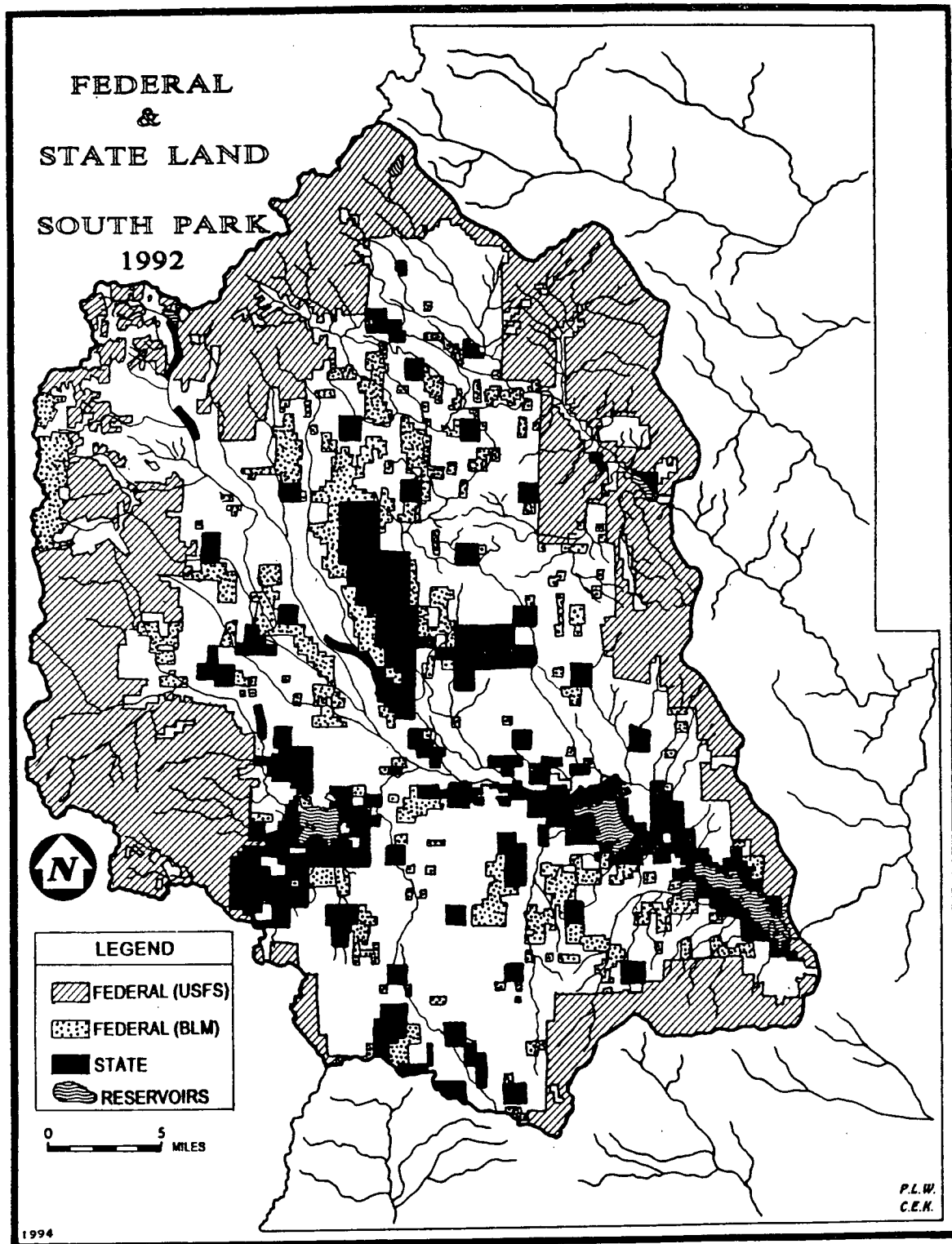
**Figure 7-1.** Irrigation Water Rights, Platte Drainage, South Park, 1993. This set of line drawings shows ditches remaining active in irrigation, with priority numbers. The most valuable senior water rights are shown using striped lines. The vast majority of South Park's irrigation ditches are no longer in use, having been transferred or abandoned in agricultural to municipal water transfers between 1932 and the present.



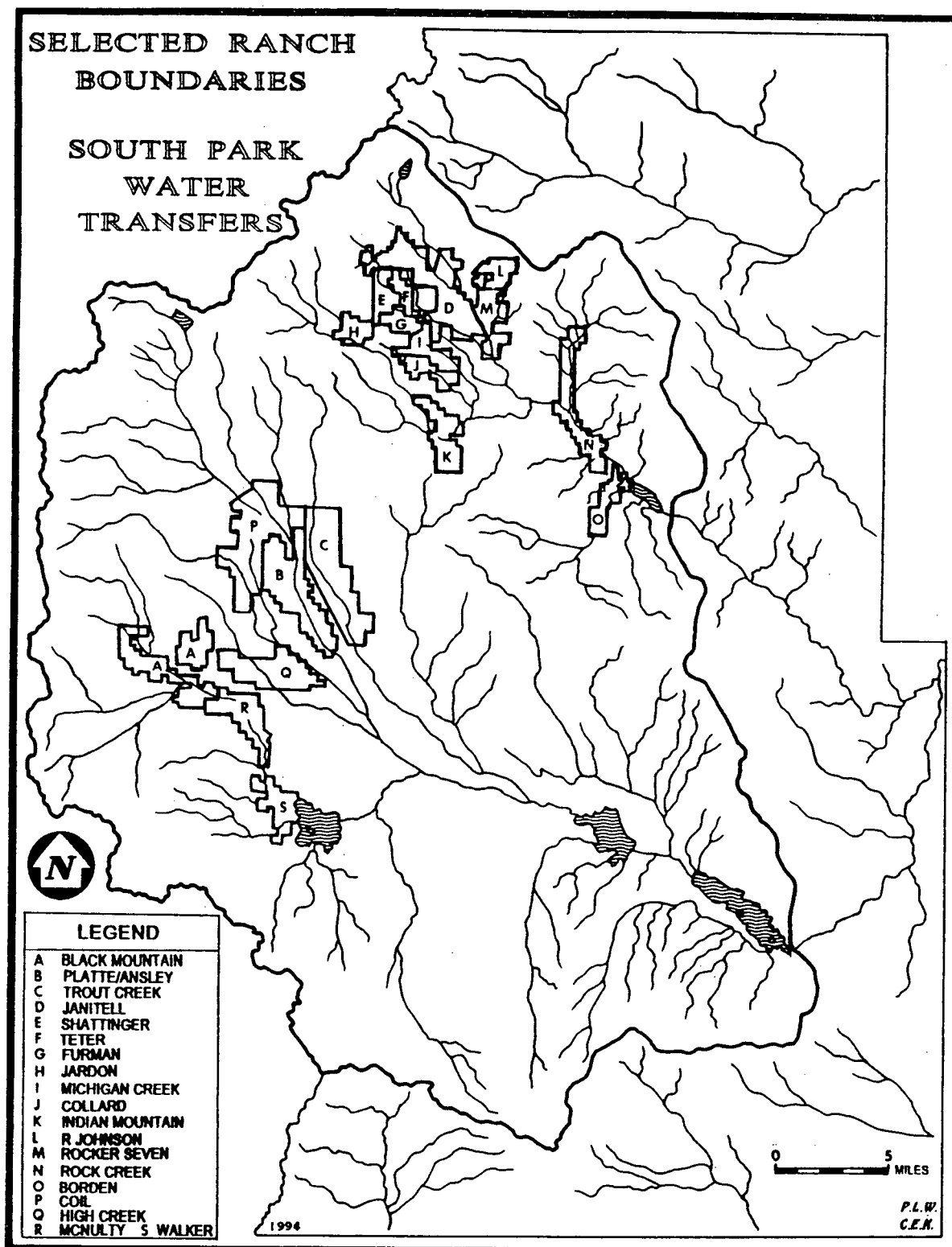
**Figure 7-2.** Irrigation Water Rights, Tarryall Drainage, South Park, 1993.

effect on the tax base by removing irrigated agricultural land from the tax roles and rendering it dry grazing land, assessed at a lower value. The transfers have also removed land from the tax books all together, either temporarily or permanently. If, during the period of continuing jurisdiction in a water transfer, land is held by a city, it cannot be taxed because municipal governments are not liable for taxes under Colorado law. If that land is then converted into public land and held by the Department of Wildlife, a municipality, or by the state as a recreational area, then the land may be removed from the tax books in perpetuity. As yet, adequate provisions do not exist to compensate rural counties for lost taxes and for impacts such as increased traffic on roads, increased demand for law enforcement, and increased need for emergency services.

Exacerbating the problem for Park County is the pattern of public ownership of land. The U.S. Forest Service, the Bureau of Land Management, and the State of Colorado control between 60% and 70% of Park County's total land area<sup>75</sup> (Figure 7-3). Since the water transfers began, that percentage has only increased. If selected ranch boundaries (Figure 7-4) are compared with the map showing federal and state control, particularly for South Park, it becomes obvious that ranching represented the most extensive private land use. It provided the greatest number of taxable acres within the county. As irrigated acreage is removed from production and improvements



**Figure 7-3. Map: Federal and State Land, South Park, 1992.**

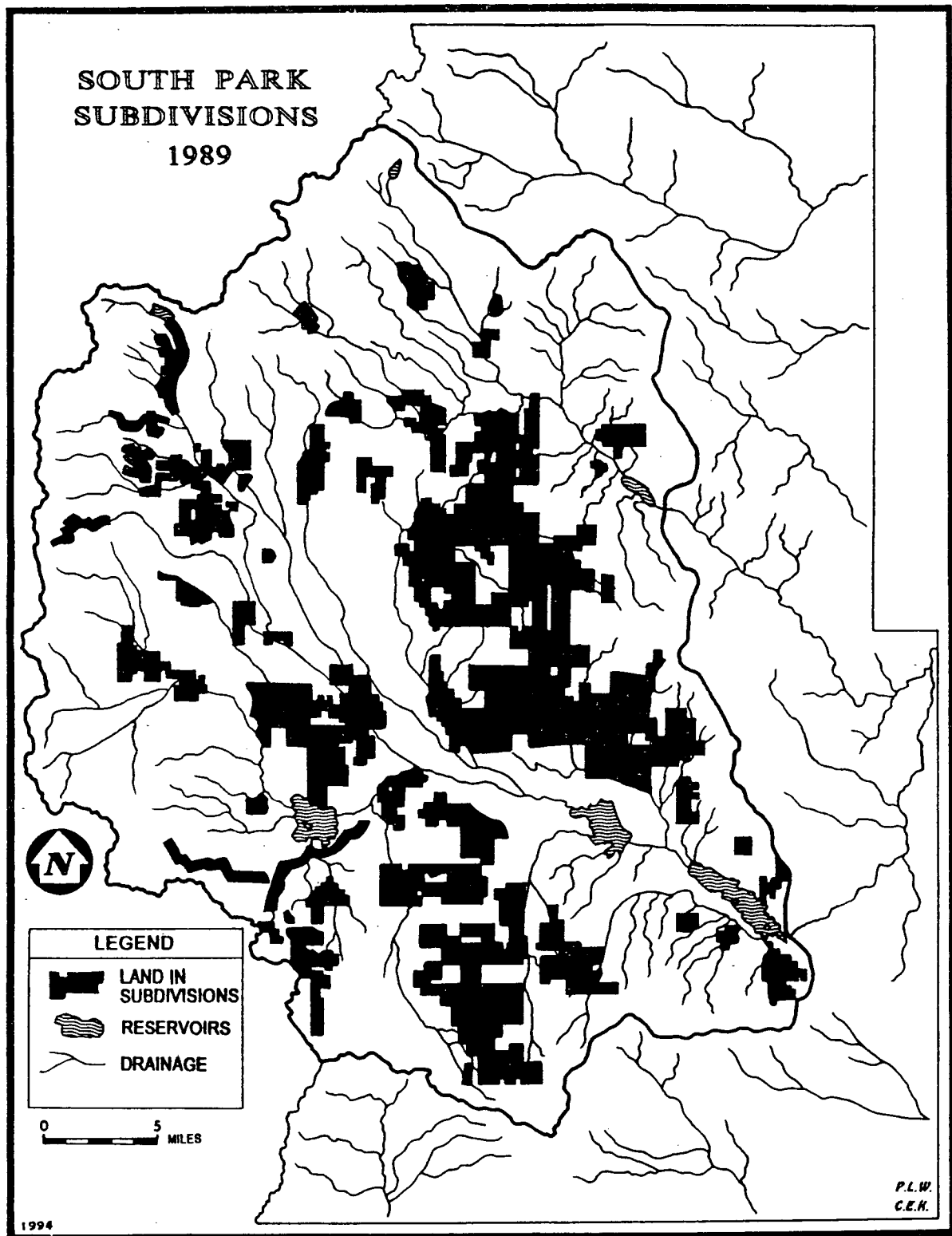


**Figure 7-4. Map: Selected Ranch Boundaries, South Park Water Transfers, 1932-1994.**

fall into disrepair, the rural county's ability to generate local tax revenues is severely curtailed.

As ranches are sold, land is often subdivided for residential use (Figure 7-5). In the long term this holds the potential to increase local tax revenues, because residential land can be taxed at a higher rate than agricultural land. In the short term however, this has not been the result. Many subdivisions have gained agricultural status and avoided higher levels of taxation by leasing to livestock interests. When cattle or sheep are grazed within the boundaries of a subdivision, even for only a matter of months during the year, the land may be classified as agricultural land. The county is not yet deriving the tax benefit residential development was expected to provide. Constrained by inadequate funding, the Upper South Platte Water Conservancy District and the Park County government are doing what they can to retain some measure of control over land and water resources.

Park County is in transition. According to the most recent figures, it has become the ninth fastest growing county in the United States.<sup>76</sup> Most of the growth is concentrated on the northeastern edge of the county, within commuting distance of Denver, but development is penetrating more remote areas of the county as well: dry, scrubby Guffey in the southern part of the county, the windswept expanses of South Park, and the foothills around Lake George. Residential development, so long anticipated by county officials, is becoming a reality. With it



**Figure 7-5. Map: South Park Subdivisions, 1989.**

will come strains on the infrastructure - on the schools, roads, and services, but with it will come an expanding tax base. The rate of development and population expansion in the mid-1990s make economic diversification inevitable. Cottage industries and service industries are most likely to appear, and the county may be more successful in attracting small and medium sized businesses. As development proceeds, the line between the urban and the rural becomes increasingly blurred.

The urban core and the rural periphery are integral to one another. As Cronon has so eloquently pointed out, the urban and the rural exist only in relation to one another. The city is built with the resources of the countryside - the water, the timber, the stone. Industry and manufacturing expand using the materials the countryside provides and the population of the countryside as a market. The countryside is cultivated, grazed, logged, and mined (brought into production so to speak) to serve the population and the interests of the city.

The rhythms of life have changed substantially in South Park over the course of the last century and half. Transformation has been effected through the changing relationship between a society and its key resources. Hydroagriculture gave way to the hydraulic society of the modernizing American West. Local control gave way to external control. One ecological mode of production gave way to another. In such a high, harsh environment, possibilities for economic development remain limited. Not even modern technology can

alter that entirely. What can change is manner in which small, rural places can retain some measure of control over their own destinies and the rhythms of daily life. Power lies not in keeping the world out, but in retaining some measure of integrity and identity in an increasingly globalized and homogenized world.

### Chapter Notes

1. Upper South Platte Water Conservancy District [hereafter USPWCD], 1955-1994, Minutes and Organizing Documents.
2. USPWCD, 1955-1994, Draft letter to Ralph Owens, n.d.
3. Original water conservancy district legislation was promulgated in 1938 and revised in 1953.
4. Colorado State Engineer, District 23 Water Commissioner, 1938-1993, Correspondence Files.
5. Park County District Court, 1889-1970, Civil Action 3418.
6. USPWCD, 1955-1994, Minutes, October 17, October 26, and December 19, 1955.
7. USPWCD, 1955-1994, Minutes, December 19, 1955.
8. USPWCD, 1955-1994, Minutes, December 19, 1955.
9. USPWCD, 1955-1994, Minutes, February 17, 1956.
10. USPWCD, 1955-1994, Minutes, April 13, 1956.
11. USPWCD, 1955-1994, Minutes, April 13, 1956.
12. USPWCD. 1955-1994, Minutes, April 13, 1956.
13. USPWCD, 1955-1994, Minutes, April 13, 1956.
14. USPWCD, 1955-1994, Minutes, May 2, 1956.
15. USPWCD, 1955-1994, Minutes, April 13, 1956.

16. USPWCD, 1955-1994, Minutes of Special Meeting, May 16, 1956.
17. USPWCD, 1955-1994, Minutes, June 11, 1956.
18. USPWCD, 1955-1994, Minutes, October 11, 1956.
19. USPWCD, 1955-1994, Minutes of Special Meeting, December 17, 1956.
20. USPWCD, 1955-1994, Minutes, June 28, 1957.
21. USPWCD, 1955-1994, Agreement between the Upper South Platte Water Conservancy District and the City of Colorado Springs, April 11, 1961.
22. USPWCD, 1955-1994, Letter read into July 8, 1958 minutes.
23. USPWCD, 1955-1994, Minutes April 24, 1959.
24. USPWCD, 1955-1994, Minutes, April 24, 1959.
25. USPWCD, 1955-1994, Minutes, May 6, 1959.
26. USPWCD, 1955-1994, Minutes, September 17, 1959.
27. USPWCD, 1955-1994, Minutes, June 2, 1960.
28. USPWCD, 1955-1994, Minutes, June 2, 1960.
29. USPWCD, 1955-1994, Correspondence Files, Letter from Charles C. Fisk to James L. Settele, April 19, 1963.
30. USPWCD, 1955-1994, Correspondence Files, Letter from Charles C. Fisk to James L. Settele, April 19, 1963, p. 2.
31. USPWCD, 1955-1994, Agreement between the Upper South Platte Water Conservancy District and the City of Colorado Springs, April 11, 1961.
32. USPWCD, 1955-1994, Minutes, October 17, 1962.
33. USPWCD, 1955-1994, Minutes, October 17, 1962.
34. USPWCD, 1955-1994, Minutes, February 19, 1963.
35. USPWCD, 1955-1994, Minutes, April 16, 1963.
36. USPWCD, 1955-1994, Minutes 1964-1984.
37. Colorado State Engineer, District 23 Water Commissioner, 1938-1993. 1941 Agreement.

38. USPWCD, 1955-1994, Minutes of Special Meeting, December 4, 1967.
39. Note: The Augustine transfer is discussed in some detail in Chapter VI. It was the first agricultural to municipal transfer of direct flow water rights since Denver's early transfers in the 1930s. It inaugurated a new era - an era in which South Park effectively lost control of its remaining water resources.
40. USPWCD, 1955-1994, Minutes of Special Meeting, November 27, 1968.
41. USPWCD, 1955-1994, Minutes of Special Meeting, November 27, 1968. And Park County District Court, 1889-1970, Civil Actions 3684 and 3705.
42. USPWCD, 1955-1994, Minutes of Special Meeting, December 4, 1967; Minutes, March 18, 1970.
43. USPWCD, 1955-1994, Minutes, March 18, 1940.
44. USPWCD, 1955-1994, Correspondence Files, Agreement, January 3, 1968.
45. USPWCD, 1955-1994, Minutes, 1965-1984.
46. USPWCD, 1955-1994, Minutes, August 1, 1974.
47. USPWCD, 1955-1994, Minutes, August 1, 1974, p. 2.
48. USPWCD, 1955-1994, Minutes, May 21, 1975.
49. USPWCD, 1955-1994, Minutes, July 11, 1979.
50. Discussion of such strategies and the district's broad powers in this regard date to: USPWCD, 1955-1994, Minutes, August 2, 1973.
51. USPWCD, 1955-1994, Resolution, October 9, 1980.
52. USPWCD, 1955-1994, Minutes, October 6, 1984.
53. Leona C. Nelson, 1993, personal communication.
54. USPWCD, 1955-1994, Annual Report, 1985, pp. 17-20.
55. USPWCD, 1955-1994, Order of the Court, Civil Action 3418, May 28, 1985.
56. USPWCD, 1955-1994, Annual Report, 1985, p. 19; and David B. Wissel, 1993, personal communication.

57. USPWCD, 1955-1994, Annual Report, 1985, pp. 26-28.
58. USPWCD, 1955-1994, Annual Report, 1985, p. 20.
59. USPWCD, 1955-1994, Minutes, 1985-1994.
60. USPWCD, 1955-1994, Foundation for Urban and Neighborhood Development, Inc. 1986. "Project to Facilitate Citizen Involvement and Support for Comprehensive Planning by the Upper South Platte Water Conservancy District." Unpublished report prepared for the USPWCD, June 1986.
61. USPWCD, 1955-1994, Minutes, 1985-1994.
62. USPWCD, 1955-1994, Fact Sheets.
63. USPWCD, 1955-1994, Foundation for Urban and Neighborhood Development, Inc. 1986. "Project to Facilitate Citizen Involvement and Support for Comprehensive Planning by the Upper South Platte Water Conservancy District." Unpublished report prepared for the USPWCD, June 1986.
64. USPWCD, 1955-1994, Minutes, September 27, 1986.
65. USPWCD, 1955-1994, Handwritten document dated Saturday, May 17, 1986, apparently written pursuant to meetings with officials in the five counties served by the USPWCD - found in Allied Movers box on top of file cabinet in Park County Building and Zoning Department's storage room.
66. USPWCD, 1955-1994, Records, 1984-1994 (in particular clipping files and other miscellaneous files).
67. USPWCD, 1955-1994, File entitled "Newspaper Clippings 1985", "A Summary of a report by the Western Governors' Association Task Force on Water Efficiency - July 1986," p. 6.
68. USPWCD, 1955-1994, Aquatic and Wetland Consultants, Inc. and Gary Lacy, 1989. "Middle Fork of the South Platte River - Corridor Planning Study." Unpublished report prepared for the USPWCD, November 1989; see also Brown, Bortz, and Coddington, Inc., 1987, "Water Management for the Upper South Platte Basin." Unpublished report prepared for the USPWCD, October 1987.
69. USPWCD, 1955-1994, Todd Robertson, 1990. "Beyond Two Forks: Future Management Alternatives for the Upper South Platte River Basin." Unpublished reports prepared for Colorado Environmental Coalition, May 1990, p. 39. Please note that for me, the words "for our... urban society" are the operative words, and seem quite telling.

70. USPWCD, 1955-1994, Minutes, 1990-1994; also notes taken by author during attendance at USPWCD meetings in 1993 and 1994.
71. USPWCD, 1955-1994, Minutes, 1990-1994.
72. USPWCD, 1955-1994, Minutes, 1990-1994.
73. Note: The Hartsel water situation and the Badger Basin water transfer are discussed in greater detail in Chapter VI.
74. USPWCD, 1955-1994. Minutes, June 20, 1985.
75. USPWCD, 1955-1994, Brown, Bortz, and Coddington, Inc., 1987, "Water Management for the Upper South Platte Basin." Unpublished report prepared for the USPWCD, October 1987; also Leona C. Nelson, personal communication, and confirmed by the U.S. Forest Service.
76. U.S. Bureau of the Census, as reported in the Park County Republican and Fairplay Flume, June 2, 1995, p. 1.

## CHAPTER EIGHT

### HEADWATERS

#### The Legal and Administrative Framework

At what point does water flowing freely in a stream become a "resource"? I would argue it becomes a resource when a person conceives some economic or personal use for it. It becomes a resource when a society and its individual members appropriate it - claim it as their own and apply it to their own benefit. In the high windswept basin at the headwaters of the South Platte River, water was property and had been defined as such since the time the European powers carved up North America, dividing the land, water, and natural resources among them. As Euro-Americans penetrated the interior of the continent, they established systems for the allocation of resources and systems of ownership.

The society that extended its control into the Rocky Mountains of Colorado was fundamentally acquisitive - based on notions of individual ownership and right. This orientation was in no sense collective. Resources were something to be claimed and exploited, not something to be shared. As such, they were allocated within the framework of the law. The system of prior appropriation was based on the idea that resources could be acquired in a rational and orderly manner, if only people were free to work and derive benefit from their own labor. This was

a fundamentally Lockean notion. Pursuit of self-interest and acquisition of material resources were virtually synonymous.

It is through appropriation of land, water, and other material resources that societies progress from a state of nature to the condition of civil political societies. It is through institutions that govern appropriation and secure private property interests that the tension between individual rights and proclivities, on the one hand, and the needs of society for order and conformity, on the other hand, are mediated. The founding documents of the United States were based on John Locke's ideas. The Declaration of Independence rests on the idea that men have natural rights, invested in them by God. Governments are instituted by men for the purpose of protecting these rights. To Locke these were the rights to life, liberty, and property. To have designs on the property of another person, especially where that property had been acquired through that individual's labor, was an assault that flew in the face of civil values and natural right. It was the gravest form of insult and threat.

The framers of the Declaration of Independence modified Locke's language somewhat. The natural rights they identified were the rights to life, liberty, and the pursuit of happiness, by which they meant essentially private property rights. The individual had the right to acquire property and actively pursue self-interest, thereby accumulating a wealth of possessions and exerting control over increasing amounts of material resources.

Once an individual owned property, the individual had the right to dispose of it as he saw fit.

This was the very essence of the doctrine of prior appropriation as it was applied to water resources in the arid and semi-arid American West. The system was instituted to safeguard the rights of individuals appropriating the waters of western streams and putting those waters to beneficial use. Once those rights were asserted they were maintained by diligence, and the owner had the right to sell and exchange those property rights (usufructuary though they may be) in the most profitable manner possible. Self-interest was at the very heart of the legal doctrine of prior appropriation and the administrative system that was assembled to protect those rights.

It is within the framework provided by these legal and bureaucratic institutions that the South Park water transfers have taken place. The system protects the rights of individual water users - the owners of the water - be they small farmers, individual ranchers, or large cities. The system does not protect the commons - the land or the community - in the area from which resources are being taken. It was never intended to do so. In this context, the area of origin is afforded no protection. Water can be sold and transferred as long as no material injury occurs to individual water users in the river system. Lost jobs, closed schools, shrinking tax bases, and a

changing environment are of no consequence in water transfer proceedings.

As R.H. Tawney has pointed out, societies based on right are acquisitive societies.<sup>1</sup> They are ruled by law, which recognizes no moral limitations to the pursuit of individual self-interest. Societies based on the principle of function offer an alternative by insisting that proprietary rights be exercised in such a way that they serve some social purpose or function. Through social responsibility and responsiveness to the community, proprietary rights are maintained.

How then, can an acquisitive society become a functional society? How can the system of prior appropriation be modified to take into account the needs of the community? One answer might be that only a revolution could accomplish such a change in American society. Prior appropriation cannot be changed because it is too thoroughly immersed in the liberalism and individualism that lie at the very heart of the acquisitive society. It can only be discarded in its entirety.

Another answer might be that social change is incremental - that small changes can ultimately produce larger transformations. If such is the case, then a beginning in water transfer cases would be to acknowledge what everybody should already know: the area of origin is adversely affected by water transfers. Rather than erecting a system to compensate a community that has lost its traditional economic base, the answer may lie in granting areas of origin a small percentage

(let us say 5% to 10%) of the water originally decreed to ditches involved in transfer proceedings. Control of these supplies could then be given to conservancy districts, which could implement district-wide augmentation plans to support continued development in the area of origin. This would not enable ranching to return to South Park, but it would allow economic activities to take place that use water on a much more limited scale. It would permit residential development to occur and allow people to establish small cottage industries and to provide services to the travelling and recreating public. Conservation would be essential. In light of Tawney's ideas, conservation would be the sort of functional consideration of society necessary to maintain proprietary and usufructuary rights.

Cynics will say this would prove impossible. No incentive exists for municipalities to act in such a manner. The law does not require them to do so. But evidence from several quarters might suggest otherwise. First: conservation easements - under this practice land owners retire or fallow portions of their land in exchange for concessions and various forms of compensation or assistance. Conservation groups have persuaded a surprising number of ranchers and farmers to allow these easements in recent years in order to protect endangered species and reduce environmental degradation. Second: in South Park the cities have stopped engaging in trenching meadows, dynamiting of beaver dams, dumping fill on wetlands, and other

environmentally destructive practices. They ceased and desisted in part under duress from the Environmental Protection Agency, and in part because these actions led them into a public relations nightmare. Bad press and bad blood make it more difficult for municipal water departments to acquire new supplies and develop those supplies with a relatively free hand. The simple concession of working hand and hand with a local conservancy district could ultimately work to the cities' benefit. Granting the district 5% to 10% of the water decreed for irrigation might quiet local opposition and speed the transfer process. This approach would not solve all the problems faced by the area of origin in water transfers, but it provides a starting point for discussion.

Another idea perhaps well worth considering is the suggestion made by Rice and MacDonnell, that Colorado water law be changed to encourage temporary transfers.<sup>2</sup> At present the law does quite the opposite. It requires permanent cessation of irrigation and verifiable dry up of the land. Temporary transfers could enable ranching to continue in places like South Park. In some years the hay meadows would be fallowed; no irrigation would take place; and the cities would use the water. In other years the ranchers would turn water out of the streams at their headgates and irrigate the meadows as they had for over a century. Temporary transfers could help effect an easier transition as rural economies shift from ranching or irrigated agriculture to new economic bases.

### Area of Origin Issues

As water was withdrawn from use in South Park, rural Park County faced the loss of its most stable and enduring industry. Established in the early 1860s, South Park ranching had been the county's economic backbone. It represented the most extensive land use, and employed a small though reliable number of people. Ranchers served as county commissioners, school board members, and along with their families filled a number of other civic positions. The agricultural population formed the core membership of church congregations. Children from ranch families filled most of the seats of local schoolhouses. The taxes paid to the county assessor on land, livestock, and ranch improvements represented the dollars the county could rely upon from year to year to fund roads and operations. Mining was cyclical. It boomed and went bust, infusing large amounts of capital into the local economy for brief periods of time. Ranching was the stable base of the local economy.

As the water transfers proceeded, Park County was thrown into a state of economic, social, and political transition. As ranchers sold their water rights, disposed of their land, and left the area, Park county took on a new social character - more urban and less traditional. On the northeastern edge of the county, in the Bailey area, a bedroom community to Denver began to emerge in the 1970s. By sheer force of numbers the Bailey area came to dominate Park County politics. The political map of the county was redrawn again and again, as voting district

boundaries were changed to accommodate the burgeoning bedroom community in the mountains. Today voters in Bailey dominate all three county commissioner districts.

As ranching declined, water rights were transferred, and land was subdivided, the character of South Park began to change as well. The people moving in were not ranchers; they were people from the front range urban corridor and elsewhere in the United States. Many of them were purchasing second homes and retirement homes. Others, particularly in the northwestern part of the county, were employed in the recreation and service industries on the Summit County side of Hoosier Pass, in the world class ski area of Breckenridge. Traditional elements had by no means been eliminated. Ranching and mining persisted, but the mix was changing. Increasingly, traditional interests became simply part of more complex socio-economic and political landscapes.

In terms of power, South Park ranchers had long dominated the ranchmen's association in central Colorado, which was one of the most powerful in the state. In the middle of the twentieth century, as the state's economy diversified, the influence of the ranchmen's associations at the statehouse began to decline. In areas where ranchers either sold out or were bought out by cities, subdividers, or speculators, the decline of the power of the associations and their members was more dramatic. It was tantamount to falling off the edge of a political flat earth.

In effect South Park was being colonized by urban interests. Municipalities were purchasing the water, developers were subdividing the land, and subsequently individuals were purchasing their small share in each. In part as a response to growth, and in part as a result of the participation of newcomers zoning was implemented in Park County for the first time in 1976. Zoning wrangled old time residents - townspeople, ranchers, and miners alike. It was seen as interference with the basic right of Americans to do with their property what they wished.

Despite the shift in the concentration of population to the Bailey side of Kenosha Pass, the county seat remained in Fairplay. The town turned increasingly away from services to the ranching and mining communities and toward services for the traveling and recreating public. Recreation, tourism, and travel had indeed been elements in the South Park economy since the middle of the nineteenth century. Travelers on the Colorado Midland Railroad used to stop at Hartsel to rejuvenate at the hot springs for a weekend. Special excursion trains ran to a place close to Eleven Mile Canyon so tourists could pick wildflowers. Service to travelers on the region's rail lines and wagon roads had been part of the county's economy since the early 1860s. But in the late 1970s and the early 1980s, recreation, tourism, and travel, became the new backbone of the area's economy and the great hope for the county's future.

The transition has been difficult for Park County. Less than 40% of the county's land is privately owned and taxable. The federal and state governments control the majority of the land. Since the Front Range cities began purchasing ranchlands and constructing reservoirs in the 1920s, urban municipalities have compounded the problem of government ownership of land. According to state law, government land cannot be taxed. The water transfers have removed some of Park County's most valuable land from production - the irrigated bottomlands. What remains in private hands is now taxed at a lower rate based on economic marginality and reduced productivity. Land acquired by the cities is removed from the tax books altogether, even if only for a five to ten year period while dry up is being completed and the land remains under the continuing jurisdiction of the water court. Where reservoirs are built, where land donated to the Colorado Division of Wildlife, or where it is turned into a state recreational area, the land is also tax exempt. Park County finds its revenues declining as the challenges of making the transition from ranching to a diversified economy intensify.

In time these losses will be offset by residential development; but, until loopholes are closed that permit subdivisions to get agricultural tax status based on the perfunctory presence of a handful of cattle for a few months of the year, benefits will not be realized. Population increases and the movements of residents and recreationalists create strains on the infrastructure. Tax revenues are necessary to

maintain the ever-expanding web of dirt and asphalt roads in this vast rural county, to support the schools, and to provide a variety of social services.

When area of origin issues are considered more broadly, Park County is in an advantageous position. When compared with an areas like Crowley and Otero counties on the Arkansas River below Pueblo, a farming region which is relatively flat and becomes oppressively hot during the summertime, South Park is fortunate. It is spectacularly beautiful, has a deep and interesting history, and affords ample recreation opportunities: fishing and camping for the sedentary, hiking and cross-country skiing for the active, and dirt biking and four wheeling for those who would rather let an engine do the work. The beauty of South Park is no longer simply an attribute of the area. It must be classified as a "scenic resource" (Figure 8-1).

As water is removed from the land and irrigation ceases, the plant species in South Park meadows undergo a transition. According to range scientist and engineer Paul Flack, who works for the city of Aurora, it takes approximately five to ten years for dryland species to replace more hydrophytic species in the former meadows.<sup>3</sup> As the water table drops, the mountain meadow plants die, and gradually other plants better adapted to a semi-arid environment take their place. At the time of the Augustine transfer in the late 1960s, one of the fears was that South Park would be turned into a dustbowl. That fear has proved unfounded. Indeed on windy days, dust devils can be observed



**Figure 8-1.** Bristlecone Pine, South Park, 1981.

swirling across the undulating floor of the park, but for the most part they do not form on the formerly irrigated hay meadows. They tend to occur instead on the sparsely vegetated range of the open park.

It is in the open park that damage from overgrazing is most evident, not in the old bottomlands where irrigation water inundated fields of native hay for over a century. Some areas remain lush due to natural subirrigation, but most of the former haylands are in the process of transition, returning to a state that more nearly approximates what John C. Fremont would have seen when he crossed the park in the late 1840s: a vast golden brown expanse, broken here and there by small, brilliant patches of green. South Park was transformed twice: once by the application of water to the land and now by its removal and expropriation.

### **Water, Power, and the Meaning of Resource Expropriation in the Rural West**

South Park is not an isolated case. The Owens Valley in California provides the most dramatic point of comparison. Dried up to slake the thirst of the growing city of Los Angeles, the Owens Valley saw the demise of its core industry (agriculture) as control of water resources passed to urban hands. It experienced similar dislocations, economically, socially, and politically.

The main difference between the two places lay in the manner by which the transfers proceeded - in how land and water rights were acquired. In the Owens Valley there was considerable subterfuge. Many of the valley's residents had no idea who they were dealing with when enquiries began into the purchase of land and water rights. In South Park, though A.D. Wall made his first assessment of the basin's resources surreptitiously, local ranchers soon discovered he was representing the city of Denver and was seeking to purchase water rights for use downstream. Some ranchers approached Wall and the city directly with offers to sell. Others sat down to discuss the matter voluntarily.

Another difference between South Park and the Owens Valley lay in the degree of collusion between the city, the federal government, and speculators in the California case. Such an unholy alliance did not exist in South Park. In the early transfers Denver acted independently. In the later transfers, those beginning in 1968 and continuing to the present, some cooperation existed between different levels of government; but it never approached the level of complicity found in the Owens Valley.

The cities of Aurora, Thornton, and Denver sought to transfer water within the framework of the law, and they developed a close working relationship with the State Engineer's office and with individual representatives of that arm of the state bureaucracy at both the district and the division levels.

As time passed, the cities had to contend with environmental regulations and concerns about the use and abuse of public lands. In that context, the cities developed close working relationships with the U.S. Forest Service, Environmental Protection Agency, Bureau of Land Management, and Colorado Division of Wildlife. These relationships are radically different in character from those in the Owens Valley. The alliances that emerged in California around the turn of the century were formed in an era of boosterism and big dam building. Land speculators, government bureaucrats, reclamation promoters, and city engineers had a common and fundamentally rapacious interest. They saw the resources of rural areas as theirs for the taking in the name of progress.

In the latter part of the twentieth century that attitude has been tempered somewhat, though certainly not eradicated. Municipal interests and agents of the federal and state government operate in a climate of scarcity. Resources are better understood as finite and as requiring judicious management if they are to prove reliable in the future. In the case of South Park the working relationship between the Front Range cities and the State Engineer's office is a practical one, born of necessity. It is not like those found in the Owens Valley, which more closely resembled a pride of lions licking their chops over the spoils of the kill.

Most significantly, in South Park water sales were voluntary. Local ranchers and their heirs actively participated

in the transfer of water rights off the meadows of the park and into municipal water pipes. Some sold knowingly to speculators, who turned around and flipped the water rights to the Front Range cities. Other local people went directly to the cities, offering their water rights and sometimes their land for sale. The ranchers and their heirs hired water brokers, engineers, and lawyers. They carefully assessed the resources they possessed and sought to derive the greatest possible profit. This is in sharp contrast to the patterns that unfolded in the Owens Valley, where coercion, deceit, and condemnation were relatively common.

The South Park water transfers represent a quiet, voluntary process. As such they may serve as a better example of what may be expected to occur in the future in the state of Colorado and elsewhere across the American West. It is in their subtlety that the South Park water transfers find their significance. The drama of the Owens Valley makes an interesting story - subterfuge, collusion, local resistance expressed in the blowing up of dams - all the elements of a James Michener novel or a Hollywood movie. South Park is less dramatic, but no less significant. The quiet, legal process that occurred in South Park removed over 40,000 acres of haylands from production, and retired 253 separate water rights from use in the high basin. Few ditches remain in active use in South Park. What was traditionally the area's most vital industry has practically disappeared (Figure 8-2).



**Figure 8-2.** Rainbow over an abandoned ranch, South Park, 1993.

Rural Park County has been thrown into a state of transition, and the law provides no remedies and no protection. According to the law, the area of origin is not damaged by these proceedings; only the holders of vested water rights can legally be injured in a water transfer. This disturbing pattern of transfer without recourse is bound to be repeated in one location after another in the areas that surround Denver, Phoenix, Albuquerque, Salt Lake City, Las Vegas, and other western cities. The problem will grow worse as urban populations expand and the demand for water grows. Small rural populations lack the economic and political might that derives from numbers; that power lies in the cities.

Municipalities can legitimately argue that drying up the hinterlands serves the interests of the greatest number of people. Reallocating water resources from the production of low value fodder crops to industrial and domestic uses is economically rational. But economic rationality takes no account of history. It places no value on social life or on landscape. The transfer of South Park's water is erasing a way of life and transforming a landscape. The open spaces of Park County are giving way to residential subdivisions. The horse as a mode of transportation is being replaced by all terrain vehicles that snarl and hiss, and tear at the sparse dryland vegetation and thin topsoil. Winnebagos and travel trailers blight the landscape in the same spots in the high mountain range where cowboys made camp during cattle drives just a couple

of decades ago. The saloons of South Park are filled with urban cowboys, not people who have actually worked the land.

Yet it was the city's capital that originally built the place. Miners found their way into the high park to exploit its mineral resources. Ranchers took up residence to feed the prospectors, and later expanded their holdings to supply beef to the city of Denver and the stockyard and slaughterhouse system that was tied so closely to nature's metropolis - Chicago. The rural cannot exist without the urban. They are part of a continuum that proves mutually defining and mutually supporting. Each fosters the growth or decline of the other.

As Patricia Nelson Limerick has pointed out, the American West is not as distinct from the East as it would like to believe.<sup>4</sup> The West's history is replete with continuities, all part of the legacy of conquest. In the history of the rural west, in the processes and forces that transform life and landscape in the region, there are persistent threads. These include the penetration of industrial capital, municipal interests, and urban values, and they reflect the primacy of heartland-hinterland relationships.

Perhaps South Park has not changed as much as some, including myself, would like to believe. Perhaps the reach of urban interests is no greater today than it was a century and half ago. Technology and time have changed it somewhat in form, but in substance and motive the relationship between city and countryside has changed little. The present is part of a

continuous history in which elements of nature become resources for human use and consumption. Rural life is defined by what the city needs and by what an urbanizing and industrializing society permits and values. This is all part of the legacy of conquest. Exploitation and expropriation of key resources remain a part of the very fabric of life in the high windswept basin that lies at the headwaters of the South Platte River.

#### Chapter Notes

1. Tawney, 1920.
2. Rice and MacDonnell, 1993.
3. Paul Flack, personal communication.
4. Limerick, 1987.

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#### Personal Communication:

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Paul Flack (Engineer, City of Aurora)  
Doris Hamilton (South Park Rancher)  
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Senator Linda Powers (State Senator, and Member, Senate Water Committee)  
Eugene G. Siemer (Director, Mountain Meadows Research Center, and Professor of Agronomy, Colorado State University)  
Allen Swartz (Agricultural Extension Agent)  
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Michael L. Walker (Water Attorney, City of Denver)  
David B. Wissel (Park County Assessor and Board Member, Upper South Platte Water Conservancy District)

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U.S. Department of the Interior, Geological Survey, Photographic Library, Denver.

## APPENDIX A

### GRAPHICS: CREDITS AND SOURCES

#### Line Drawings

Cathy Kindquist, conceptualization and research  
Kathy Limborg, design and drafting  
Pat Wiles, drafting

#### SOUTH FORK SOUTH PLATTE RIVER (UPPER REACH) - p. 125.

Base: W.W. Wheeler, June 1977. "South Fork South Platte River Above Fourmile Creek." District 23 Water Commissioner's Office, Fairplay.

Sources: Ditches Database (Appendix C).  
Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.

#### SOUTH FORK SOUTH PLATTE RIVER (LOWER REACH) - p. 125.

Base: W.W. Wheeler, February 1978. "Straight Line Diagram of South Platte River from Hartsel to Waterton." District 23 Water Commissioner's Office, Fairplay.

Sources: Ditches Database (Appendix C).  
Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.

#### SOUTH FORK SOUTH PLATTE RIVER - PRIOR TO RESERVIOR CONSTRUCTION (ANTERO TO ELEVEN MILE CANYON SITES) - p. 126.

Base: Original Line Drawing by Kindquist and Limborg.  
Sources: Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.

Ditches Database (Appendix C).

#### MIDDLE FORK SOUTH PLATTE RIVER (UPPER REACH) - p. 127.

Base: W.W. Wheeler, June 1977. "Middle Fork South Platte River." Denver Water Department, Records.

Sources: Ditches Database (Appendix C).  
Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.

MIDDLE FORK SOUTH PLATTE RIVER (LOWER REACH) - p. 127.  
 Base: W.W. Wheeler, June 1977. "Middle Fork South Platte River." District 23 Water Commissioner's Office, Fairplay.  
 Sources: Ditches Database (Appendix C).  
 Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.

FOURMILE CREEK - p. 128.  
 Base: Original Line Drawing by Kindquist and Limborg.  
 Sources: Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.  
 Ditches Database (Appendix C).  
 Mark Curry (District 23 Water Commissioner, retired), Personal Communication.

HIGH CREEK - p. 128.  
 Base: Original Line Drawing by Kindquist and Limborg.  
 Sources: Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.  
 Ditches Database (Appendix C).  
 Mark Curry (District 23 Water Commissioner, retired), Personal Communication.

TWELVEMILE CREEK - p. 129.  
 Base: Original Line Drawing by Kindquist and Limborg.  
 Sources: Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.  
 Ditches Database (Appendix C).  
 Mark Curry (District 23 Water Commissioner, retired), Personal Communication.

BUFFALO CREEK AND SALT CREEK - p. 129.  
 Base: Original Line Drawing by Kindquist and Limborg.  
 Sources: Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1." District 23 Water Commissioner's Office, Fairplay.  
 Ditches Database (Appendix C).  
 Mark Curry (District 23 Water Commissioner, retired), Personal Communication.

TARRYALL CREEK - p. 130.  
 Base: W.W. Wheeler and Associates, January 1977. "Tarryall Creek." District 23 Water Commissioner's Office, Fairplay.  
 Sources: Ditches Database (Appendix C).  
 Colorado State Engineer, 1918. "Map of Water District 23, Irrigation Division No. 1."

- District 23 Water Commissioner's Office,  
Fairplay.
- ROCK CREEK - p. 130.  
Base: Original Line Drawing by Kindquist and Limborg.  
Sources: Colorado State Engineer, 1918. "Map of Water  
District 23, Irrigation Division No. 1."  
District 23 Water Commissioner's Office,  
Fairplay.  
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Ditches Database (Appendix C).  
Mark Curry (District 23 Water Commissioner,  
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- MICHIGAN CREEK - p. 131.  
Base: W.W. Wheeler and Associates, January 1977.  
"Michigan Creek." District 23 Water  
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Sources: Ditches Database (Appendix C).  
Colorado State Engineer, 1918. "Map of Water  
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District 23 Water Commissioner's Office,  
Fairplay.
- JEFFERSON CREEK - p. 131.  
Base: W.W. Wheeler and Associates, January 1977.  
"Jefferson Creek." District 23 Water  
Commissioner's Office, Fairplay.  
Sources: Ditches Database (Appendix C).  
Colorado State Engineer, 1918. "Map of Water  
District 23, Irrigation Division No. 1."  
District 23 Water Commissioner's Office,  
Fairplay.

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### Line Drawings

Cathy Kindquist, conceptualization and research  
Pat Wiles, design and drafting

- SERIES: PLATTE DRAINAGE  
TARRYALL DRAINAGE  
- ESTABLISHMENT OF DITCHES, 1860-1990  
- pp. 120-121.  
- STATUS OF DITCHES, 1993 - pp. 214-215.  
- MUNICIPAL CONTROL, 1993 - pp. 240-241.  
- TRANSFERS, 1993 - pp. 246-247.  
- IRRIGATION WATER RIGHTS, 1993 - pp. 291-292.  
Base: Original Line Drawing by Kindquist and Wiles.  
Sources: Note: This series assembled from line  
drawing series detailed in the previous  
section. The two schematic drawings at this

scale represent South Park's two drainages:  
the Tarryall and the Platte.  
Ditches Database (Appendix C).

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### Maps

Cathy Kindquist, conceptualization and research  
Pat Wiles, design and drafting

#### LOCATION MAP - p. 2.

Base: Park County, 1993. "Park County Base Map." Park  
County Surveyor's Office, Fairplay.  
Sources: Harold Faye, 1976. "Colorado Rockies - Peaks and  
Passes." In Marshall Sprague, Colorado: A  
Bicentennial History. New York:  
Norton.

#### COLORADO MOUNTAIN PARKS - p. 3.

Base: C.E. Kindquist and P.L. Wiles, 1994. "Location  
Map."  
Sources: J.M. Crowley, 1964. "The Mountain Parks of  
Colorado - Regional Setting." In Crowley,  
1964 (See Bibliography).  
Harold Faye, 1976. "Colorado Rockies - Peaks and  
Passes." In Marshall Sprague, Colorado: A  
Bicentennial History. New York: W.W.  
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#### SOUTH PARK PHYSIOGRAPHY - p. 62.

Base: Allan Cartography, 1989. "Colorado." Medford,  
Oregon: Raven Maps and Images.  
P.L. Wiles and C.E. Kindquist, 1994. "Relief."  
Note: Using Allan Cartography's map of Colorado  
as a base, Pat Wiles created an original  
map, rendering the topography of central  
Colorado in dots as opposed to colors - an  
accomplishment bordering on the miraculous.  
Though conceived by Kindquist, the genius  
and precision required to produce these maps  
must be attributed to Pat Wiles, graphic  
artist.

Sources: U.S. Forest Service (USDA), 1992. "Pike National  
Forest." n.p. RIDGES, RANGES, AND STREAMS

Base: P.L. Wiles and C.E. Kindquist, 1994. "Relief."

Sources: U.S. Forest Service (USDA), 1992. "Pike National  
Forest." n.p.

#### EARLY TOWNS, WAGON ROADS, AND RAILROADS

#### SOUTH PARK, 1858-1918 - p. 71.

Base: Park County, 1993. "Park County Base Map." Park  
County Surveyor's Office, Fairplay.

Sources: G.M. Wheeler, 1873. Geographical and Geological  
Explorations and Surveys West of the 100th

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#### ACCESS TO SOUTH PARK

##### MOUNTAIN PASSES - p. 74.

Base: P.L. Wiles and C.E. Kindquist, 1994. "Relief."

Sources: U.S. Forest Service (USDA), 1992. "Pike National Forest." n.p.

#### COMPONENTS OF THE LAND

##### SOUTH PARK - p. 86.

Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.

Sources: J.M. Crowley, 1964. "Major Components of the Land." In Crowley, 1964 (See Bibliography).  
U.S. Forest Service (USDA), 1992. "Pike National Forest." n.p.

#### HISTORICALLY IRRIGATED LANDS

##### SOUTH PARK - p. 88.

Base: W.W. Wheeler and Associates, n.d. "South Park General Area Map." Denver Water Department, Records.

Sources: 1974-1993. Court Exhibits: Transfer Maps - Irrigated Lands. Colorado, Division 1 Water Court. Records. Weld County Courthouse, Greeley.

#### COLORADO WATER DIVISIONS - p. 108.

Base: Harold Faye, 1976. "Colorado Rockies - Peaks and Passes." In Marshall Sprague, Colorado: A Bicentennial History. New York: W.W. Norton.

- Source: Colorado State Engineer. 1989. "Divisions." District 23 Water Commissioner's Office, Fairplay.
- SOUTH PARK DRAINAGE - p. 123.
- Base: W.W. Wheeler and Associates, n.d. "South Park General Area Map." Denver Water Department, Records.
- Sources: U.S. Forest Service (USDA), 1992. "Pike National Forest." n.p.
- EARLY DENVER ACQUISITIONS
- ELEVEN MILE RESERVOIR BASIN, 1929-1932 - p. 177.
- Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.
- Sources: Denver Municipal Water Works, 1936. "Lands Purchased for Eleven Mile Canon Reservoir." Denver Water Department, Records.
- THE HYDRAULIC PARK, 1994 - p. 193.
- Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.
- Sources: U.S. Forest Service (USDA), 1992. "Pike National Forest." n.p.
- DENVER'S MUNICIPAL WATER SUPPLY, 1990 - p. 206.
- Base: Denver Water Department, 1984. Untitled rendering of the Denver water system that initially appeared on the cover of the Draft EIS for Two Forks Reservoir. Denver Water Department, Records.
- Sources: Denver Water Department, 1968. "Denver Board of Water Commissioners - Water Supply System." Denver Water Department, Records.
- AURORA'S MUNICIPAL WATER SUPPLY, 1990 - p. 208.
- Source: Aurora Department of Utilities, 1991. "Raw Water Supply System - City of Aurora." Aurora Department of Utilities, Records.
- DENVER METROPOLITAN AREA, 1990 - p. 210.
- Base: C.E. Kindquist and P.L. Wiles, 1994. "Location Map."
- Sources: S.J. Leonard and T.J. Noel, 1990. "The Emergence of Metro Denver." In Leonard and Noel, 1990 (See Bibliography).
- FEDERAL AND STATE LAND
- SOUTH PARK, 1992 - p. 294.
- Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.
- Sources: U.S. Forest Service (USDA), 1992. "Pike National Forest." n.p.
- J.M. Crowley, 1964. "South Park - Land Ownership." In Crowley, 1964 (See Bibliography).

SELECTED RANCH BOUNDARIES

SOUTH PARK WATER TRANSFERS - p. 295.

Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.

Sources: 1974-1993. Court Exhibits: Transfer Maps. Colorado, Division 1 Water Court. Records. Weld County Courthouse, Greeley.

SOUTH PARK SUBDIVISIONS, 1989 - p. 297.

Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.

Sources: Park County, 1989. "Park County Subdivisions." Park County Building and Zoning Office, Fairplay.

SERIES: SOUTH PARK WATER TRANSFERS

- WATER RIGHTS AND IRRIGATED ACRES RETIRED FROM PRODUCTION, 1915-1994 - p. 219.

- MUNICIPAL WATER TRANSFERS, 1915-1994 - p. 237.

- RANCH OWNERSHIP AT TIME OF TRANSFER - p. 248.

Base: Park County, 1993. "Park County Base Map." Park County Surveyor's Office, Fairplay.

Sources: Transfers Database (Appendix B)

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Historical Photographs

As credited in the captions.

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Contemporary/Color Photographs

Cathy Kindquist, photographer.

## APPENDIX B

### SOUTH PARK WATER TRANSFERS, DATABASE

The first and smallest of the databases presented in the appendices, the Transfers Database contains basic information about the ranches involved in the South Park water transfers.

The information is presented in two parts, and the categories are coded as follows:

TRANSFER	Name of ranch involved in municipal water transfer
CITY	City acquiring water rights
D	Drainage (P=Platte, T=Tarryall)
OWNERSHIP	Ownership of ranch at time of sale of water rights: Local = Local rancher Local (Heirs) = Local rancher's heirs Abs Rancher = Absentee rancher Local Coop = Cooperative of local ranchers (for example: grazing associations) Spec = Developers or Speculators
TOTAL AC	Total acres in the ranch (if known)
PRIORITY	Priority date - earliest water right
PN	Priority number - earliest water right
DECREE	Date of formal transfer decree. Note: Some have no decree date, indicating that no formal transfer of water rights occurred, or that (in the case of the Ralph Johnson ranch) the case has not yet gone to court.
WR	The number of water rights involved in transfer proceedings
LAND	Land sold to city in transfer (Y=Yes, N=No)
AMT IN TFR	Total amount of water (in cfs - cubic feet per second) decreed to ditches involved in transfer proceedings
AMT TFRED	Amount transferred in court proceedings to a new (municipal) point of diversion and/or storage.
AMT RELINQ	Amount relinquished to the stream in court proceedings
PCT TFRED	Percent transferred
PCT RELINQ	Percent relinquished
IRR ACRES	Irrigated acres retired from production

### Sources

The information presented in this database is drawn primarily from court documents (the formal transfer decrees). It includes information from original adjudication papers and the district water commissioner.

TRANSFER	
CITY	Transfer Decrees
D	
OWNERSHIP	District 23 Water Commissioner
TOTAL AC	Denver Water Department, Aurora Department of Utilities, City of Thornton (Water Resources Division)
PRIORITY	Transfer Decrees
PN	Transfer Decrees
DECREE	Transfer Decrees
WR	Transfer Decrees
LAND	District 23 Water Commissioner
AMT IN TFR	Transfer Decrees, Water Right Adjudications
AMT TFRED	Transfer Decrees, District 23 Water Commissioner ("Alpha list")
AMT RELINQ	Transfer Decrees, District 23 Water Commissioner ("Alpha list")
PCT TFRED	
PCT RELINQ	
IRR ACRES	Transfer Decrees, District 23 Water Commissioner, and City Water Departments (engineering reports).

PART I  
TRANSFERS DATABASE

TRANSFER	CITY	D	OWNERSHIP	TOTAL AC	PRIORITY	PN	DECREE	WR	LAND
Antero	Denver	P	Local	0.00	10/10/1881	149	/ /	2	Y
Augustine	Aurora	P	Abs. Rancher	0.00	08/01/1868	10	11/27/1968	14	N
Badger Basin	Aurora	P	Local Coop	0.00	06/01/1874	25	08/26/1983	13	N
Beery	Denver	P		5600.00	06/01/1861	1	07/14/1976	5	Y
Black Mountain	Aurora	P	Spec	0.00	08/01/1878	92	03/20/1991	7	N
Borden	Denver	T	Local (Heirs)	420.00	05/01/1866	3	04/13/1933	5	Y
Coil	Aurora	P	Local	8180.00	05/23/1873	18	08/26/1983	8	N
Collard	Aurora	T	Local	1380.00	04/05/1876	55	09/19/1991	2	Y
Collard	Thornton	T	Local	460.00	04/05/1876	55	09/19/1991	2	Y
Eleven Mile	Denver	P	Local	0.00	07/01/1872	15	/ /	4	Y
Epperson	Denver	P	Local (Heirs)	1240.00	06/01/1879	102	/ /	2	Y
Four Mile	Denver	P		0.00	06/01/1868	9	11/12/1982	7	N
Furman	Thornton	T	Local	1080.00	05/01/1882	154	02/08/1991	3	Y
High Creek	Aurora	P	Spec	0.00	08/31/1873	22	06/21/1979	8	N
Huron	Aurora	P	Local Coop	0.00	06/15/1874	30	08/26/1983	35	N
Indian Mountain	Aurora	T	Spec	0.00	05/20/1878	86	08/10/1988	3	N
Janitell	Aurora	T	Spec	16317.00	10/01/1874	33	03/06/1991	20	N
Jardon	Denver	P	Local	440.00	06/01/1879	102	10/28/1932	3	Y
Johnson, Ralph	Aurora	T	Local (Heirs)	1900.00	06/01/1875	51	/ /	5	N
Johnston, Dixon	Thornton	T	Local	0.00	05/15/1872	13	04/29/1988	7	N
McDowell	Thornton	P	Local	20929.70	07/01/1867	6	01/16/1979	8	N
McNulty	Aurora	P	Abs Rancher	0.00	09/01/1873	23	12/01/1986	8	N
Michigan Creek	Thornton	T	Spec	2520.00	03/15/1880	110	02/08/1991	6	Y
Platte Ansley	Thornton	P	Spec	0.00	07/01/1879	104	03/20/1986	9	N
Rock Creek	Thornton	T	Spec	2331.00	05/15/1871	11	07/23/1987	33	Y
Rocker Seven	Thornton	T	Spec	2406.00	04/25/1875	39	06/25/1987	5	Y
Rogers, George A.	Denver	P	Local	300.00	05/01/1875	42	05/23/1934	4	Y
Rogers, Lucinda	Denver	P	Local	1320.00	05/15/1879	99	/ /	3	Y
Schattinger	Thornton	T	Local	0.00	05/15/1875	46	10/01/1987	6	N
Teter	Thornton	T	Local	0.00	04/12/1875	37	04/29/1988	3	N
Trout Creek	Thornton	P	Spec	0.00	07/01/1862	2	03/20/1986	5	N
Walker	Aurora	P	Spec	0.00	06/25/1873	20	08/26/1983	10	N

PART II  
TRANSFERS DATABASE

TRANSFER	CITY	AMT IN TFR	AMT TFRED	AMT RELINQ	PCT TFRED	PCT RELINQ	IRR ACRES
Antero	Denver	97.79	0.00	0.00	0.00	0.00	0.00
Augustine	Aurora	240.45	14.98	225.47	6.23	93.77	1700.00
Badger Basin	Aurora	183.20	29.46	153.74	16.08	83.92	2456.00
Beery	Denver	102.59	20.00	82.59	19.50	80.50	1125.00
Black Mountain	Aurora	105.23	14.44	90.79	13.72	86.28	678.00
Borden	Denver	59.84	8.70	51.14	14.54	85.46	350.00
Coil	Aurora	287.05	24.28	262.77	8.46	91.54	1298.00
Collard	Aurora	18.75	3.82	14.93	20.36	79.64	478.50
Collard	Thornton	6.25	1.27	4.98	20.36	79.64	159.50
Eleven Mile	Denver	8.00	0.00	8.00	0.00	100.00	0.00
Epperson	Denver	10.80	0.00	0.00	0.00	0.00	0.00
Four Mile	Denver	96.89	7.00	89.89	7.22	92.78	725.00
Furman	Thornton	36.60	13.90	22.70	37.98	62.02	860.00
High Creek	Aurora	126.40	16.62	109.78	13.15	86.85	1624.00
Huron	Aurora	678.88	94.30	584.58	13.89	86.11	9410.00
Indian Mountain	Aurora	58.32	20.13	38.19	34.52	65.48	511.00
Janitell	Aurora	115.51	31.21	84.30	27.02	72.98	4747.30
Jardon	Denver	18.91	6.17	12.74	32.63	67.37	0.00
Johnson, Ralph	Aurora	32.24	0.00	0.00	0.00	0.00	670.00
Johnston, Dixon	Thornton	18.46	5.31	13.15	28.76	71.24	697.00
McDowell	Thornton	168.48	71.79	96.69	42.61	57.39	1813.00
McNulty	Aurora	66.59	15.08	51.51	22.65	77.35	775.00
Michigan Creek	Thornton	81.36	10.50	70.86	12.91	87.09	1147.00
Platte Ansley	Thornton	156.85	17.80	139.05	11.35	88.65	2270.00
Rock Creek	Thornton	112.30	9.40	102.90	8.37	91.63	780.00
Rocker Seven	Thornton	21.84	3.70	18.14	16.94	83.06	311.00
Rogers, George A.	Denver	32.60	4.02	28.58	12.33	87.67	0.00
Rogers, Lucinda	Denver	225.20	0.00	0.00	0.00	0.00	0.00
Schattinger	Thornton	21.65	9.79	11.86	45.22	54.78	660.00
Teter	Thornton	16.00	8.00	8.00	50.00	50.00	820.00
Trout Creek	Thornton	62.00	22.20	39.80	35.81	64.19	2600.00
Walker	Aurora	199.02	15.85	183.17	7.96	92.04	968.00

# APPENDIX C SOUTH PARK DITCHES, DATABASE

The Ditches Database is perhaps the most important database presented in the appendices. It contains detailed information about 417 irrigation water rights in South Park. The database excludes other ditches in Colorado Water District 23 which lie outside the boundaries of South Park. The database also excludes ditches that were historically used for purposes other than irrigation (mining, for example). The purpose here is to look at water rights that have become, or have the potential to become, involved in agricultural-to-municipal water transfers. This database can be linked with the Diversions Database presented in Appendix E, which is also arranged alphabetically by ditch. In this manner, information about the characteristics of ditches can be connected with information about their use.

Categories of information in the Ditches Database are coded as follows:

DITCHES	Name of the ditch
TRANSFER	Transfer ditch as in
OWNER 1993	Owner in 1993 (City, Local owner or Irrigator)
SOURCE	Stream or source from which ditch takes its water
ADJ	Year of Adjudication
PRIOR DATE	Priority Date
PN	Priority Number
CFS O	Amount of water (in cfs) decreed to ditch in original adjudication
CFS D	Amount of water decreed to ditch according to transfer decree
AMT IN TFR	Amount of water involved in transfer proceedings
CFS TFRED	Amount transferred to municipal use in

CFS RELINQ	court proceedings Amount relinquished to the stream in transfer proceedings
AF TFRED	Amount of water (in acre feet) transferred to municipal use (may represent a maximum or an average annual figure) - if known
DEC IRR AC	Irrigated acreage according to transfer decree
STATUS	Status of the ditch: TFR = transfered to municipal use TFRAB = abandoned in transfer proceedings IRR = irrigation (still active) AUG = augmentation AB = abandoned
ORIGINAL CLAIMANT	Person claiming ditch at time of original adjudication
COMMENTS	Varied: notes inconsistencies in data, local changes in water rights, and misc. information. "CA 7777" refers to a court case number.

#### Sources

Information in the Ditches Database is drawn from a multiplicity of sources, primarily administrative documents generated by the Colorado State Engineer's office and by the District 23 Water Commissioner. Court documents, including both original adjudications of water rights, and transfer decrees were also used as sources.

DITCHES	
TRANSFER	Transfer Decrees
OWNER 1993	District 23 Water Commissioner (ownership list)
SOURCE	District 23 Water Commissioner ("Alpha" list)
ADJ	Water Right Adjudications
PRIOR DATE	Water Right Adjudications, District 23 Water Commissioner (water right lists, 1918 district map), Colorado State Engineer (water right tabulations, 1890-1990)
PN	Water Right Adjudications, District 23 Water Commissioner (water right

CFS O	lists, 1918 district map), Colorado State Engineer (water right tabulations, 1890-1990) Water Right Adjudications, District 23 Water Commissioner (water right lists, 1918 district map), Colorado State Engineer (water right tabulations, 1890-1990)
CFS D	Transfer Decrees
AMT IN TFR	Transfer Decrees, Water Right Adjudications
CFS TFRED	Transfer Decrees, District 23 Water Commissioner ("Alpha" list)
CFS RELINQ	Transfer Decrees, District 23 Water Commissioner ("Alpha" list)
AF TFRED	Transfer Decrees
DEC IRR AC	Transfer Decrees
STATUS	District 23 Water Commissioner ("Alpha" list)
ORIGINAL CLAIMANT	Water Right Adjudications
COMMENTS	Miscellaneous

# PART I

## DITCHES DATABASE

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Alden and Milligan	Augustine	Aurora	Four Mile Ck	1889	08/31/1873	22
Alden and Milligan	High Creek	Aurora	Four Mile Ck	1889	08/31/1873	22
Alkaline	Platte Ansley	Thornton	Middle Fork	1889	07/01/1885	205
Anchor	Janitell	Aurora	Jefferson Ck	1889	05/20/1879	100
Anderson	Coil	Aurora	Middle Fork	1889	04/20/1881	135
Anderson Brewer		Western Water Ltd.	Tarryall Ck	1889	04/05/1876	54
Anderson Brewer		Western Water Ltd.	Tarryall Ck	1889	06/01/1881	145
Anderson No. 1 (No. 2)	Coil	Aurora	Middle Fork	1889	05/25/1875	48
Anderson No. 3	Coil	Aurora	Middle Fork	1889	07/01/1873	21
Baker		Albert Wahl	Guernsey Gulch	1889	06/15/1878	88
Baker & Lilley	Johnson, Ralph	Aurora	Dead Man's Ck	1889	06/01/1875	51
Baker and Lilley		Albert Wahl	Dead Man's Ck	1889	06/01/1875	51
Balm of Gilead	Huron	Aurora	Balm of Gilead C	1889	07/15/1876	65
Baton		Marjorie Rudisill	Four Mile Ck	1913	09/01/1889	335
Beaver	Rocker 7	Thornton	North Fork	/	/	
Beery	Beery	Denver	Four Mile Ck	1889	06/15/1861	1
Binkley	Black Mountain	Aurora	Twelve Mile Ck	1889	09/01/1879	107
Binkley No. 2	Black Mountain	Aurora	Twelve Mile Ck	1889	08/01/1878	92
Bonnell	Platte Ansley	Thornton	Middle Fork	1889	05/08/1882	159
Bonnell Enl. No. 1	Platte Ansley	Thornton	Middle Fork	1889	05/15/1888	218
Borden	Borden	Denver	Tarryall Ck	1889	05/01/1866	3
Borden Enl.	Rock Creek	Thornton	Tarryall Ck	1889	12/31/1879	109

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Borden No. 2	Rock Creek	Thornton	Tarryall Ck	1889	11/01/1874	35
Borden No. 2	Borden	Denver	Tarryall Ck	1889	11/01/1874	35
Boreas No. 2	Link	Englewood	W Slope	/	/	0
Brownlow & Stephens	Beery	Denver	Four Mile Ck	1889	06/10/1874	29
Brubaker	Janitell	Aurora	Jefferson Ck	1889	05/15/1875	46
Brubaker	Schattlinger	Aurora	Jefferson Ck	1889	05/15/1875	46
Brubaker		Albert Wahl	Jefferson Ck	1889	05/15/1875	46
Burlingame	McNulty	Aurora	South Fork	1889	08/10/1878	93
Burlingame	Black Mountain	Aurora	South Fork	1889	08/10/1878	93
Burlingame No. 2	McNulty	Aurora	South Fork	1889	06/10/1888	222
Burlingame No. 3	McNulty	Aurora	South Fork	1889	06/10/1888	223
Burlington Waste	Beery	Denver	Unnamed Slough	1918	09/30/1905	404
Burns & Sessions	Janitell	Aurora	Jefferson Ck	1889	10/01/1874	33
Canon	McDowell	Thornton	Middle Fork	1889	07/15/1867	7
Central	Huron	Aurora	South Fork	1889	06/01/1877	77
Chapelle	McNulty	Aurora	South Fork	1889	09/01/1873	23
Cheney Spring		Lucky Rose	Middle Fork	1913	05/15/1873	273
Chet No. 1	Rock Creek	Thornton	Radcliff Ck	1953	12/31/1890	A-50
Chet No. 2	Rock Creek	Thornton	Radcliff Ck	1953	12/31/1890	A-51
Chet No. 3	Rock Creek	Thornton	Radcliff Ck	1953	12/31/1890	A-52
Chet No. 4	Rock Creek	Thornton	Radcliff Ck	1953	12/31/1890	A-53
Chet No. 5	Rock Creek	Thornton	Johnson Ck	1953	12/31/1890	A-54
Chet No. 6	Rock Creek	Thornton	Johnson Ck	1953	12/31/1890	A-55
Chet No. 7	Rock Creek	Thornton	Johnson Ck	1953	12/31/1890	A-56
Chubb	Antero	Denver	Greens Lake	1889	06/01/1884	195
Cincinnati	Janitell	Aurora	Michigan Ck	1889	06/20/1879	103
Cincinnati	Schattlinger	Thornton	Michigan Ck	1889	06/20/1879	103
Como Jim	Rogers, Lucinda	Denver	South Fork	1889	10/01/1886	209
Craig	Janitell	Aurora	Jefferson Ck	1889	05/05/1882	158
Crooked Creek		Pete Shakel	Crooked Ck	1889	12/31/1877	82
Crosier		Stagestop Homeowners	House Ck	1889	05/01/1866	4
Crosier & Hawxhurst		Thornton	Jefferson Ck	1889	04/25/1875	39
Crosier & Hawxhurst	Rocker 7	Gary Magness	Jefferson Ck	1889	04/25/1875	39

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Crosier & Taylor		J. C. Green	Michigan Ck	1889	10/01/1876	68
D. F. Miller No. 1	Coil	Aurora	Middle Fork	1889	05/10/1881	141
Daniel Fyffe	Badger Basin	Aurora	Four Mile Ck	1889	06/01/1874	25
Demick	Teter	Thornton	Michigan Ck	1889	04/12/1875	37
Demick Ent No. 1	Teter	Thornton	Michigan Ck	1889	04/01/1881	132
Demick Ent No. 2	Teter	Thornton	Michigan Ck	1889	03/01/1882	150
Ditch	Coil	Aurora	Middle Fork	1889	05/24/1887	212
Ditch No. 52	Platte Ansley	Thornton		1889	/	
Divine Mill	Huron	Aurora	Middle Fork	1889	05/31/1882	164
Dixon & Decoursey	High Creek	Aurora	South Fork	1889	06/15/1877	
Donovan	Badger Basin	Aurora	Four Mile Ck	1889	05/15/1878	85
Drake	Antero	Denver	South Fork	1889	10/10/1881	149
Dudley	Beery	Denver	Four Mile Ck	1889	05/10/1883	181
Dunbar	Collard	Aurora	Tarryall Ck	1889	04/05/1876	55
Dunbar	Collard	Thornton	Tarryall Ck	1889	04/05/1876	55
Dunbar No. 1	Collard	Aurora	Tarryall Ck	1889	06/01/1881	146
Dunbar No. 1	Collard	Thornton	Tarryall Ck	1889	06/01/1881	146
Dunbar No. 2	Rock Creek	Thornton	Tarryall Ck	1889	08/01/1880	129
Dunbar No. 3	Rock Creek	Thornton	Tarryall Ck	1889	05/30/1880	117
Dunbar No. 3	Borden	Denver	Tarryall Ck	1889	05/30/1880	117
Eagle Rock		Eagle Rock Ranch	Ruby Gulch Ck	1922	04/22/1922	
East Side		Western Financial	Twelve Mile Ck	1889	06/01/1882	165
Edmiston		Bob Powell	Buffalo Ck	1913	05/01/1874	278
Edmondson Seepage	Platte Ansley	Thornton	Seepage	1918	06/10/1882	
Elisha Alden	High Creek	Aurora	Middle Fork	1889	05/21/1879	101
Elisha Alden	Augustine	Aurora	Middle Fork	1889	05/21/1879	101
Euhler	Badger Basin	Aurora	Middle Fork	1918	06/01/1892	395
Fehringer No. 1	McDowell	Thornton	Middle Fork	1889	04/20/1875	38
Fehringer No. 1 Ent No. 1	McDowell	Thornton	Middle Fork	1918	04/20/1875	381
Fehringer No. 1 Ent No. 2	McDowell	Thornton	Middle Fork	1953	09/30/1949	A-252
Fehringer No. 2	McDowell	Thornton	Middle Fork	1889	04/20/1878	84
Fehringer No. 2 Ent No. 1	McDowell	Thornton	Middle Fork	1918	04/20/1878	384
Fehringer No. 2 Ent No. 2	McDowell	Thornton	Middle Fork	1953	08/15/1949	A-250

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
First Field	Badger Basin	Aurora	3 Mile Slough	1918	09/01/1892	399
Foster	Huron	Aurora	South Fork	1889	07/31/1876	66
Four Mile (#176)	Beery	Denver	Four Mile Ck	1889	08/20/1882	176
Four Mile (#9)	Four Mile	Denver	Four Mile Ck	1889	06/01/1868	9
Four Mile No. 1	Badger Basin	Aurora	Four Mile Ck	1913	06/01/1880	303
Four Mile No. 2	Badger Basin	Aurora	Four Mile Ck	1913	06/01/1880	304
Four Mile, 1st Enl (#190)	Four Mile	Denver	Four Mile Ck	1889	05/11/1884	190
Franks	High Creek	Aurora	South Fork	1889	06/15/1877	78
Fremont	Furman	Thornton	Tarryall Ck	1896	07/01/1889	236
Fritz	Huron	Aurora	Middle Fork	1889	07/01/1877	81
Funk			No Name Ck	1913	10/07/1889	336
Furman Waste Water			Michigan Ck	1918	05/01/1882	414
Garden		Twelve Mile Fishing Club	Twelve Mile Ck	1889	03/23/1882	153
Gibson		J. C. Green	Michigan Ck	1889	09/15/1880	130
Gibson Enl No. 1		J. C. Green	Michigan Ck	1889	07/25/1882	175
Guiraud	McDowell	Thornton	Middle Fork	1889	07/01/1867	6
Guiraud 3T	McDowell	Thornton	Middle Fork	1889	07/01/1867	6
Guiraud 3T		Miscellaneous	Middle Fork	1889	07/01/1867	6
Guiraud No. 1	McDowell	Thornton	Middle Fork	1889	07/01/1867	6
Guiraud No. 1	McDowell	Thornton	Middle Fork	1913	05/01/1888	330
Guiraud No. 2	McDowell	Thornton	Middle Fork	1889	07/01/1867	6
Guiraud No. 2	McDowell	Thornton	Middle Fork	1913	05/01/1908	368
Hall No. 1		Tag Fanning	Salt Ck	1913	05/10/1872	264
Hall No. 2		Tag Fanning	Salt Ck	1913	05/10/1872	265
Harland	Indian Mountain	Aurora	Tarryall Ck	1889	05/20/1878	86
Harland Extension	Indian Mountain	Aurora	Waste	1889	05/15/1884	191
Harrington & Rickards	Huron	Aurora	Middle Fork	1889	10/15/1884	197
Harrington South	Huron	Aurora	South Fork	1889	09/15/1882	177
Harris	Badger Basin	Aurora	Four Mile Ck	1889	05/01/1881	138
Harry L. Sweet	Walker	Aurora	S Fork Buffalo C	1913	05/01/1873	268
Hartsel Four Mile	Badger Basin	Aurora	Four Mile Ck	1889	06/08/1885	202
Haver No. 1	Walker	Aurora	South Fork	1889	06/25/1873	20
Haver No. 1		Western Union Realty	South Fork	1889	06/25/1873	20

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Haver No. 2	Walker	Aurora	South Fork	1889	07/01/1876	64
Haver No. 3	Walker	Aurora	South Fork	1889	05/01/1887	210
Haver No. 3		Ranch of the Rockies	South Fork	1889	05/01/1887	210
Hawthurst	Rocker 7	Thornton	Jefferson Ck	1889	04/25/1876	56
Heeley No. 1		Twelve Mile Fishing Club	Twelve Mile Ck	1889	07/01/1880	125
Heeley No. 2		Twelve Mile Fishing Club	Twelve Mile Ck	1889	07/01/1880	126
Henry	Schattinger	Thornton	Mountain Ck	1889	07/25/1879	106
Henry E. Rogers No. 1	Huron	Aurora	Cross Ck		05/15/1874	377
Henry E. Rogers No. 2	Huron	Aurora	Union Ck		06/15/1874	378
High Creek No. 2	Badger Basin	Aurora	High Ck	1913	06/01/1880	302
High Creek Placer		Harley Hamilton	Four Mile Ck	1913	05/15/1898	354
Holst & Pecker		Woody Nelson	Tarryall Ck	1889	12/15/1876	70
Holst No. 1		Woody Nelson	Tarryall Ck	1889	05/15/1876	59
Holst No. 2		Woody Nelson	Tarryall Ck	1889	04/30/1879	97
Holthusen	Johnston, Dixon	Thornton	Tarryall Ck	1889	07/01/1875	54
Holthusen	Johnston, Dixon	Thornton	No Name Ck	1913	09/01/1888	332
Holthusen No. 1	Johnston, Dixon	Thornton	Tarryall Ck	1889	06/01/1880	120
Hopson	Johnston, Dixon	Thornton	Unnamed Ck	1889	05/15/1872	13
Hopson Ent No. 1	Johnston, Dixon	Thornton	Unnamed Ck	1889	10/17/1889	225
Hot Springs	Huron	Aurora	South Fork	1889	05/15/1877	75
Howbert Gulch	Rogers, George	Denver	Howbert Gulch	1918	/ /	388
Hubbard	High Creek	Aurora	South Fork	1889	05/22/1876	60
Hubbard No. 2	McNulty	Aurora	South Fork	1889	06/15/1888	226
Island	Walker	Aurora	South Fork	1889	06/30/1876	63
Island	Jardon	Denver	Middle Fork	1889	05/20/1885	201
Jackson		Bob Ponwell	Buffalo Ck	1913	05/01/1874	279
Jardon	Huron	Aurora	South Fork	1953	06/10/1919	A-155
Jasper		Caranna	Mill Ditch	1893	06/14/1891	230
Jefferson Lake	Jefferson Lake	Aurora	Jefferson Lake	1889	06/25/1888	227
John Radford		Tosch Williams	Twelve Mile Ck	1889	07/01/1887	217
Kammer		Albert Hack	Michigan Ck	1913	06/01/1900	355
Kenosha	Rocker 7	Thornton	North Fork	1985	07/08/1884	196
Kester Sweet	McNulty	Aurora	South Fork	1889	06/01/1874	24

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Kester Sweet	High Creek	Aurora	South Fork	1889	06/01/1874	24
Lake	Janitell	Aurora	Guernsey Ck	1953	06/22/1922	A-133
Lasell	Furman	Thornton	Michigan Ck	1889	05/01/1882	154
Laveck	Schattinger	Thornton	Waste	1889	05/15/1877	74
Laveck Enl No. 1	Schattinger	Thornton	Waste	1889	05/28/1878	87
Laveck No. 2	Schattinger	Thornton	Quaken Asp Gulch	1889	07/01/1877	80
Lee No. 1	Rock Creek	Thornton	Rock Creek	1889	06/01/1876	61
Lee No. 2	Rock Creek	Thornton	Rock Creek	1889	05/01/1877	72
Lee No. 3	Rock Creek	Thornton	Rock Creek	1889	05/15/1884	192
Lee No. 4	Rock Creek	Thornton	Rock Creek	1889	05/21/1884	194
Left Hand	Huron	Aurora	Left Hand Ck	1913	04/01/1906	367
Lilley & Harriman		Albert Wahl	Jefferson Ck	1889	09/17/1881	147
Link		Darrel Johns	Tarryall Ck	1889	05/20/1885	200
Litmer	Janitell	Aurora	Jefferson Ck	1889	06/15/1882	171
Litmer Enl No. 1	Janitell	Aurora	Jefferson Ck	1889	11/13/1883	186
Little Channel	Jardon	Denver	South Fork	1889	05/01/1882	157
Little Channel	Epperson	Denver	South Fork	1889	05/01/1882	157
Love & Raynor	Rogers, George	Denver	South Fork	1889	05/08/1881	139
Lowe Placer	Four Mile	Denver		1913	12/31/1879	
Lower Kenosha	Janitell	Aurora		1913	06/01/1889	333
Main / Hotel	Badger Basin	Aurora	South Fork	1889	04/05/1879	95
Malice		Marjorie Rudisill	Four Mile Ck	1893	04/25/1890	229
Marcott			Spring	1953	03/01/1950	
Marshall			Tarryall Ck	1953	10/23/1943	
Mary G. Borden	Rock Creek	Thornton	Tarryall Ck	1889	11/30/1874	36
McCartney	Michigan Creek	Thornton	Tarryall Ck	1889	05/20/1885	199
McCartney		Freda Wahl	Tarryall Ck	1889	05/20/1885	199
McManus	Rock Creek	Thornton	Tarryall Ck	1889	05/01/1876	57
Mesa	Janitell	Aurora	Michigan Ck	1889	11/15/1881	149A
Mexican	Badger Basin	Aurora	South Fork	1889	05/17/1884	193
Michigan		Freda Wahl	Michigan Ck	1889	06/30/1875	53
Mikles		Rod Ansley	Willow Ck	1889	06/10/1882	168
Mill	Borden	Denver	Tarryall Ck	1889	08/01/1866	5

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Miller			Middle Fork	1889	07/15/1882	174
Miller & Chapman	Coil	Aurora	Middle Fork	1889	05/23/1873	18
Miller & Chapman Ent No. 1	Coil	Aurora	Middle Fork	1889	06/20/1878	89
Miller Deyarman	McNulty	Aurora	South Fork	1913	06/01/1885	320
Miller Four Mile		Newkirk	Four Mile Ck	1913	05/02/1901	358
Milligan	High Creek	Aurora	Four Mile Ck	1889	05/01/1877	71
Milligan	Augustine	Aurora	Four Mile Ck	1889	05/01/1877	71
Montag Truax		Western Water Ltd.	Tarryall Ck	1889	06/15/1885	204
Nelson	Augustine	Aurora	Pennsylvania Ck	1889	04/01/1879	94
Nelson High Creek	Augustine	Aurora	High Ck	1889	03/15/1885	198
Nelson No. 2	Augustine	Aurora	Slough Seepage	1913	05/01/1890	340
Nelson No. 3	Augustine	Aurora	High Ck	1913	05/01/1895	347
O'Brien			South Fork	1889	05/20/1883	182
O'Neil	Janitell	Aurora	Tarryall Ck	1889	05/10/1879	98
Ohler	Janitell	Aurora	Jefferson Ck	1889	06/25/1888	228
Ohler Gulch	Janitell	Aurora	Ohler Gulch	1889	04/01/1878	83
Packer	Michigan Creek	Thornton	Tarryall Ck	1889	06/20/1880	123
Packer & Bonis		Jack Eavenson	Tarryall Ck	1889	05/15/1875	45
Packer & Bonis Ent No. 1		Jack Eavenson	Tarryall Ck	1889	05/14/1877	73
Park	Coil	Aurora	Middle Fork	1889	06/10/1882	166
Park Gulch		Meridian Prop.	Park Ck	1889	05/08/1884	189
Parmalee & Shoemaker Ent No. 1	Walker	Aurora	South Fork	1889	06/01/1880	121
Parmalee & Shoemaker No. 1	Walker	Aurora	South Fork	1889	05/20/1875	47
Parmalee & Shoemaker No. 2	Walker	Aurora	South Fork	1889	06/01/1877	76
Parmalee & Shoemaker No. 3	Walker	Aurora	South Fork	1889	06/15/1876	62
Peabody	Johnston, Dixon	Thornton	Tarryall Ck	1889	04/20/1880	112
Peabody No. 2	Johnston, Dixon	Thornton	Tarryall Ck	1889	05/10/1881	140
Peabody No. 3		Western Water Ltd.	Tarryall Ck	1889	05/15/1886	206
Pearl Lower	Four Mile	Denver	Four Mile Ck	1889	05/15/1887	211
Pearl Spring	Four Mile	Denver	Spring	1953	12/31/1888	A-45
Pearl Upper	Four Mile	Denver	Four Mile Ck	1889	06/15/1888	224
Perkins Gulch	Rogers, George	Denver	Perkins Gulch		/ /	376
Petrie		Darrel Johns	Tarryall Ck	1889	06/01/1880	118

DITCHES	TRANSFER	OWNER 1993	SOURCE	ADJ	PRIOR DATE	PN
Pierce	Huron	Aurora	South Fork	1889	07/01/1880	124
Platte Station		Gordon Price	South Fork	1889	05/10/1880	115
Platte Station Ent No. 1		Gordon Price	South Fork	1889	05/15/1881	144
Prince	Augustine	Aurora	Middle Fork	1889	08/01/1868	10
Prince Ent No. 1	Augustine	Aurora	Middle Fork	1889	05/10/1876	58
Pruden	Huron	Aurora	Pruden Ck	1889	06/15/1874	30
Radford & Wright		Twelve Mile Fishing Club	Twelve Mile Ck	1889	03/21/1882	152
Randall		Freda Wahl	Michigan Ck	1889	08/01/1878	91
Randall & Nicholas	Janitell	Aurora	Michigan Ck	1889	10/14/1874	34
Randall Ent No. 1		Freda Wahl	Michigan Ck	1889	04/01/1881	133
Ratcliff No. 1	Rock Creek	Thornton	Ratcliff Ck	1889	05/01/1872	12
Ratcliff No. 2	Rock Creek	Thornton	Rock Ck	1889	05/20/1873	17
Ratcliff No. 3	Rock Creek	Thornton	Rock Ck	1889	05/01/1875	44
Ratcliff No. 4	Rock Creek	Thornton	Rock Ck	1889	06/01/1880	119
Ratcliff No. 5	Rock Creek	Thornton	Rock Ck	1889	06/09/1880	122
Ratcliff No. 6	Rock Creek	Thornton	Rock Ck	1889	05/01/1882	155
Ratcliff No. 7	Rock Creek	Thornton	Rock Ck	1889	05/01/1882	156
Ratcliff No. 8	Rock Creek	Thornton	Rock Ck	1889	05/21/1882	162
Ratcliff No. 9	Rock Creek	Thornton	Rock Ck	1889	05/21/1882	163
Raynor & Edmondson No. 1	Platte Ansley	Thornton	Middle Fork	1889	06/10/1882	167
Raynor & Edmondson No. 2	Platte Ansley	Thornton	Middle Fork	1889	07/15/1879	105
Raynor & Edmondson No. 3	Platte Ansley	Thornton	Middle Fork	1889	06/15/1882	170
Raynor & Edmondson No. 4	Platte Ansley	Thornton	Middle Fork	1889	06/28/1882	173
Raynor & Edmondson No. 5	Platte Ansley	Thornton	Middle Fork	1889	06/14/1882	169
Rebecca			Michigan Ck	1889	05/01/1884	188
Redmon		Gordon Price	South Fork	1889	06/20/1882	172
Reinhardt No. 1	Augustine	Aurora	Four Mile Ck	1889	06/01/1874	28
Reinhardt No. 2	Augustine	Aurora	High Ck	1889	05/01/1881	136
Reinhardt No. 3	Augustine	Aurora	High Ck	1889	05/01/1881	137
Reinhardt No. 4	Augustine	Aurora	Prince Ditch	1889	08/01/1876	67
Rheinacher	Janitell	Aurora	Tarryall Ck	1953	12/31/1893	A-77
Rickards Lower	Huron	Aurora	South Fork	1889	09/15/1882	178
Robbins No. 1	Rock Creek	Thornton	Radcliff Ck	1953	12/31/1885	A-32

Robbins No. 1	Huron	Aurora	1913	06/01/1872	266
Robbins No. 2	Rock Creek	Thornton	1953	12/31/1885	A-33
Robbins No. 2	Huron	Aurora	1913	06/01/1873	275
Robbins No. 3	Rock Creek	Thornton	1953	12/31/1885	A-34
Robbins Sims	Huron	Aurora	1913	05/01/1873	272
Rock Creek	Rock Creek	Thornton	1889	06/15/1872	14
Rock Creek Enl	Rock Creek	Thornton	1889	06/01/1874	27
Rock Creek No. 1	Rock Creek	Thornton	1889	06/30/1877	79
Rogers & Miller	Black Mountain	Aurora	1901	05/27/1901	236
Rogers (High Creek)	Black Mountain	Aurora	1893	06/01/1884	231
Rogers (S Fork)	High Creek	Aurora	1889	05/10/1880	114
Rogers North	Huron	Aurora	1889	05/15/1879	99
Rogers North	Rogers, Lucinda	Denver	1889	05/15/1879	99
Rogers South	Rogers, Lucinda	Denver	1889	05/15/1882	160
Sacramento		D. Larson	1889	07/27/1886	208
Sadler	Huron	Aurora	1889	05/31/1875	49
Salt Creek		Tag Fanning	1913	10/07/1889	337
Schattinger	Janitell	Aurora	1889	06/01/1883	183
Schattinger Waste	Furman	Thornton	1913	10/09/1895	351
Sessions	Janitell	Aurora	1889	07/31/1880	127
Sheeprock		Merle Wright	1889	11/01/1882	179
Sigafus	Trout Creek	Thornton	1889	05/25/1873	19
Sigafus Enl No. 1	Trout Creek	Thornton	1889	05/01/1875	43
Sigafus Enl No. 2	Trout Creek	Thornton	1889	10/05/1876	69
Sims	Huron	Aurora	1913	06/01/1876	289
Skelton	Janitell	Aurora	1889	11/01/1880	131
Slater	Indian Mountain	Aurora	1889	05/20/1880	116
Slater	Indian Mountain	Bellamah	1889	05/20/1880	116
Small	McDowell	Thornton	1889	07/15/1867	7
Small	McDowell	Thornton	1889	05/01/1868	8
Snyder Creek	Rocker 7	Thornton	1918	07/08/1884	
Souders & Wolfe No. 2		Rod Ansley	1889	08/01/1880	128
Souders & Wolfe No. 3		Rod Ansley	1889	06/01/1887	214

Souders & Wolfe No. 4		Rod Ansley	South Fork	1889	06/12/1886	207
Souders & Wolfe No. 5		Rod Ansley	South Fork	1889	06/20/1887	215
Souders & Wolfe No. 6		Aurora	South Fork	1889	05/25/1887	213
South Side Juniors		Aurora	South Fork		12/02/1889	
Spring		Western Union	Spring Ck	1913	10/07/1889	338
Spring Branch		Thornton	Spring Ck	1889	07/01/1879	104
Spring No. 1		Aurora	Spring Ck	1913	05/01/1877	293
Spring No. 2		Aurora	No Name Ck	1913	05/01/1877	295
St. Charles			Michigan Ck	1889	04/25/1883	180
Stevens No. 1		Denver	Little Trout Ck	1889	07/01/1872	15
Stevens No. 2		Denver	Little Trout Ck	1889	09/01/1872	16
Stevens No. 3		Denver	Little Trout Ck	1889	06/01/1874	26
Stevens No. 4		Denver	Little Trout Ck	1889	07/01/1874	32
Tarryall (Ck)		Freda Wahl	Tarryall Ck	1889	06/15/1875	52
Taylor		J. C. Green	Michigan Ck	1889	07/18/1878	90
Taylor's Jefferson Ck		J. C. Green	Jefferson Ck	1913	06/13/1890	342
Temple		Denver	Four Mile Ck	1953	12/31/1895	A-280
Thompson		Aurora	Middle Fork	1889	04/02/1881	134
Thompson & Radcliff			South Fork	1889	04/12/1879	96
Thorborg		Twelve Mile Fishing Club	Twelve Mile Ck	1889	03/20/1882	151
Three Mile		Aurora	Three Mile Ck	1913	04/01/1904	365
Three Mile		Aurora	Three Mile Ck	1918	10/31/1892	400
Trevan Lower		Bob West	Sacramento	1889	07/09/1887	219
Trevan Upper		Bob West	Sacramento	1889	06/27/1887	216
Troppe		Denver	Mill Ditch	1889	07/01/1874	31
Trout Creek		Thornton	Trout Ck	1889	07/01/1862	2
Trout Creek		A. Ebel	Trout Ck	1889	07/01/1862	2
Turner No. 1		Aurora	Four Mile Ck	1918	06/01/1880	389
Turner No. 2		Aurora	Spring Branch	1918	04/15/1887	397
Turner Seepage		Aurora	Seepage	1918	12/31/1874	380
W. H. Miller		Circle R Homeowners	Michigan Ck	1889	10/15/1887	221
W. H. Miller No. 2		Circle R Homeowners	Michigan Ck	1889	04/20/1883	185

W. R. Head	Johnson, Ralph	Aurora	Jefferson Ck	1889	09/01/1879	108
W. R. Head No. 2	Johnson, Ralph	Aurora	Jefferson Ck	1889	06/10/1885	203
W. R. Head No. 3	Johnson, Ralph	Aurora	Jefferson Ck	1889	05/10/1881	142
W. R. Head No. 4	Johnson, Ralph	Aurora	Jefferson Ck	1889	05/15/1881	143
Wadley No. 1		A. Ebel	Trout Ck	1889	05/01/1875	40
Wadley No. 2		A. Ebel	Trout Ck	1889	05/01/1875	41
Wadley No. 3		A. Ebel	Trout Ck	1889	06/01/1875	50
Warm Springs		Harley Hamilton	Warm Springs	1899	09/01/1880	129.5
Weaver No. 1		B. R. McNulty	South Fork	1889	05/01/1880	113
Weaver No. 2		B. R. McNulty	South Fork	1889	07/01/1883	184
Weaver No. 3		Aurora	South Fork	1889	07/12/1887	220
Weed	McNulty	Aurora	Middle Fork	1889	05/01/1875	42
Weed	Rogers, George	Denver	Middle Fork	1889	06/01/1879	102
Weed	Jardon	Denver	Middle Fork	1889	06/01/1879	102
Weed	Epperson	Denver	Middle Fork	1889	10/01/1881	148
Western	Huron	Aurora	South Fork	1889	05/16/1882	161
Weston		Doc Johnson	Beaver Ck	1889	03/15/1880	110
Whitten	Michigan Creek	Thornton	Michigan Ck	1889	03/15/1880	110
Whitten	Janitell	Aurora	Michigan Ck	1913	06/01/1885	321
Whitten No. 1		Tony Sanborn	Michigan Ck	1913	06/01/1885	322
Whitten No. 2	Michigan Creek	Thornton	Michigan Ck	1913	06/01/1885	323
Whitten No. 3	Michigan Creek	Thornton	Michigan Ck	1913	06/01/1885	324
Whitten No. 4	Michigan Creek	Thornton	Michigan Ck	1889	05/15/1871	11
Wilkin	Rock Creek	Thornton	Tarryall Ck	1913	08/11/1873	276
William A. Thomas	Janitell	Aurora	Trout Ck	1913	06/01/1879	297
Winkler	Black Mountain	Aurora	Twelve Mile Ck			

# PART II

## DITCHES DATABASE

DITCHES	TRANSFER	CFS O	CFS D	AMT IN IFR	CFS IFRD	CFS RELINQ	AF IFRD	DEC IRR AC
Alden and Milligan	Augustine	15.00	15.00	5.00	0.00	5.00	0.00	0.00
Alden and Milligan	High Creek	15.00	15.00	10.00	1.00	9.00	0.00	85.10
Alkaline	Platte Ansley	27.00	27.00	27.00	0.00	27.00	0.00	0.00
Anchor	Janitell	21.40	0.00	11.12	5.50	5.62	0.00	764.20
Anderson	Coil	54.05	54.05	22.00	3.13	18.87	0.00	46.00
Anderson Brewer		23.35	0.00	0.00	0.00	0.00	0.00	0.00
Anderson Brewer		23.35	0.00	0.00	0.00	0.00	0.00	0.00
Anderson No. 1 (No. 2)	Coil	10.45	10.45	10.45	4.98	5.47	0.00	317.00
Anderson No. 3	Coil	18.40	13.40	6.40	3.68	2.72	0.00	175.00
Baker		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baker & Lilley	Johnson, Ralph	14.60	14.60	7.30	0.00	0.00	0.00	0.00
Baker and Lilley		14.60	14.60	0.00	0.00	0.00	0.00	0.00
Balm of Gilead		13.50	13.50	13.50	1.10	12.40	0.00	198.00
Baton	Huron	3.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver	Rocker 7	0.00	16.00	4.00	0.00	4.00	0.00	0.00
Beery	Beery	39.49	39.49	39.49	20.00	19.49	0.00	0.00
Binkley	Black Mountain	25.00	25.00	25.00	0.08	24.91	0.00	16.00
Binkley No. 2	Black Mountain	20.00	20.00	20.00	0.59	19.41	0.00	51.00
Bonnell	Platte Ansley	27.00	27.00	27.00	8.40	18.60	696.00	0.00
Bonnell Ent. No. 1	Platte Ansley	6.75	10.00	10.00	0.00	10.00	0.00	0.00
Borden	Borden	10.00	8.70	8.70	8.70	0.00	0.00	0.00
Borden Ent.	Rock Creek	5.00	5.00	5.00	1.90	3.10	144.00	0.00
Borden No. 2	Rock Creek	9.26	9.26	4.63	0.60	4.03	68.00	0.00
Borden No. 2	Borden	9.26	9.26	4.63	0.00	4.63	0.00	0.00
Boreas No. 2	Link	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brownlow & Stephens	Beery	39.49	39.49	39.49	0.00	39.49	0.00	0.00
Brubaker	Janitell	17.51	0.00	5.19	2.03	3.16	0.00	487.00
Brubaker	Schattinger	17.51	0.00	2.06	1.80	0.26	184.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRED	CFS RELINQ	AF TFRED	DEC IRR	AC
Brubaker		17.51	0.00	0.00	0.00	0.00	0.00	0.00	
Burlingame	McNulty	27.00	27.00	6.75	1.12	5.63	0.00	0.00	29.00
Burlingame	Black Mountain	27.00	27.00	20.25	1.61	18.64	0.00	0.00	158.00
Burlingame No. 2	McNulty	1.62	1.62	0.81	0.00	0.81	0.00	0.00	0.00
Burlingame No. 3	McNulty	1.62	1.62	1.62	0.41	1.21	0.00	0.00	31.00
Burlington Waste	Beery	2.00	2.00	2.00	0.00	2.00	0.00	0.00	0.00
Burns & Sessions	Janitell	27.00	0.00	9.36	5.99	3.37	0.00	0.00	1010.40
Canon	McDowell	57.59	57.69	41.59	41.59	0.00	0.00	0.00	0.00
Central	Huron	33.00	33.00	33.00	4.20	28.80	0.00	0.00	402.00
Chapelle	McNulty	6.00	6.00	5.00	1.68	3.32	0.00	0.00	177.00
Cheney Spring		27.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chet No. 1	Rock Creek	1.25	1.25	1.25	0.00	1.25	0.00	0.00	0.00
Chet No. 2	Rock Creek	1.70	1.70	1.70	0.00	1.70	0.00	0.00	0.00
Chet No. 3	Rock Creek	4.00	4.00	4.00	0.00	4.00	0.00	0.00	0.00
Chet No. 4	Rock Creek	1.60	1.60	1.60	0.00	1.60	0.00	0.00	0.00
Chet No. 5	Rock Creek	0.50	0.50	0.50	0.00	0.50	0.00	0.00	0.00
Chet No. 6	Rock Creek	0.50	0.50	0.50	0.00	0.50	0.00	0.00	0.00
Chet No. 7	Rock Creek	2.00	2.00	2.00	0.00	2.00	0.00	0.00	0.00
Chubb	Antero	91.52	0.00	91.52	0.00	0.00	0.00	0.00	0.00
Cincinnati	Janitell	13.50	9.42	3.83	0.64	3.19	0.00	0.00	111.50
Cincinnati	Schattinger	13.50	9.42	5.59	5.59	0.00	281.00	0.00	0.00
Como Jim	Rogers, Lucinda	84.00	0.00	84.00	0.00	0.00	0.00	0.00	0.00
Craig	Janitell	8.65	6.60	6.60	1.63	4.97	0.00	0.00	334.20
Crooked Creek		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosier		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosier & Hawxhurst	Rocker 7	21.24	2.68	1.34	0.40	0.94	32.00	0.00	0.00
Crosier & Hawxhurst		21.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosier & Taylor		31.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D. F. Miller No. 1	Coil	126.20	126.20	126.20	4.77	121.43	0.00	0.00	359.00
Daniel Fyffe	Badger Basin	6.00	6.00	6.00	1.32	4.68	0.00	0.00	101.00
Demick	Teter	14.00	8.00	8.00	5.10	2.90	332.00	0.00	0.00
Demick Ent No. 1	Teter	10.00	4.00	4.00	2.90	1.10	0.00	0.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRD	CFS RELINQ	AF TFRD	DEC IRR	AC
Demick Entl No. 2	Teter	10.00	4.00	4.00	0.00	4.00	107.00	0.00	
Ditch	Coil	50.00	50.00	50.00	0.00	50.00	0.00	0.00	
Ditch No. 52	Platte Ansley	10.00	0.00	10.00	0.00	10.00	0.00	0.00	
Divine Hill	Huron	49.00	49.00	49.00	9.60	39.40	0.00	690.00	
Dixon & Decoursey	High Creek	4.00	4.00	4.00	2.62	1.38	0.00	126.30	
Donovan	Badger Basin	45.00	45.00	45.00	4.68	40.32	0.00	490.00	
Drake	Antero	6.27	0.00	6.27	0.00	0.00	0.00	0.00	
Dudley	Beery	16.21	16.21	16.21	0.00	16.21	0.00	0.00	
Dunbar	Collard	26.31	26.31	5.25	2.75	2.50	0.00	0.00	
Dunbar	Collard	26.31	26.31	1.75	0.91	0.84	0.00	0.00	
Dunbar No. 1	Collard	27.00	27.00	13.50	1.07	12.43	0.00	0.00	
Dunbar No. 1	Collard	27.00	27.00	4.50	0.36	4.14	0.00	0.00	
Dunbar No. 2	Rock Creek	4.05	4.05	4.05	0.50	3.55	43.00	0.00	
Dunbar No. 3	Rock Creek	4.00	2.00	2.00	0.30	1.70	22.00	0.00	
Dunbar No. 3	Borden	4.00	4.00	2.00	0.00	2.00	0.00	0.00	
Eagle Rock		11.66	0.00	0.00	0.00	0.00	0.00	0.00	
East Side		18.70	0.00	0.00	0.00	0.00	0.00	0.00	
Edmiston		10.00	0.00	0.00	0.00	0.00	0.00	0.00	
Edmondson Seepage	Platte Ansley	10.00	10.00	10.00	0.00	10.00	0.00	0.00	
Elisha Alden	High Creek	57.09	57.09	19.03	4.25	14.78	0.00	325.40	
Elisha Alden	Augustine	57.09	57.09	38.06	0.00	38.06	0.00	325.40	
Euhler	Badger Basin	6.50	6.50	6.50	1.13	5.37	0.00	213.00	
Fehringer No. 1	McDowell	17.90	17.90	17.90	17.90	0.00	0.00	0.00	
Fehringer No. 1 Ent No. 1	McDowell	17.90	17.90	17.90	0.00	17.90	0.00	0.00	
Fehringer No. 1 Ent No. 2	McDowell	10.10	10.10	10.10	0.00	10.10	0.00	0.00	
Fehringer No. 2	McDowell	13.40	13.40	3.40	3.40	0.00	0.00	0.00	
Fehringer No. 2 Ent No. 1	McDowell	10.50	10.50	10.50	0.00	10.50	0.00	0.00	
Fehringer No. 2 Ent No. 2	McDowell	13.60	13.60	13.60	0.00	13.60	0.00	0.00	
First Field	Badger Basin	3.00	3.00	3.00	0.49	2.51	0.00	94.00	
Foster	Huron	42.00	42.00	42.00	5.00	37.00	0.00	495.00	
Four Mile (#176)	Beery	5.40	5.40	5.40	0.00	5.40	0.00	0.00	
Four Mile (#9)	Four Mile	15.00	15.00	15.00	7.00	8.00	0.00	0.00	
Four Mile No. 1	Badger Basin	2.00	2.00	2.00	1.44	0.56	0.00	118.00	

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRED	CFS RELINQ	AF TFRED	DEC IRR AC
Four Mile No. 2	Badger Basin	2.00	2.00	2.00	1.04	0.96	0.00	56.00
Four Mile, 1st Ent (#190)	Four Mile	3.75	3.75	3.75	0.00	3.75	0.00	0.00
Franks	High Creek	37.59	37.50	9.00	1.87	7.13	0.00	182.60
Fremont	Furman	20.00	20.00	20.00	5.70	14.30	0.00	0.00
Fritz	Huron	24.00	24.00	24.00	5.70	18.30	0.00	559.00
Funk		1.00	0.00	0.00	0.00	0.00	0.00	0.00
Furman Waste Water		10.00	0.00	0.00	0.00	0.00	0.00	0.00
Garden		11.00	0.00	0.00	0.00	0.00	0.00	0.00
Gibson		1.65	0.00	0.00	0.00	0.00	0.00	0.00
Gibson Ent. No. 1		1.10	0.00	0.00	0.00	0.00	0.00	0.00
Guiraud	McDowell	48.97	48.97	20.27	6.20	14.07	0.00	0.00
Guiraud 3I	McDowell	0.00	0.00	1.20	0.00	1.20	0.00	0.00
Guiraud 3I		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Guiraud No. 1	McDowell	0.00	0.00	4.70	1.30	3.40	0.00	0.00
Guiraud No. 1	McDowell	4.00	4.00	4.00	0.00	4.00	0.00	0.00
Guiraud No. 2	McDowell	0.00	0.00	4.00	0.00	4.00	0.00	0.00
Guiraud No. 2	McDowell	2.00	2.00	2.00	0.00	2.00	0.00	0.00
Hall No. 1		12.00	0.00	0.00	0.00	0.00	0.00	0.00
Hall No. 2		2.00	0.00	0.00	0.00	0.00	0.00	0.00
Harland	Indian Mountain	27.00	27.00	27.00	4.97	22.03	0.00	394.00
Harland Extension	Indian Mountain	4.32	4.32	4.32	0.00	4.32	0.00	0.00
Harrington & Rickards	Huron	94.00	94.00	94.00	10.50	83.50	0.00	995.00
Harrington South	Huron	43.00	43.00	43.00	4.90	38.10	0.00	364.00
Harris	Badger Basin	16.45	16.45	16.45	0.75	15.70	0.00	666.00
Harry L. Sweet	Walker	8.00	8.00	8.00	0.00	8.00	0.00	0.00
Hartsel Four Mile	Badger Basin	22.00	22.00	22.00	1.85	20.15	0.00	118.00
Haver No. 1	Walker	24.32	24.32	24.32	1.30	23.02	0.00	100.00
Haver No. 1		24.32	24.32	0.00	0.00	0.00	0.00	100.00
Haver No. 2	Walker	29.98	29.98	29.98	3.04	26.94	0.00	174.00
Haver No. 3	Walker	20.47	20.47	9.47	4.60	4.87	0.00	257.00
Haver No. 3		20.47	20.47	11.00	11.00	0.00	0.00	257.00
Hawthurst	Rocker 7	12.00	4.00	4.00	1.00	3.00	94.00	0.00
Heeley No. 1		11.00	0.00	0.00	0.00	0.00	0.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRED	CFS RELINQ	AF TFRED	DEC IRR AC
Heeley No. 2		5.50	0.00	0.00	0.00	0.00	0.00	0.00
Henry	Schattinger	1.00	1.00	1.00	0.00	1.00	0.00	0.00
Henry E. Rogers No. 1	Huron	8.00	8.00	8.00	0.00	8.00	0.00	0.00
Henry E. Rogers No. 2	Huron	28.00	28.00	20.00	0.00	20.00	0.00	0.00
High Creek No. 2	Badger Basin	2.00	2.00	2.00	0.91	1.09	0.00	37.00
High Creek Placer		1.00	0.00	0.00	0.00	0.00	0.00	0.00
Holst & Packer		11.70	0.00	0.00	0.00	0.00	0.00	0.00
Holst No. 1		8.78	0.00	0.00	0.00	0.00	0.00	0.00
Holst No. 2		11.70	0.00	0.00	0.00	0.00	0.00	0.00
Holthusen	Johnston, Dixon	1.31	1.31	1.31	0.31	1.00	100.00	0.00
Holthusen	Johnston, Dixon	5.00	5.00	5.00	0.00	5.00	0.00	0.00
Holthusen No. 1	Johnston, Dixon	1.35	1.35	1.35	0.00	1.35	0.00	0.00
Hopson	Johnston, Dixon	5.40	5.40	3.20	1.30	1.90	74.00	0.00
Hopson Enl No. 1	Johnston, Dixon	0.60	0.60	0.60	0.00	0.60	0.00	0.00
Hot Springs	Huron	28.00	28.00	28.00	9.70	18.30	0.00	1048.00
Howbert Gulch	Rogers, George	2.00	2.00	2.00	0.00	2.00	0.00	0.00
Hubbard	High Creek	19.00	19.00	19.00	0.00	19.00	0.00	463.50
Hubbard No. 2	McNulty	30.00	30.00	30.00	0.00	30.00	0.00	0.00
Island	Walker	12.67	12.67	12.67	1.39	11.28	0.00	84.00
Island	Jardon	8.11	8.11	8.11	2.04	6.07	0.00	0.00
Jackson		5.00	0.00	0.00	0.00	0.00	0.00	0.00
Jardon	Huron	2.00	1.00	1.00	0.00	1.00	0.00	0.00
Jasper		30.00	0.00	0.00	0.00	0.00	0.00	0.00
Jefferson Lake	Jefferson Lake	546.00	0.00	0.00	0.00	0.00	0.00	0.00
John Radford		12.00	0.00	0.00	0.00	0.00	0.00	0.00
Kammer		2.00	0.00	0.00	0.00	0.00	0.00	0.00
Kenosha	Rocker 7	8.00	8.00	3.00	0.00	3.00	0.00	0.00
Kester Sweet	McNulty	25.39	25.39	20.31	11.32	8.99	0.00	474.00
Kester Sweet	High Creek	25.39	25.39	5.08	3.25	1.83	0.00	264.30
Lake	Janitell	10.00	10.00	10.00	0.00	10.00	0.00	0.00
Lasell	Furman	12.00	9.60	9.60	1.50	8.10	0.00	0.00
Lavack	Schattinger	8.00	8.00	8.00	0.00	8.00	0.00	0.00
Lavack Enl No. 1	Schattinger	2.00	2.00	2.00	0.00	2.00	0.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRD	CFS RELINQ	AF TFRD	DEC IRR AC
Lavack No. 2	Schattinger	3.00	3.00	3.00	2.40	0.60	123.00	0.00
Lee No. 1	Rock Creek	1.08	1.08	1.08	0.30	0.78	18.00	0.00
Lee No. 2	Rock Creek	0.50	0.50	0.50	0.10	0.40	5.00	0.00
Lee No. 3	Rock Creek	15.00	0.39	0.39	0.30	0.09	15.00	0.00
Lee No. 4	Rock Creek	15.00	0.39	0.39	0.20	0.19	8.00	0.00
Left Hand	Huron	5.00	5.00	5.00	0.00	5.00	0.00	0.00
Lilley & Harriman		12.00	0.00	0.00	0.00	0.00	0.00	0.00
Link		19.00	0.00	0.00	0.00	0.00	0.00	0.00
Litmer	Janitell	2.00	2.00	2.00	0.79	1.21	0.00	214.40
Litmer Ent No. 1	Janitell	4.00	1.42	1.42	0.00	1.42	0.00	0.00
Little Channel	Jardon	8.10	8.10	4.05	0.48	3.57	0.00	0.00
Little Channel	Epperson	8.10	8.10	4.05	0.00	0.00	0.00	0.00
Love & Raynor	Rogers, George	8.10	8.10	8.10	1.71	6.39	0.00	0.00
Low Placer	Four Mile	7.14	7.14	7.14	0.00	7.14	0.00	0.00
Lower Kenosha	Janitell	9.60	9.60	9.60	0.00	9.60	0.00	0.00
Main / Hotel	Badger Basin	29.00	29.00	29.00	6.37	22.63	0.00	452.00
Malice		30.00	0.00	0.00	0.00	0.00	0.00	0.00
Marcott		1.50	0.00	0.00	0.00	0.00	0.00	0.00
Marshall		10.00	0.00	0.00	0.00	0.00	0.00	0.00
Mary G. Borden	Rock Creek	6.00	6.00	3.00	0.30	2.70	28.00	0.00
McCartney	Michigan Creek	75.00	75.00	46.88	2.60	44.28	0.00	0.00
McCartney		75.00	0.00	0.00	0.00	0.00	0.00	0.00
McHanus	Rock Creek	20.00	20.00	10.00	0.30	9.70	35.00	0.00
Mesa	Janitell	0.00	5.00	5.00	0.00	5.00	0.00	0.00
Mexican	Badger Basin	13.00	13.00	13.00	0.00	13.00	0.00	0.00
Michigan		0.16	0.00	0.00	0.00	0.00	0.00	0.00
Mikles		20.55	0.00	0.00	0.00	0.00	0.00	0.00
Mill	Borden	43.46	43.46	43.46	0.00	43.46	0.00	0.00
Miller		15.76	0.00	0.00	0.00	0.00	0.00	0.00
Miller & Chapman	Coil	10.00	10.00	10.00	3.79	6.21	0.00	232.00
Miller & Chapman Ent No. 1	Coil	2.00	2.00	2.00	0.76	1.24	0.00	55.00
Miller Deyarman	McNulty	1.50	1.50	0.75	0.22	0.53	0.00	26.00
Miller Four Mile		2.00	0.00	0.00	0.00	0.00	0.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRD	CFS RELINQ	AF TFRD	DEC IRR	AC
Milligan	High Creek	17.55	17.55	17.55	1.38	16.17	0.00	112.80	
Milligan	Augustine	17.55	17.55	17.55	1.38	16.17	0.00	112.80	
Montag Truax		25.00	0.00	0.00	0.00	0.00	0.00	0.00	
Nelson	Augustine	27.00	0.00	27.00	0.00	27.00	0.00	0.00	
Nelson High Creek	Augustine	10.00	10.00	10.00	0.00	10.00	0.00	0.00	
Nelson No. 2	Augustine	5.00	5.00	5.00	0.00	5.00	0.00	0.00	
Nelson No. 3	Augustine	2.50	2.50	2.50	0.00	2.50	0.00	0.00	
O'Brien		6.50	0.00	0.00	0.00	0.00	0.00	0.00	
O'Neil	Janitell	28.83	8.00	8.00	5.26	2.74	0.00	477.60	
Ohler	Janitell	30.00	7.00	7.00	3.22	3.78	0.00	56.80	
Ohler Gulch	Janitell	0.00	0.00	0.00	0.00	0.00	0.00	223.00	
Packer	Michigan Creek	12.00	12.00	12.00	2.00	10.00	0.00	0.00	
Packer & Bonis		1.60	0.00	0.00	0.00	0.00	0.00	0.00	
Packer & Bonis Ent No. 1		4.60	0.00	0.00	0.00	0.00	0.00	0.00	
Park	Coil	60.00	60.00	60.00	3.17	56.83	0.00	114.00	
Park Gulch		6.08	0.00	0.00	0.00	0.00	0.00	0.00	
Parmalee & Shoemaker Ent No. 1	Walker	9.30	9.30	9.30	0.00	9.30	0.00	0.00	
Parmalee & Shoemaker No. 1	Walker	30.54	30.54	30.50	1.74	28.76	0.00	115.00	
Parmalee & Shoemaker No. 2	Walker	44.30	44.30	44.30	2.87	41.43	0.00	169.00	
Parmalee & Shoemaker No. 3	Walker	30.48	30.48	30.48	0.91	29.57	0.00	69.00	
Peabody	Johnston, Dixon	3.00	3.00	3.00	1.90	1.10	151.00	0.00	
Peabody No. 2	Johnston, Dixon	4.00	4.00	4.00	1.80	2.20	108.00	0.00	
Peabody No. 3		10.00	0.00	0.00	0.00	0.00	0.00	0.00	
Peart Lower	Four Mile	35.00	35.00	35.00	0.00	35.00	0.00	0.00	
Peart Spring	Four Mile	1.50	1.50	1.50	0.00	1.50	0.00	0.00	
Peart Upper	Four Mile	30.00	30.00	30.00	0.00	30.00	0.00	0.00	
Perkins Gulch	Rogers, George	2.50	2.50	2.50	0.00	2.50	0.00	0.00	
Petrie		27.00	0.00	0.00	0.00	0.00	0.00	0.00	
Pierce	Huron	55.00	55.00	55.00	2.80	52.20	0.00	0.00	
Platte Station		9.00	0.00	0.00	0.00	0.00	0.00	0.00	
Platte Station Ent No. 1		11.45	0.00	0.00	0.00	0.00	0.00	0.00	
Prince	Augustine	10.00	10.00	10.00	10.00	0.00	0.00	0.00	
Prince Ent No. 1	Augustine	45.60	45.60	45.60	3.60	42.00	0.00	0.00	

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRED	CFS RELINQ	AF TFRED	DEC IRR AC
Pruden	Huron	13.51	13.51	13.51	1.20	12.31	0.00	0.00
Radford & Wright		15.00	0.00	0.00	0.00	0.00	0.00	0.00
Randall		27.00	0.00	0.00	0.00	0.00	0.00	0.00
Randall & Nicholas	Janitell	28.00	10.00	10.00	1.62	8.38	0.00	576.10
Randall Enl No. 1		27.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 1	Rock Creek	20.00	20.00	20.00	0.30	19.70	20.00	0.00
Ratcliff No. 2	Rock Creek	4.21	4.21	4.21	0.80	3.41	50.00	0.00
Ratcliff No. 3	Rock Creek	4.06	4.06	4.06	0.60	3.46	33.00	0.00
Ratcliff No. 4	Rock Creek	3.16	3.16	3.16	0.20	2.96	10.00	0.00
Ratcliff No. 5	Rock Creek	3.16	3.16	3.16	0.20	2.96	5.00	0.00
Ratcliff No. 6	Rock Creek	2.05	2.05	2.05	0.20	1.85	13.00	0.00
Ratcliff No. 7	Rock Creek	2.05	2.05	2.05	0.20	1.85	8.00	0.00
Ratcliff No. 8	Rock Creek	4.32	4.32	4.32	0.20	4.12	10.00	0.00
Ratcliff No. 9	Rock Creek	4.10	4.10	4.10	0.20	3.90	10.00	0.00
Raynor & Edmondson No. 1	Platte Ansley	20.00	20.00	20.00	2.90	17.10	255.00	0.00
Raynor & Edmondson No. 2	Platte Ansley	25.00	25.00	25.00	2.60	22.40	194.00	0.00
Raynor & Edmondson No. 3	Platte Ansley	5.85	5.85	5.85	1.30	4.55	95.00	0.00
Raynor & Edmondson No. 4	Platte Ansley	2.00	2.00	2.00	0.50	1.50	33.00	0.00
Raynor & Edmondson No. 5	Platte Ansley	20.00	20.00	20.00	2.10	17.90	151.00	0.00
Rebecca		5.00	0.00	0.00	0.00	0.00	0.00	0.00
Redmon		13.40	0.00	0.00	0.00	0.00	0.00	0.00
Reinhardt No. 1	Augustine	36.00	36.00	36.00	0.00	36.00	0.00	0.00
Reinhardt No. 2	Augustine	8.92	8.92	8.92	0.00	8.92	0.00	0.00
Reinhardt No. 3	Augustine	8.92	8.92	8.92	0.00	8.92	0.00	0.00
Reinhardt No. 4	Augustine	6.90	6.90	6.90	0.00	6.90	0.00	0.00
Rheinacher	Janitell	5.00	5.00	5.00	0.00	5.00	0.00	0.00
Rickards Lower	Huron	45.00	45.00	45.00	0.00	45.00	0.00	0.00
Robbins No. 1	Rock Creek	1.75	1.75	1.75	0.00	1.75	0.00	0.00
Robbins No. 1	Huron	2.00	2.00	2.00	1.00	1.00	0.00	0.00
Robbins No. 2	Rock Creek	2.75	2.75	2.75	0.00	2.75	0.00	0.00
Robbins No. 2	Huron	1.80	1.80	1.80	1.00	0.80	0.00	0.00
Robbins No. 3	Rock Creek	1.75	1.75	1.75	0.00	1.75	0.00	0.00
Robbins Sims	Huron	1.80	1.80	1.80	1.00	0.80	0.00	0.00

DITCHES	TRANSFER	CFS O	CFS D	AMT IN TFR	CFS TFRD	CFS RELINQ	AF TFRD	DEC IRR	AC
Rock Creek	Rock Creek	2.70	2.70	2.70	0.20	2.50	18.00	0.00	
Rock Creek Enl	Rock Creek	2.30	2.30	2.30	0.00	2.30	0.00	0.00	
Rock Creek No. 1	Rock Creek	1.35	1.35	1.35	0.50	0.85	30.00	0.00	
Rogers & Miller	Black Mountain	25.00	25.00	12.50	0.68	11.82	0.00	127.00	
Rogers (High Creek)	Black Mountain	14.30	14.30	14.30	10.91	3.39	0.00	127.00	
Rogers (S Fork)	High Creek	42.74	42.74	42.74	2.25	40.49	0.00	64.40	
Rogers North	Huron	84.00	84.00	16.80	0.80	16.00	0.00	0.00	
Rogers North	Rogers, Lucinda	84.00	84.00	57.20	0.00	0.00	0.00	0.00	
Rogers South	Rogers, Lucinda	84.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sacramento		60.00	0.00	0.00	0.00	0.00	0.00	0.00	
Sadler	Huron	49.00	49.00	49.00	5.30	43.70	0.00	365.00	
Salt Creek		5.00	0.00	0.00	0.00	0.00	0.00	0.00	
Schattinger	Janitell	2.16	2.16	2.16	0.19	1.97	0.00	49.00	
Schattinger Waste	Furman	0.00	7.00	7.00	6.70	0.30	0.00	0.00	
Sessions	Janitell	13.50	2.35	2.35	0.83	1.52	0.00	402.10	
Sheeprock		11.70	0.00	0.00	0.00	0.00	0.00	0.00	
Sigafus	Trout Creek	25.00	25.00	25.00	16.90	8.10	1349.00	1330.00	
Sigafus Enl No. 1	Trout Creek	25.00	25.00	25.00	5.30	19.70	426.00	0.00	
Sigafus Enl No. 2	Trout Creek	10.00	10.00	10.00	0.00	10.00	0.00	0.00	
Sims	Huron	4.00	4.00	4.00	1.00	3.00	0.00	0.00	
Skelton	Janitell	10.00	6.50	6.50	3.37	3.13	0.00	0.00	
Slater	Indian Mountain	27.00	27.00	14.00	2.16	11.84	0.00	117.00	
Slater	Indian Mountain	27.00	0.00	13.00	13.00	0.00	0.00	117.00	
Small	McDowell	16.00	16.00	16.00	1.40	14.60	0.00	0.00	
Small	McDowell	1.32	1.32	1.32	0.00	1.32	0.00	0.00	
Snyder Creek	Rocker 7	10.50	10.50	9.50	2.30	7.20	46.00	0.00	
Souders & Wolfe No. 2		1.86	0.00	0.00	0.00	0.00	0.00	0.00	
Souders & Wolfe No. 3		2.17	0.00	0.00	0.00	0.00	0.00	0.00	
Souders & Wolfe No. 4		3.21	0.00	0.00	0.00	0.00	0.00	0.00	
Souders & Wolfe No. 5		2.55	0.00	0.00	0.00	0.00	0.00	0.00	
Souders & Wolfe No. 6	Black Mountain	11.68	11.68	11.68	0.21	11.47	0.00	285.00	
South Side Juniors	Huron	0.00	55.85	55.85	0.00	55.85	0.00	1037.00	
Spring		1.00	0.00	0.00	0.00	0.00	0.00	0.00	

Spring Branch	Platte Ansley	0.00	0.00	0.00	0.00	0.00	209.00	0.00
Spring No. 1	Huron	1.90	1.90	0.70	1.20	0.00	0.00	0.00
Spring No. 2	Huron	0.72	0.72	0.00	0.72	0.00	0.00	0.00
St. Charles		6.00	0.00	0.00	0.00	0.00	0.00	0.00
Stevens No. 1	Eleven Mile	2.00	0.00	0.00	2.00	0.00	0.00	0.00
Stevens No. 2	Eleven Mile	2.00	0.00	0.00	2.00	0.00	0.00	0.00
Stevens No. 3	Eleven Mile	2.00	0.00	0.00	2.00	0.00	0.00	0.00
Stevens No. 4	Eleven Mile	2.00	0.00	0.00	2.00	0.00	0.00	0.00
Tarryall (Ck)		7.90	0.00	0.00	0.00	0.00	0.00	0.00
Taylor		13.50	0.00	0.00	0.00	0.00	0.00	0.00
Taylor's Jefferson Ck		8.00	0.00	0.00	0.00	0.00	0.00	0.00
Temple	Four Mile	4.50	4.50	0.00	4.50	0.00	0.00	0.00
Thompson	Badger Basin	31.00	31.00	9.14	21.86	0.00	0.00	666.00
Thompson & Radcliff		27.00	0.00	0.00	0.00	0.00	0.00	0.00
Thorborg		15.50	0.00	0.00	0.00	0.00	0.00	0.00
Three Mile	Huron	5.00	5.00	0.00	5.00	0.00	0.00	0.00
Three Mile	Badger Basin	5.25	5.25	1.34	4.91	0.00	0.00	64.00
Trevan Lower		30.00	0.00	0.00	0.00	0.00	0.00	0.00
Trevan Upper		30.00	0.00	0.00	0.00	0.00	0.00	0.00
Troppe	Borden	1.05	1.05	0.00	1.05	0.00	0.00	0.00
Trout Creek	Trout Creek	2.00	0.00	0.00	2.00	0.00	0.00	230.00
Trout Creek		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turner No. 1	Augustine	3.00	3.00	0.00	3.00	0.00	0.00	0.00
Turner No. 2	Augustine	2.50	2.50	0.00	2.50	0.00	0.00	0.00
Turner Seepage	Augustine	13.50	13.50	0.00	13.50	0.00	0.00	270.00
W. H. Miller		1.35	0.00	0.00	0.00	0.00	0.00	0.00
W. H. Miller No. 2		2.00	0.00	0.00	0.00	0.00	0.00	0.00
W. R. Head	Johnson, Ralph	27.00	5.70	0.00	0.00	0.00	0.00	0.00
W. R. Head No. 2	Johnson, Ralph	15.00	15.00	0.00	0.00	0.00	0.00	0.00
W. R. Head No. 3	Johnson, Ralph	2.68	1.80	0.00	0.00	0.00	0.00	0.00
W. R. Head No. 4	Johnson, Ralph	2.63	2.44	0.00	0.00	0.00	0.00	0.00
Wadley No. 1		4.78	0.00	0.00	0.00	0.00	0.00	0.00
Wadley No. 2		11.66	0.00	0.00	0.00	0.00	0.00	0.00

Wadley No. 3	3.25	0.00	0.00	0.00	0.00	0.00	0.00
Warm Springs	8.00	0.00	0.00	0.00	0.00	0.00	0.00
Weaver No. 1	1.35	0.00	0.00	0.00	0.00	0.00	0.00
Weaver No. 2	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Weaver No. 3	1.35	1.35	1.35	0.33	1.02	0.00	38.00
Weed	20.00	20.00	20.00	2.31	17.69	0.00	0.00
Weed	13.50	13.50	6.75	3.65	3.10	0.00	0.00
Weed	13.50	0.00	6.75	0.00	0.00	0.00	0.00
Western	66.00	0.00	66.00	28.80	37.20	0.00	3.05
Weston	31.45	0.00	0.00	0.00	0.00	0.00	0.00
Whitten	15.00	11.42	6.48	2.40	4.08	0.00	0.00
Whitten	15.00	11.42	3.80	0.14	3.66	0.00	40.00
Whitten No. 1	1.50	0.00	0.00	0.00	0.00	0.00	0.00
Whitten No. 2	4.00	4.00	4.00	1.00	3.00	0.00	0.00
Whitten No. 3	5.00	5.00	5.00	1.00	4.00	0.00	0.00
Whitten No. 4	7.00	7.00	7.00	1.50	5.50	0.00	0.00
Wilkin	10.00	10.00	10.00	1.00	9.00	107.00	0.00
William A. Thomas	8.00	8.00	8.00	0.00	8.00	0.00	0.00
Winkler	1.50	1.50	1.50	0.35	1.15	0.00	32.00
McNulty							
Rogers, George							
Jardon							
Epperson							
Huron							
Michigan Creek							
Janitell							
Michigan Creek							
Michigan Creek							
Michigan Creek							
Rock Creek							
Janitell							
Black Mountain							

# PART III

## DITCHES DATABASE

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Alden and Milligan	Augustine	TFRAB	Horace Alden & James Milligan	
Alden and Milligan	High Creek	TFR	Horace Alden & James Milligan	
Alkaline	Platte Anstley	TFRAB	Henry H. Ahrens	
Anchor	Janitell	TFR	Joseph Crockett	
Anderson	Coil	TFR	Joseph Purcell	AMT_IN_TFR includes 7 cfs from Anderson No. 3, TFR in CA 3585, Abandoned 39.05 cfs.
Anderson Brewer		AUG		
Anderson Brewer		AUG	R. B. Anderson & Herman Lass	
Anderson No. 1 (No. 2)	Coil	TFR	Joseph Purcell	7 cfs TFR to Anderson Ditch in CA 3585.
Anderson No. 3	Coil	TFR	Joseph Purcell	cfs_DEC_0 = Entire Flow of Guernsey Gulch.
Baker		IRR	David Baker	
Baker & Lilley	Johnson, Ralph	TFR	David Baker & William H Lilley	State list shows Baker & Lilley enl. 3/31/1917 priority date adj. 1921 for 3 cfs.
Baker and Lilley		IRR	David Baker and Wm. H. Lilley	
Balm of Gilead	Huron	TFR	Ludlow H. Pruden	DEC_IRR_AC Includes H.E. Rogers No. 2, and Pruden. Should be on Abandonment List. So Junior it's futile.
Baton		IRR		
Beaver	Rocker 7	TFRAB	W. R. Head and James Moynahan	18 water from North Fork. 8 cfs Abandoned 1984 Div. Engr. Thornton got undivided half interest in the 8 cfs, or 4cfs.
Beery	Beery	TFR	Marie Guiraud	
Binkley	Black Mountain	TFR	John A. Binkley	
Binkley No. 2	Black Mountain	TFR	John A. Binkley	
Bonnell	Platte Anstley	TFR	Henry H. Ahrens	
Bonnell Enl. No. 1	Platte Anstley	TFR	Henry H. Ahrens	6.75 is the corrects cfs dec.
Borden	Borden	TFR	Timothy & Olney A. Borden	
Borden Enl.	Rock Creek	TFR		

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Borden No. 2	Rock Creek	TFR	Timothy & Olney A. Borden	
Borden No. 2	Borden	TFRAB	Timothy & Olney A. Borden	
Boreas No. 2	Link	TFR		Interbasin water from W Slope.
Brownlow & Stephens	Beery	TFRAB	Timothy & Olney A. Borden	
Brubaker	Janitell	TFR	See Memo	Claimants: David Baker, Edward L. Case, Milo F. Case.
Brubaker	Schattinger	TFR	See Memo	Claimants: David Baker, Edward L. and Milo F. Case.
Brubaker		IRR	See Memo	Claimants: David Baker, Edward L. and Milo F. Case.
Burlingame	McNulty	TFR	See Memo	Claimants: Anson K. Burlingame, W.H. Souders, A.H. Wolfe.
Burlingame	Black Mountain	TFR	See Memo	Claimants: Anson K. Burlingame, W.H. Souders, A.H. Wolfe.
Burlingame No. 2	McNulty	TFRAB	Anson K. Burlingame	
Burlingame No. 3	McNulty	TFR	Anson K. Burlingame	
Burlington Waste	Beery	TFRAB		
Burns & Sessions	Janitell	TFR	See Memo	Claimants: Lulu V. Dunbar, Isaac Ware, Martin Klein, trustee. 16 cfs TFR to Small Ditch in 1955.
Canon	McDowell	TFR	Marie Guiraud	
Central	Huron	TFR	Jerome E. Harrington	
Chapelle	McNulty	TFR	Sarah J. Hubbard	5 cfs TFR to another ditch in CA 3502, 1cfs Abandoned.
Cheney Spring		IRR		Documents seemed to indic same PN as Fehringer No. 1 Enl No. 1, however, date of adjudic, priority, etc. suggest PN 273 or 274.
Chet No. 1	Rock Creek	TFRAB		
Chet No. 2	Rock Creek	TFRAB		
Chet No. 3	Rock Creek	TFRAB		
Chet No. 4	Rock Creek	TFRAB		
Chet No. 5	Rock Creek	TFRAB		
Chet No. 6	Rock Creek	TFRAB		

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Chet No. 7	Rock Creek	TFRAB		
Chubb	Antero	TFR	Robert R. Newitt	No formal transfer or abandon.
Cincinnati	Janitell	TFR	See Memo	Claimants: Henry Schatttinger, Charles G. Volz, A.F. Leesburg.
Cincinnati	Schatttinger	TFR	See Memo	Claimants: Henry Schatttinger, Charles G. Volz, A.F. Leesburg.
Como Jim	Rogers, Lucinda	TFR	Joseph Rogers	No formal transfer or abandon.
Craig	Janitell	TFR	William A. Craig & Asa Bishop	
Crooked Creek		IRR	George Weston	cfs dec = entire flow of Crooked Creek.
Crosier	Rocker 7	AUG	Adelia Borden	cfs dec = entire flow of House Creek.
Crosier & Hawxhurst		TFR	Edwin Crosier & Mary Moynahan	
Crosier & Hawxhurst		IRR	Edwin Crosier & Mary Moynahan	
Crosier & Taylor		IRR	Edwin Crosier & Samuel Taylor	
D. F. Miller No. 1	Coil	TFR	David F. Miller	
Daniel Fyffe	Badger Basin	TFR	Samuel Hartsel	
Demick	Teter	TFR	Thomas T. Wilke	
Demick Entl No. 1	Teter	TFRAB	Thomas T. Wilke	
Demick Entl No. 2	Teter	TFR	Thomas T. Wilke	
Ditch	Coil	TFRAB	David F. Miller	
Ditch No. 52	Platte Ansley	TFRAB		
Divine Hill	Huron	TFR	B. F. Spinney	aka Lower Dixon Ditch.
Dixon & Decoursey	High Creek	TFR		
Donovan	Badger Basin	TFR	A. C. Donovan	No formal transfer or abandon.
Drake	Antero	TFR	John W. Drake	
Dudley	Beery	TFRAB	George P. Dudley	
Dunbar	Collard	TFR	Thomas M Dunbar & James Dunbar	In CA 1991: TFR 4.0, AB 15.31.
Dunbar	Collard	TFR	Thomas M Dunbar & James Dunbar	In CA 1991: TFR 4.0, AB 15.31.
Dunbar No. 1	Collard	TFR	See Memo	Claimants: Thomas M. Dunbar, James T. Dunbar, C.H. Dunbar, and Henry Foote. In Collard Transfer: Aur and Thorn owned 20 cfs - only applied to change 18 cfs - 2.0 cfs reserved for the DOW and CUCB.

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Dunbar No. 1	Collard	TFR	See Memo	Claimants: Thomas M., James T., and C.H. Dunbar, and Henry Foote.
Dunbar No. 2	Rock Creek	TFR	Thomas M Dunbar	
Dunbar No. 3	Rock Creek	TFR	Thomas Dunbar & George Troppe	
Dunbar No. 3	Borden	TFRAB	Thomas Dunbar & George Troppe	
Eagle Rock		IRR		According to state list, 2 priorities in this ditch.
East Side		AUG	Henry C Radford & David Wright	
Edmiston		IRR		
Edmondson Seepage	Platte Ansley	TFRAB		
Elisha Alden	High Creek	TFR	Horace Alden	
Elisha Alden	Augustine	TFRAB		
Euhler	Badger Basin	TFR	C. L. Buschman & A. Fehringer	
Fehringer No. 1	McDowell	TFR	C. L. Buschman & A. Fehringer	
Fehringer No. 1 Ent No. 1	McDowell	TFRAB		Same PW as Cheney Spring Ditch.
Fehringer No. 1 Ent No. 2	McDowell	TFRAB		
Fehringer No. 2	McDowell	TFR		
Fehringer No. 2 Ent No. 1	McDowell	TFRAB		
Fehringer No. 2 Ent No. 2	McDowell	TFRAB		
First Field	Badger Basin	TFR		
Foster	Huron	TFR	B. F. Spinney	
Four Mile (#176)	Beery	TFRAB	E. S. Thompson	
Four Mile (#9)	Four Mile	TFR	Charles W. Lowe	1 cfs to the Willows water district, Denver gets 6 cfs.
Four Mile No. 1	Badger Basin	TFR		
Four Mile No. 2	Badger Basin	TFR		
Four Mile, 1st Ent (#190)	Four Mile	TFRAB	Charles W. Lowe	In CA 1960: AB 24.59 cfs, TFR 4 cfs to Franks from another priority.
Franks	High Creek	TFR		Note: On District 23 Map, 2 ditches have PN 236.
Fremont	Furman	TFR		
Fritz	Huron	TFR	William Richards & S Richards	
Funk		AB		

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Furman Waste Water		IRR		Appears that this ditch was omitted / forgotten in the transfer process. It should be TFRAB under either Michigan Creek or Furman.
Garden		IRR	Henry Radford & David Wright	
Gibson		IRR	Samuel Taylor	
Gibson Entl No. 1		IRR	Samuel Taylor	
Guiraud	McDowell	TFR	Marie Guiraud	Of the original 48.97 cfs decreed: 4.7 cfs TFR to G1 in 1917, 4 cfs TFR to G2, 1917, 20 cfs TFR to G3, 1955.
Guiraud 3T	McDowell	TFR	James McDowell	20 cfs transferred from the Guiraud (PW 6).
Guiraud 3T		AUG	Marie Guiraud	20 cfs TFR in 1955 from PW No. 6. Water used for Augmentation in Park Co. and elsewhere.
Guiraud No. 1	McDowell	TFR	Marie Guiraud	Under cfs_dec_o it reads 0.00.... because Guiraud No. 1 has priority number 6 (Guiraud ditch) water in it, transferred to the number one from the original location.
Guiraud No. 1	McDowell	TFRAB	Ernest C. Guiraud	Guiraud Ditch water (PW 6) - CFS_DEC_O.
Guiraud No. 2	McDowell	TFRAB	Marie Guiraud	Guiraud Ditch water (PW 6) - cfs_dec_o.
Guiraud No. 2	McDowell	TFRAB	Ernest C. Guiraud	Guiraud Ditch water (PW 6) - CFS_DEC_O.
Hall No. 1		IRR		Considered Futile by water commissioner. When flow is adequate to reach Antero, they can't take water. When stream's dry, they can't take water. They can only take water when the flow disappears on the ranch before it reaches Antero.
Hall No. 2		IRR		Some of the Harland may be Bellamah AUG water.
Harland	Indian Mountain	TFR	Seth S. Slater	
Harland Extension	Indian Mountain	TFRAB	William H. Wilson	
Harrington & Rickards	Huron	TFR	See Memo	Claimants: Jerome E. Harrington, William and Samuel Rickards.
Harrington South	Huron	TFR	Jerome E. Harrington	
Harris	Badger Basin	TFR	P. F. Reinhardt	
Harry L. Sweet	Walker	TFRAB		
Hartsel Four Mile	Badger Basin	TFR	Samuel Hartsel	

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Haver No. 1	Walker	TFR	Cleveland Cattle Company	
Haver No. 1		AUG	Cleveland Cattle Company	
Haver No. 2	Walker	TFR	Cleveland Cattle Company	
Haver No. 3	Walker	TFR	Cleveland Cattle Company	In Case W-8109-75 (Ranch of the Rockies): 11cfs TFR. AUG.
Haver No. 3		AUG	Cleveland Cattle Company	
Hawkhurst	Rocker 7	TFR	Mary Moynahan	
Heeley No. 1		IRR	Henry C Radford & David Wright	
Heeley No. 2		IRR	Henry C Radford & David Wright	
Henry	Schattinger	TFR	Henry Schattinger	
Henry E. Rogers No. 1	Huron	TFRAB		See South Side Juniors.
Henry E. Rogers No. 2	Huron	TFRAB		See South Side Juniors.
High Creek No. 2	Badger Basin	TFR		According to District 23 Map, aka Nelson High Creek.
High Creek Placer		IRR		So Junior: it's considered futile.
Holst & Packer		IRR	Gilbert W Packer & John Moore	
Holst No. 1		IRR	John W Moore & Frank Newton	
Holst No. 2		IRR	John W Moore & Frank Newton	
Holthusen	Johnston, Dixon	TFR	William Holthusen	
Holthusen	Johnston, Dixon	TFRAB		
Holthusen No. 1	Johnston, Dixon	TFRAB	George L. Hopson	
Hopson	Johnston, Dixon	TFR	George L. Hopson	Another .6 cfs "moved" according to state list, numbers don't add up.
Hopson Ent No. 1	Johnston, Dixon	TFR	George L. Hopson	
Hot Springs	Huron	TFR	Samuel Hartsel	
Houbert Gulch	Rogers, George	TFRAB		
Hubbard	High Creek	TFR	Fillmore Hubbard	
Hubbard No. 2	McNulty	TFRAB	Fillmore Hubbard	
Island	Walker	TFR	R. P. Shoemaker	
Island	Jardon	TFR	Thomas R. Robbins	
Jackson		IRR		
Jardon	Huron	TFR		

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Jasper		AUG		
Jefferson Lake	Jefferson Lake	TFR	See Memo	Claimants: David Baker, William Craig, James Moynahan, Joseph Crockett, George O'Brien, Milo F. Case, William P. Lilley, Willard R. Head.
John Radford		IRR	John Radford	
Kammer		IRR		
Kenosha	Rocker 7	TFRAB	James Moynahan	5.0 cfs AB 1984, State Eng'r.
Kester Sweet	McNulty	TFR	Job K. Sweet & Joseph Weaver	
Kester Sweet	High Creek	TFR		
Lake	Janitell	TFRAB		Ditch was reduced from 12 to 9.6 cfs, 7/30/1896.
Lasell	Furman	TFR	Samuel M. Lassell	
Lavack	Schattinger	TFRAB	Charles Lavack (heirs)	
Lavack Enl No. 1	Schattinger	TFRAB	Charles Lavack (heirs)	
Lavack No. 2	Schattinger	TFR	Charles Lavack (heirs)	
Lee No. 1	Rock Creek	TFR	James A. Lee	
Lee No. 2	Rock Creek	TFR	James A. Lee	
Lee No. 3	Rock Creek	TFR	James A. Lee	
Lee No. 4	Rock Creek	TFR	James A. Lee	
Left Hand	Huron	TFRAB		See South Side Juniors.
Lilley & Harriman		IRR	William H. Lilley	
Link		IRR	James M., W. L., & K. W. Link	
Litmer	Janitell	TFR	William A. Craig	
Litmer Enl No. 1	Janitell	TFRAB	William A. Craig	
Little Channel	Jardon	TFR	Thomas Robbins & H. Epperson	
Little Channel	Epperson	TFR	Thomas Robbins & H. Epperson	
Love & Raynor	Rogers, George	TFR	James B. Sims & A. McIntyre	Under PN: Decree says 55, but 55 is Collard's Dunbar Ditch... surmise Lowe Placer may be mining ditch 55?
Lowe Placer	Four Mile	TFRAB		
Lower Kenosha	Janitell	TFRAB		
Main / Hotel	Badger Basin	TFR	Samuel Hartsel	
Malice		AUG		
Marcott		AB	Logan Marcott	

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Marshall		AB		CFS_DEC_O = Flood.
Mary G. Borden	Rock Creek	TFR	Timothy & Mary G. Borden	
McCartney	Michigan Creek	TFR	William & Frank W. McCartney	Thornton 62.5% ownership via Michigan Ck TFR.
McCartney		IRR	William & Frank W. McCartney	
McManus	Rock Creek	TFR	James T. Dunbar	
Mesa	Janitell	TFRAB		Waste from Randall & Nicholas.
Mexican	Badger Basin	TFR	Samuel Hartsel	
Michigan		IRR	William McCartney	
Mikles		IRR	S. C. Mikles	
Mill	Borden	TFRAB	Olney A. Borden	Mill Ditch re-decreed as Marshall - Flood decree only.
Miller		AB		aka D.F. Miller ditch.
Miller & Chapman	Coil	TFR	David F. Miller	
Miller & Chapman Ent No. 1	Coil	TFR	David F. Miller	
Miller Deyarman	McNulty	TFR		
Miller Four Mile		IRR		
Milligan	High Creek	TFR	James S Milligan & A Sancomb	Total for High creek and Augustine.
Milligan	Augustine	TFR	James S Milligan & A Sancomb	
Montag Truax		AUG	George A Montag & E P Truax	
Nelson	Augustine	TFR	Lars Nelson	
Nelson High Creek	Augustine	TFRAB		
Nelson No. 2	Augustine	TFRAB		
Nelson No. 3	Augustine	TFRAB		
O'Brien		AB		Water commissioner has no record of this ditch. Assume it was abandoned at some point in the past.
O'Neil	Janitell	TFR	Daniel O'Neil	
Ohler	Janitell	TFR	George M. Ohler	
Ohler Gulch	Janitell	TFR	Joseph Crockett	cfs dec and amt in tfr = entire flow of Ohler Gulch. cfs relinquished = anything over 1.63 cfs.
Packer		TFR	Gilbert Packer	
Packer & Bonis	Michigan Creek	IRR	Gilbert Packer & L Bonis	
Packer & Bonis Ent No. 1		IRR		

DITCHES	TRANSFER	STATUS	ORIGINAL CLAIMANT	COMMENTS
Park	Coil	TFR	George A. Miller	
Park Gulch		AUG	William H. Wilson	
Parmalee & Shoemaker Ent. No. 1	Walker	TFRAB	See Memo	Claimants: R.P. Shoemaker, G.S., H.S., H.J. Parmalee.
Parmalee & Shoemaker No. 1	Walker	TFR	See Memo	Claimants: R.P. Shoemaker, George S., Horace S. and Hilda J. Parmalee.
Parmalee & Shoemaker No. 2	Walker	TFR	See P&S No. 1	
Parmalee & Shoemaker No. 3	Walker	TFR	See P&S No. 1	
Peabody	Johnston, Dixon	TFR	Lelon Peabody	
Peabody No. 2	Johnston, Dixon	TFR	Lelon Peabody	
Peabody No. 3		AUG	Lelon Peabody	
Pearl Lower	Four Mile	TFRAB	John Peart	
Pearl Spring	Four Mile	TFRAB	John Peart	
Pearl Upper	Four Mile	TFRAB	John Peart	
Perkins Gulch	Rogers, George	TFR		
Petrie		IRR	Seth S. Slater	
Pierce	Huron	TFR	William & Samuel Rickards	
Platte Station		IRR	M. A. Rich	
Platte Station Ent. No. 1		IRR	M. A. Rich	
Prince	Augustine	TFR	Marie Guiraud	
Prince Ent. No. 1	Augustine	TFR	Marie Guiraud	
Pruden	Huron	TFR	Ludlow H. Pruden	
Radford & Wright		IRR	Henry Radford & David Wright	
Randall		IRR	See Memo	Claimants: William McCartney, Edwin Rilke, and Edward Reed. Original decree reduced.
Randall & Nicholas	Janitell	TFR	G. M. Ohler	
Randall Ent. No. 1		IRR	William McCartney	
Ratcliff No. 1	Rock Creek	TFR	Benjamin Ratcliff	
Ratcliff No. 2	Rock Creek	TFR	Benjamin Ratcliff	
Ratcliff No. 3	Rock Creek	TFR	Benjamin Ratcliff	
Ratcliff No. 4	Rock Creek	TFR	Benjamin Ratcliff	
Ratcliff No. 5	Rock Creek	TFR	Benjamin Ratcliff	
Ratcliff No. 6	Rock Creek	TFR	Benjamin Ratcliff	

Ratcliff No. 7	Rock Creek	TFR	Benjamin Ratcliff
Ratcliff No. 8	Rock Creek	TFR	Benjamin Ratcliff
Ratcliff No. 9	Rock Creek	TFR	Benjamin Ratcliff
Raynor & Edmondson No. 1	Platte Ansley	TFR	See Memo
Raynor & Edmondson No. 2	Platte Ansley	TFR	See R&E No. 1
Raynor & Edmondson No. 3	Platte Ansley	TFR	See R&E No. 1
Raynor & Edmondson No. 4	Platte Ansley	TFR	See R&E No. 1
Raynor & Edmondson No. 5	Platte Ansley	TFR	See R&E No. 1
Rebecca		AB	Charles H. Dunbar
Redmon		IRR	W. H. Souders & A. H. Wolfe
Reinhardt No. 1	Augustine	TFRAB	P. F. Reinhardt
Reinhardt No. 2	Augustine	TFRAB	P. F. Reinhardt
Reinhardt No. 3	Augustine	TFRAB	P. F. Reinhardt
Reinhardt No. 4	Augustine	TFRAB	P. F. Reinhardt
Rheinacher	Janitell	TFRAB	
Rickards Lower	Huron	TFRAB	William & Samuel Rickards
Robbins No. 1	Rock Creek	TFRAB	
Robbins No. 1	Huron	TFR	
Robbins No. 2	Rock Creek	TFRAB	
Robbins No. 2	Huron	TFR	
Robbins No. 3	Rock Creek	TFRAB	
Robbins Sims	Huron	TFR	
Rock Creek	Rock Creek	TFR	Georgina J. Dunbar
Rock Creek Ent	Rock Creek	TFRAB	Georgina J. Dunbar
Rock Creek No. 1	Rock Creek	TFR	Georgina J. Dunbar
Rogers & Miller	Black Mountain	TFR	
Rogers (High Creek)	Black Mountain	TFR	
Rogers (S Fork)	High Creek	TFR	John M. Dixon & Job K. Sweet
Rogers North	Huron	TFR	Joseph Rogers & B. F. Spinney
Rogers North	Rogers, Lucinda	TFR	Joseph Rogers & B. F. Spinney
Rogers South	Rogers, Lucinda	TFR	Joseph Rogers

Claimants: John Raynor, Alfred T. Edmondson,  
Arthur Reynolds.

Note: The Fremont Ditch has the same priority  
number according to the District 23 Map.  
Includes acreage for the Rogers and Miller Ditch.

State list shows only original decree.

Sacramento	Huron	IRR	Joseph Rogers	365 irr ac incl. Rogers N
Sadler		TFR	B. F. Spinney	
Salt Creek		IRR		
Schattinger	Janitell	TFR	Peter Schattinger	
Schattinger Waste	Furman	TFR		
Sessions	Janitell	TFR		Irrig area incl. Skelton.
Sheeprock		IRR	Joseph & Robert Crockett	Claimants: Edward P. Arthur, Harold, Thomas D.,
Sigafus	Trout Creek	TFR	See Memo	Henriette, and Ellen Chalmers. Another 1040 acres
				were irrig jointly by the Sigafus and Trout Ck
				rights.
Sigafus Enl No. 1	Trout Creek	TFR	See Sigafus Memo	
Sigafus Enl No. 2	Trout Creek	TFRAB	See Sigafus Memo	
Sims	Huron	TFR		
Skelton	Janitell	TFR	George M. Ohler	
Slater	Indian Mountain	TFR	Seth S. Slater	Bellamah claims part of this ditch for Aug water.
Slater	Indian Mountain	AUG	Seth S. Slater	All. to AUG.
Small	McDowell	TFR	Marie Guiraud	
Small	McDowell	TFRAB	Marie Guiraud	16 cfs TFR from the Canon Ditch in 1955.
Snyder Creek	Rocker 7	TFR		Original Small Decree.
Souders & Wolfe No. 2		IRR	W. H. Souders & A. H. Wolfe	
Souders & Wolfe No. 3		IRR	W. H. Souders & A. H. Wolfe	
Souders & Wolfe No. 4		IRR	W. H. Souders & A. H. Wolfe	
Souders & Wolfe No. 5		IRR	W. H. Souders & A. H. Wolfe	
Souders & Wolfe No. 6	Black Mountain	TFR	W. H. Souders & A. H. Wolfe	
South Side Juniors	Huron	TFRAB		SS Juniors: Poncho Villa, Left Hand Gulch, Brown,
				Sims, Spring Ck, Magna East & West, Jordan East &
				West, and the Henry E. Rogers Nos. 1 & 2.
Spring		AUG		Some question of ownership: Aurora? Sandy
				Sanborn? Western Union? Also, same PM as
				Michigan Res Feeder Ditch. CFS_DEC_0 and
				AMT_IN TFR = entire flow.

Spring Branch	Platte Ansley	TFR	See Memo	Claimants: Alfred I. Edmondson, John Raynor, Arthur Reynolds. cfs dec = entire flow.
Spring No. 1	Huron	TFR		
Spring No. 2	Huron	TFRAB		
St. Charles		AB	Charles H. Dunbar	
Stevens No. 1	Eleven Mile	TFRAB		
Stevens No. 2	Eleven Mile	TFRAB	J. Gregg O'Brien	
Stevens No. 3	Eleven Mile	TFRAB	Gregg O'Brien	
Stevens No. 4	Eleven Mile	TFRAB		
Tarryall (Ck)		IRR	William McCartney	
Taylor		IRR	Samuel & Julia M. Taylor	
Taylor's Jefferson Ck		IRR		
Temple	Four Mile	TFRAB		
Thompson	Badger Basin	TFR	Samuel Hartsel	
Thompson & Radcliff		AB	E. S. Thompson	Ownership obscure. Newkirk? But Newkirk doesn't use it. McKulty? But he doesn't use it. Good ditch, good water. Wasn't active in 1993. Owned by Moses (att'y from Denver)? Finally, Denise decided it was abandoned.
Thorborg		IRR	Henry C Radford & David Wright	
Three Mile	Huron	TFRAB		
Three Mile	Badger Basin	TFR		
Treman Lower		IRR	William Trevan	
Treman Upper		IRR	William Trevan	
Troppe	Borden	TFRAB	George F. Troppe	
Trout Creek	Trout Creek	TFR		Part of this ditch belongs to Alex Ebel, part to Thornton. In the Trout Ck Transfer, another 1040 acres were irrig jointly by the Sigafus and Trout Ck rights. Could the 490 af tfred be an estimate of what they'd get? Review Trout Ck decree. Confusion over 2cfs attached to the Trout Ck... Decree is for entire flow of Trout Ck.

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## APPENDIX D

### 1885 AGRICULTURAL CENSUS, SOUTH PARK

In 1885 the state of Colorado conducted a census, using the forms of the United States Census of 1880. In the pages that follow, a portion of the enumeration is transcribed: the manuscript agricultural census for South Park. Organized in four sections, the first part presents figures on ranch value and acreage. The second part shows production, labour, fertilizer, and fencing. Part III is a livestock and poultry inventory, and Part IV represents production of hay and potatoes.

The tables in this appendix present information for South Park only. Data from other corners of Park County were excluded on the basis of the author's knowledge of pioneer names in these parts of the county: the Platte Canyon area in the northwest, the Black Mountain and West Fourmile areas (the present-day Guffey area) to the south, and the Lake George area in the southeast.

The categories of information are coded as follows:

ED	Enumeration District (1885 Census, Park County, Colorado)
P	Page (1885 Census, Park County)
LAST_NAME	Last Name, Head of Ranch Household
FIRST_NAME	First Name, Head of Ranch Household
TENURE	Tenure: Own = Owns ranch RENT = Rents or Leases CROP = Sharecrops
IMP_ACRES	Improved acreage
UNIMP_ACRES	Unimproved acreage
FARM_VALUE	Value of the Farm (in dollars)
MACH_VALUE	Value of Machinery (in dollars)

STOCK_VALUE	Value of Stock (in dollars)
FENCES	Miles of Fence
FERTILIZER	Tons of Fertilizer
LABOUR PAID	Total Paid for Labour (in dollars)
LABOUR WKS	Total Weeks of Labour (example: 1 person full time = 52 weeks; 2 people full time = 104 weeks; 10 people hired for 8 weeks around the haying season = 80 weeks)
PRODUCTION	Total Farm Production (in dollars)
AC_MOWN	Acres of Hay Mown
AC_UNMOWN	Acres of Irrigated Meadow (Unmown)
TONS_HAY	Tons of Hay Cut
AC_POTATOE	Acres of Potatoes Planted
BUSH_POTAT	Bushels of Potatoes Produced

Note: The author has a transcribed copy of the entire Park County Agricultural Census for 1885.

PART I

1885 CENSUS  
VALUE AND ACREAGE

ED	P	LAST_NAME	FIRST_NAME	TENURE	IMP_ACRES	UNIMP_ACRE	FARM_VALUE	MACH_VALUE	STOCK_VALU
1	1	Lowe	Charles W.	Own	280	0	2000	300	1000
1	1	Humferson	Edger	Own	500	160	3000	200	1000
1	1	Sweet	J.K.	Own	700	0	15000	500	2500
1	1	Radford	M.C.	Own	1000	0	4500	100	3000
1	1	Dixon	J.M.	Own	1000	0	12000	250	2000
1	1	Parmelle	J.D.	Own	1500	0	5000	250	2500
1	1	Shoemaker	R.P.	Own	500	0	4000	200	2000
1	1	Haver	L.C.	Own	2000	0	9000	200	20000
1	1	Sweek	J.L.	Own	800	0	5000	200	30000
1	1	Funk	W.H.	CROP	500	0	20000	100	1500
1	2	Mulock	J.P.	Own	8000	40	2000	150	210000
1	2	Abrams	Clara	Own	8	0	350	0	0
1	2	Asher	J.R.	Own	160	0	200	100	200
1	2	Lloyd	W.C.	Own	0	100	50	0	300
1	2	Aulstrum	E.M.	Own	0	75	5000	125	1500
1	2	Scott	Mrs.S.A.	Own	0	75	1500	150	13000
1	2	Davis	Charles	Own	18	7	2000	100	1200
1	2	Goodnight	Joseph	Own	10	0	250	50	700
1	2	Dell	Mary	Own	15	0	1000	200	1000
1	3	Littleton	W.A.	Own	0	160	700	100	6000
1	3	Tremayne	Richard	Own	30	50	5000	300	16500
1	3	Hartsell	Joseph	Own	10	40	200	100	4000
1	3	Bender	John	Own	15	105	1200	75	6000
1	3	Berry	WM.	Own	60	40	5000	500	3500
1	3	?		Own	40	0	500	50	1500
1	3	Witcher	John R.	Own	20	140	200	50	32000
1	3	?		Own	60	100	200	50	6500
1	3	O'Brien	John	Own	30	130	1000	50	11000
1	3	Gross	Thomas	Own	50	50	2500	75	4000
1	4	Tremayne	Harry	Own	20	300	1000	200	2000
1	4	Turner	Charles	Own	0	160	350	25	360
1	4	Robbins	Thomas	Own	150	500	8500	100	9000
1	4	Sims	J.B.	Own	150	0	300	75	13000
1	4	Pruden	L.H.	Own	100	260	500	150	1000
1	4	Russel	R.B.	RENT	0	30	10000	100	2000
1	4	Hartsell	Samuel	Own	200	4000	100000	1000	40000
1	4	Rickard	W.B.	Own	50	550	8000	200	4000
1	4	Risner	WM.	RENT	0	480	0	0	200
1	4	Donovan	A.C.	Own	200	500	10000	150	12000
1	5	Guiraud	Louis	Own	600	1400	30000	1500	5000
1	5	Rinehart	P.F.	Own	200	1000	11000	0	500
1	5	Eulor	?P.	Own	0	291	2000	300	2000
1	5	Alden	Howell	Own	300	260	10000	500	1500
1	5	Alden	E.	Own	70	130	3000	100	1000
1	5	Dudley	Geo.	Own	50	200	3000	200	6000

ED	P	LAST_NAME	FIRST_NAME	TENURE	IMP_ACRES	UNIMP_ACRE	FARM_VALUE	MACH_VALUE	STOCK_VALU
1	5	Milligan	Jas.	Own	0	160	300	50	1000
1	5	Fiffe	Obe.	Own	0	150	500	50	800
1	5	Rich	N.A.	Own	100	540	10000	100	3000
1	5	Binkley	John	Own	40	540	3000	100	6000
1	6	Johnston	Oliver	Own	75	85	5000	100	1200
1	6	Johnston	WM.	Own	40	120	1200	50	275
1	6	Nelson	Lars	Own	0	200	800	200	1300
1	6	Weston	Geo.	Own	200	820	7000	100	5000
1	6	Weaver	Jos.	Own	20	300	900	75	1500
1	6	Miller	David	Own	200	1040	10500	100	4000
1	6	Merts	WM.	Own	0	40	800	100	3000
1	6	Rogers	Jas.E.	Own	0	0	0	0	2200
1	6			Own	0	320	1500	100	3000
1	6	Smith, Purcell		Own	200	860	8000	150	400
1	7	Eddy Brothers		Own	0	1100	10000	300	50000
1	7	Becham	Henry C.	Own	0	0	0	0	20000
1	7	Tremayne	John	Own	40	200	10000	100	300
2	1	Wadley	Mary & Sons	Own	1500	900	10000	200	1200
2	1	Spurlock	Obediah	CROP	0	0	0	0	250
2	1	Chalmers	Harold	CROP	4000	4000	40000	800	350
2	1	Guiraud	Mary	Own	1000	100	10000	100	15000
2	1	Guiraud	Joseph	Own	1000	150	10000	0	225
2	1	Guiraud	Joseph	Own	1000	100	10000	0	0
2	2	Feringer, Rink		Own	960	40	25000	952	1240
2	2	Rishaburger	Henry	Own	320	0	2000	525	8500
2	2	Harrington	J.C.	Own	2640	0	2640	1000	10000
2	2	Spinney	Benjamin F.	Own	4240	0	42400	1000	13000
2	2	Rogers	Joseph	Own	1280	0	35000	1000	20000
2	2	Rayner	James B.	Own	400	0	3500	230	1000
2	2	?		Own	160	0	800	175	1344
2	2	Stoll	Frederick	Own	160	0	2000	1065	2350
2	2	Smith	E.J.	Own	480	0	17500	500	2500
2	2	Swan	Richard	Own	320	0	6000	400	3205
2	3	Bysong	Joseph	Own	160	0	1000	0	1100
2	3	Clarkson	Ann	Own	160	0	2500	110	2905
2	3	Vermillion	WM.	Own	160	0	150	0	0
2	3	Stoll	Frank	Own	160	0	600	100	530
2	3	Messenger	Ortero	Own	270	50	500	25	170
2	3	Horn	John	Own	100	60	700	25	713
2	3	Pulver	Frank C.	Own	160	0	1500	175	1060
2	3	North	George	Own	160	0	0	0	0
2	3	Row	John	CROP	160	100	1000	0	325
2	4	Fluman	Gottlieb	Own	120	80	1000	25	3075
2	4	Badger	John	Own	160	0	600	150	1800
2	4	Hiwan	Thomas	Own	160	0	3000	80	1525
2	4	McLaughlin	Sarah A.	Own	320	0	6283	400	3715
2	4	Krebill	Henry	Own	160	0	500	600	0
2	4	?	Alexander	Own	160	0	100	2	700
2	4	Mahoney	Michael	Own	320	0	4000	50	2300
2	4	Krebill	Henry	Own	160	0	1500	125	600

ED	P	LAST_NAME	FIRST_NAME	TENURE	IMP_ACRES	UNIMP_ACRE	FARM_VALUE	MACH_VALUE	STOCK_VALU
2	4	Kelley	Jacob	Own	320	0	1000	150	3565
2	4	Herman	John	Own	160	0	100	0	50
2	5	Baker	David	Own	720	0	20000	1290	0
2	6	Duberry	Willa	CROP	480	0	1800	150	725
2	6	Duberry	Lilley	RENT	760	0	2000	200	3135
2	6	Williams	John	Own	440	0	4000	150	3110
2	6	Allen	?	Own	320	0	6000	100	2775
2	6	Allen	Addie	Own	80	0	500	0	285
2	6	Farnum	WM. R.	Own	320	0	5500	150	260
2	6	Bonis	Lawrence	Own	360	0	3000	100	3430
2	6	Packer	G.W.	Own	1120	0	15000	300	13300
2	6	Hawkins	Joseph	Own	80	0	200	0	150
2	6	Link	James R.	Own	1520	0	13000	300	38000
2	7	Borden	Timothy	Own	1360	0	15000	300	5760
2	7	?	John	Own	520	0	7000	250	2000
2	7	Stout	Albert	Own	600	0	0	0	370
2	7	Slater	S.S.	Own	2500	0	25000	1000	15875
2	7	Wilson	W.V.	Own	320	0	8500	50	50
2	7	Crosier	Edwin R.	Own	320	0	5000	200	2160
2	7	McCartney	WM.	Own	440	0	8000	500	5050
2	7	Borden	Mary	Own	2200	0	20000	500	5915
2	7	Troppe	George	Own	440	0	2200	200	3425
2	7	Dunbar	Thomas	Own	1600	0	10000	250	7400
2	8	Dunbar	James	Own	440	0	5000	200	2835
2	8	Dunbar	Charles	Own	320	0	3500	100	2180
2	8	Pike	E.	Own	280	0	4000	200	1150
2	8	Miller	WM.	Own	160	0	0	0	1075
2	8	Monaghan	Peter	CROP	300	0	3000	350	3300
2	8	Coats	Raymond	Own	160	0	300	100	1625
2	8	Whitten, Geddes		Own	800	0	6750	1190	3735
2	8	?	Henry	Own	160	0	2000	0	825
2	8	Ratcliff	Benjamin	Own	1290	0	1800	100	2000
2	8	Lee	James	Own	320	0	3000	300	8005
2	9	Case	E.L.	Own	480	0	5000	1000	4871
2	9	Wyatt	John	Own	80	130	1000	200	4735
2	9	Baker	David	Own	720	0	20000	615	1290
2	9	Harriman	Clark	Own	160	0	1000	100	5025
2	9	Litmer	Fred J.	Own	640	0	15000	1000	2925
2	9	Craig	W.H.	Own	160	0	1000	200	1000
2	9	Head	W.R.	Own	1000	0	10000	1200	2160
2	9	Crockett	Joseph	Own	760	0	15000	1000	5550
2	9	Read	Edwin F.	Own	240	0	5000	200	720
2	9	Tyler	Samuel	Own	400	0	7000	500	1400
2	10	McCartney	Frank W.	Own	160	0	3300	200	400
2	10	Lasell	Samuel	Own	160	0	5000	200	8550
2	10	Peabody	Lelon	Own	290	0	5000	200	1180
2	10	Holthusen	WM. M.	Own	320	0	1000	200	2560
2	10	Votz	John	Own	320	0	5000	300	1500
2	10	Shattinger	Henry	Own	640	0	10000	300	1200
2	10	Hyatt	Thomas	Own	160	0	1000	200	900
2	10	Smith	James J.	Own	160	0	6000	100	625

ED	P	LAST_NAME	FIRST_NAME	TENURE	IMP_ACRES	UNIMP_ACRE	FARM_VALUE	MACH_VALUE	STOCK_VALU
2	10	Stow	WM. J.	Own	160	0	2000	100	0
2	10	Kline	David	Own	160	0	6000	0	0
2	14	Lavack	Charles	Own	320	0	3000	200	3500
2	14	Bolinger	Webster	Own	1080	0	15000	600	0
2	14	Wadsworth	Frederick M.	Own	750	0	10000	200	5000
2	14	Reichenecker	Albert	Own	1200	0	5000	0	2000
2	14	Link, Lee	James, WM.	Own	560	0	1100	200	1000
2	14	Nickerson	Charles	Own	160	0	1000	0	1540
2	14	Burns	WM.M.	Own	400	0	5000	500	2000
2	14	O'Neil	Daniel	Own	840	0	10000	100	2850
					0	0	0	0	0
					76511	23518	993823	38909	895618

PART II

1885 CENSUS

PRODUCTION, LABOUR, AND MISCELLANEOUS

ED	P	LAST_NAME	FIRST_NAME	FENCES	FERTILIZER	LABOUR_PAID	LABOUR_WKS	PRODUCTION
1	1	Lowe	Charles W.	0	0	\$ 1100	52	\$ 574
1	1	Humferson	Edger	0	0	\$ 0	0	\$ 0
1	1	Sweet	J.K.	0	0	\$ 700	52	\$ 3500
1	1	Radford	M.C.	220	0	\$ 0	0	\$ 150
1	1	Dixon	J.M.	70	0	\$ 500	52	\$ 1500
1	1	Parmelle	J.D.	0	0	\$ 200	52	\$ 500
1	1	Shoemaker	R.P.	0	0	\$ 200	52	\$ 500
1	1	Haver	L.C.	200	0	\$ 1500	52	\$ 600
1	1	Sweek	J.L.	0	0	\$ 50	8	\$ 120
1	1	Funk	W.H.	0	50	\$ 200	8	\$ 360
1	2	Mulock	J.P.	0	0	\$ 3000	52	\$ 0
1	2	Abrams	Clara	0	0	\$ 0	0	\$ 0
1	2	Asher	J.R.	0	0	\$ 0	0	\$ 150
1	2	Lloyd	W.C.	0	0	\$ 0	0	\$ 0
1	2	Aulstrum	E.M.	0	0	\$ 400	52	\$ 380
1	2	Scott	Mrs.S.A.	0	0	\$ 300	52	\$ 50
1	2	Davis	Charles	0	0	\$ 0	0	\$ 500
1	2	Goodnight	Joseph	50	0	\$ 0	0	\$ 300
1	2	Dell	Mary	150	0	\$ 200	52	\$ 700
1	3	Littleton	W.A.	0	0	\$ 0	0	\$ 0
1	3	Tremayne	Richard	0	0	\$ 100	52	\$ 500
1	3	Hartsell	Joseph	0	0	\$ 100	20	\$ 260
1	3	Bender	John	0	0	\$ 0	0	\$ 100
1	3	Berry	WM.	0	0	\$ 300	52	\$ 600
1	3	?		0	0	\$ 0	0	\$ 120
1	3	Witcher	John R.	0	0	\$ 100	20	\$ 800
1	3	?		0	0	\$ 75	12	\$ 150
1	3	O'Brien	John	0	0	\$ 200	40	\$ 500
1	3	Gross	Thomas	0	0	\$ 100	12	\$ 500
1	4	Tremayne	Harry	0	0	\$ 0	0	\$ 325
1	4	Turner	Charles	65	0	\$ 0	0	\$ 0
1	4	Robbins	Thomas	0	0	\$ 100	12	\$ 600
1	4	Sims	J.B.	0	0	\$ 0	0	\$ 120
1	4	Pruden	L.H.	0	0	\$ 800	52	\$ 600
1	4	Russel	R.B.	0	0	\$ 1000	52	\$ 0
1	4	Hartsell	Samuel	0	0	\$ 3000	0	\$ 2000
1	4	Rickard	W.B.	0	0	\$ 0	0	\$ 300
1	4	Risner	WM.	0	0	\$ 0	0	\$ 0
1	4	Donovan	A.C.	0	0	\$ 1000	90	\$ 1000
1	5	Guiraud	Louis	0	0	\$ 3500	400	\$ 3600
1	5	Rinehart	P.F.	200	0	\$ 1000	0	\$ 1200
1	5	Eulor	?P.	0	0	\$ 100	0	\$ 0
1	5	Alden	Howell	0	0	\$ 500	100	\$ 2000
1	5	Alden	E.	0	0	\$ 150	52	\$ 600
1	5	Dudley	Geo.	0	0	\$ 400	100	\$ 300
1	5	Milligan	Jas.	0	0	\$ 0	0	\$ 0

ED	P	LAST_NAME	FIRST_NAME	FENCES	FERTILIZER	LABOUR_PAID	LABOUR_WKS	PRODUCTION
1	5	Fiffe	Obe.	0	0	\$ 0	0	\$ 0
1	5	Rich	N.A.	0	0	\$ 200	52	\$ 500
1	5	Binkley	John	0	0	\$ 100	36	\$ 300
1	6	Johnston	Oliver	0	0	\$ 200	52	\$ 500
1	6	Johnston	WM.	0	0	\$ 75	20	\$ 600
1	6	Nelson	Lars	0	0	\$ 0	0	\$ 0
1	6	Weston	Geo.	0	0	\$ 400	75	\$ 1000
1	6	Weaver	Jos.	120	0	\$ 100	20	\$ 150
1	6	Miller	David	0	0	\$ 800	75	\$ 1500
1	6	Merts	WM.	0	0	\$ 0	0	\$ 0
1	6	Rogers	Jas.E.	0	0	\$ 0	0	\$ 0
1	6			0	0	\$ 0	0	\$ 0
1	6	Smith, Purcell		0	0	\$ 300	52	\$ 700
1	7	Eddy Brothers		0	0	\$ 1000	52	\$ 0
1	7	Becham	Henry C.	0	0	\$ 400	52	\$ 0
1	7	Tremayne	John	0	0	\$ 50	38	\$ 1000
2	1	Wadley	Mary & Sons	0	0	\$ 1500	260	\$ 750
2	1	Spurlock	Obediah	0	0	\$ 0	0	\$ 0
2	1	Chalmers	Harold	500	0	\$ 1000	80	\$ 5000
2	1	Guiraud	Mary	0	0	\$ 1000	84	\$ 1950
2	1	Guiraud	Joseph	900	0	\$ 0	0	\$ 1800
2	1	Guiraud	Joseph	0	0	\$ 0	0	\$ 1000
2	2	Feringer, Rink		8	0	\$ 1840	140	\$ 2750
2	2	Rishaburger	Henry	200	0	\$ 600	60	\$ 0
2	2	Harrington	J.C.	0	1000	\$ 1800	1000	\$ 15000
2	2	Spinney	Benjamin F.	1500	0	\$ 2500	1500	\$ 3000
2	2	Rogers	Joseph	500	0	\$ 1500	180	\$ 0
2	2	Rayner	James B.	100	0	\$ 300	28	\$ 400
2	2	?		0	0	\$ 30	4	\$ 150
2	2	Stoll	Frederick	0	0	\$ 415	45	\$ 825
2	2	Smith	E.J.	0	0	\$ 0	0	\$ 125
2	2	Swan	Richard	0	0	\$ 500	40	\$ 850
2	3	Bysong	Joseph	100	0	\$ 25	4	\$ 25
2	3	Clarkson	Ann	0	0	\$ 250	12	\$ 300
2	3	Vermillion	WM.	0	0	\$ 0	0	\$ 0
2	3	Stoll	Frank	0	0	\$ 200	0	\$ 470
2	3	Messenger	Ortero	100	0	\$ 0	0	\$ 130
2	3	Horn	John	0	0	\$ 0	0	\$ 0
2	3	Pulver	Frank C.	0	150	\$ 60	8	\$ 400
2	3	North	George	0	0	\$ 0	0	\$ 0
2	3	Row	John	0	0	\$ 0	0	\$ 0
2	4	Fluman	Gottlieb	100	0	\$ 50	4	\$ 0
2	4	Badger	John	0	0	\$ 75	5	\$ 400
2	4	Hiwan	Thomas	0	0	\$ 0	0	\$ 50
2	4	McLaughlin	Sarah A.	0	0	\$ 450	40	\$ 425
2	4	Krebill	Henry	0	0	\$ 0	0	\$ 200
2	4	?	Alexander	0	0	\$ 0	0	\$ 300
2	4	Mahoney	Michael	50	0	\$ 0	0	\$ 1000
2	4	Krebill	Henry	0	0	\$ 100	20	\$ 200
2	4	Kelley	Jacob	25	0	\$ 150	0	\$ 8

ED	P	LAST_NAME	FIRST_NAME	FENCES	FERTILIZER	LABOUR_PAID	LABOUR_WKS	PRODUCTION
2	4	Herman	John	9	0	\$ 0	0	\$ 0
2	5	Baker	David	0	0	\$ 900	76	\$ 2000
2	6	Duberry	Willa	0	0	\$ 0	0	\$ 0
2	6	Duberry	Lilley	0	30	\$ 0	0	\$ 200
2	6	Williams	John	0	0	\$ 320	15	\$ 500
2	6	Allen	?	0	0	\$ 0	0	\$ 1500
2	6	Allen	Addie	0	0	\$ 0	0	\$ 1100
2	6	Farnum	WM. R.	30	0	\$ 350	12	\$ 800
2	6	Bonis	Lawrence	100	0	\$ 0	0	\$ 0
2	6	Packer	G.W.	100	0	\$ 500	40	\$ 1500
2	6	Hawkins	Joseph	0	0	\$ 0	0	\$ 100
2	6	Link	James R.	0	0	\$ 1500	96	\$ 1500
2	7	Borden	Timothy	450	0	\$ 600	260	\$ 2000
2	7	?	John	150	0	\$ 600	52	\$ 1500
2	7	Stout	Albert	100	0	\$ 0	0	\$ 0
2	7	Slater	S.S.	500	0	\$ 1800	720	\$ 5000
2	7	Wilson	W.V.	120	0	\$ 90	8	\$ 0
2	7	Crosier	Edwin R.	100	0	\$ 250	24	\$ 1500
2	7	McCartney	WM.	50	0	\$ 500	32	\$ 2500
2	7	Borden	Mary	300	0	\$ 1200	104	\$ 1500
2	7	Troppe	George	0	0	\$ 0	0	\$ 1000
2	7	Dunbar	Thomas	300	0	\$ 800	65	\$ 1500
2	8	Dunbar	James	50	0	\$ 0	0	\$ 800
2	8	Dunbar	Charles	23	0	\$ 0	0	\$ 800
2	8	Pike	E.	20	0	\$ 170	12	\$ 800
2	8	Miller	WM.	0	0	\$ 0	0	\$ 800
2	8	Monaghan	Peter	0	0	\$ 350	0	\$ 4600
2	8	Coats	Raymond	100	0	\$ 0	0	\$ 500
2	8	Whitten, Geddes		600	0	\$ 2000	200	\$ 5000
2	8	?	Henry	0	0	\$ 500	0	\$ 0
2	8	Ratcliff	Benjamin	200	0	\$ 900	76	\$ 1000
2	8	Lee	James	200	0	\$ 88	20	\$ 475
2	9	Case	E.L.	300	0	\$ 900	104	\$ 1800
2	9	Wyatt	John	50	0	\$ 0	0	\$ 1000
2	9	Baker	David	0	0	\$ 900	76	\$ 2000
2	9	Harriman	Clark	0	0	\$ 500	40	\$ 1500
2	9	Litmer	Fred J.	100	0	\$ 500	104	\$ 2500
2	9	Craig	W.H.	100	0	\$ 25	52	\$ 1000
2	9	Head	W.R.	2000	0	\$ 3000	0	\$ 5300
2	9	Crockett	Joseph	300	0	\$ 600	0	\$ 3000
2	9	Read	Edwin F.	250	0	\$ 125	0	\$ 1000
2	9	Tyler	Samuel	300	0	\$ 1000	0	\$ 1750
2	10	McCartney	Frank W.	100	0	\$ 150	0	\$ 500
2	10	Lasell	Samuel	0	0	\$ 600	0	\$ 700
2	10	Peabody	Lelon	0	0	\$ 300	0	\$ 600
2	10	Holthusen	WM. M.	0	0	\$ 0	0	\$ 500
2	10	Votz	John	50	0	\$ 250	0	\$ 700
2	10	Shattinger	Henry	150	0	\$ 250	0	\$ 1000
2	10	Hyatt	Thomas	50	0	\$ 400	0	\$ 1000
2	10	Smith	James J.	50	0	\$ 200	0	\$ 0
2	10	Stow	WM. J.	0	0	\$ 0	0	\$ 0

ED	P	LAST_NAME	FIRST_NAME	FENCES	FERTILIZER	LABOUR_PAID	LABOUR_WKS	PRODUCTION
2	10	Kline	David	0	0	\$ 0	0	\$ 0
2	14	Lavack	Charles	100	0	\$ 500	0	\$ 2800
2	14	Bolinger	Webster	0	0	\$ 0	0	\$ 0
2	14	Wadsworth	Frederick M.	50	0	\$ 1850	0	\$ 1500
2	14	Reichenecker	Albert	0	0	\$ 0	0	\$ 800
2	14	Link, Lee	James, WM.	0	0	\$ 250	12	\$ 1000
2	14	Nickerson	Charles	0	0	\$ 0	0	\$ 800
2	14	Burns	WM.M.	0	0	\$ 0	0	\$ 0
2	14	O'Neil	Daniel	100	0	\$ 900	72	\$ 1200
				0	0	\$ 0	0	\$ 0
				****	1230	\$ 65463	7912	\$ 144242

PART III

1885 CENSUS  
LIVESTOCK AND POULTRY

ED	P	LAST_NAME	FIRST_NAME	AC_MOWN	AC_UNMOWN	TONS_HAY	AC_POTATOE	BUSH_POTAT
1	1	Lowe	Charles W.	70	210	41	0.25	5
1	1	Humferson	Edgar	50	480	10	0.50	15
1	1	Sweet	J.K.	200	500	200	0.00	0
1	1	Radford	M.C.	25	100	18	0.00	0
1	1	Dixon	J.M.	200	800	150	0.00	0
1	1	Parmelle	J.D.	50	0	60	2.00	100
1	1	Shoemaker	R.P.	100	400	75	0.50	25
1	1	Haver	L.C.	75	2000	80	0.00	0
1	1	Sweek	J.L.	25	0	20	0.00	0
1	1	Funk	W.H.	100	400	50	0.00	0
1	2	Mulock	J.P.	30	10	35	0.00	0
1	2	Abrams	Clara	0	0	0	0.00	0
1	2	Asher	J.R.	10	0	11	3.00	70
1	2	Lloyd	W.C.	0	0	0	5.00	100
1	2	Aulstrum	E.M.	25	0	30	0.50	20
1	2	Scott	Mrs. S.A.	10	0	5	0.00	0
1	2	Davis	Charles	0	0	0	7.00	500
1	2	Goodnight	Joseph	0	0	0	4.00	300
1	2	Dell	Mary	5	0	10	4.00	100
1	3	Littleton	W.A.	0	0	0	0.00	0
1	3	Tremayne	Richard	30	0	60	0.00	0
1	3	Hartsell	Joseph	0	0	0	0.00	0
1	3	Bender	John	10	0	10	0.00	0
1	3	Berry	WM.	60	0	70	2.00	32
1	3	?		10	0	20	0.00	0
1	3	Witcher	John R.	14	0	50	0.00	0
1	3	?		15	0	15	2.00	75
1	3	O'Brien	John	15	0	40	1.00	300
1	3	Gross	Thomas	10	0	40	1.00	75
1	4	Tremayne	Harry	16	0	15	0.00	0
1	4	Turner	Charles	0	0	0	0.00	0
1	4	Robbins	Thomas	100	500	100	0.00	0
1	4	Sims	J.B.	25	125	20	0.00	0
1	4	Pruden	L.H.	100	0	90	0.00	0
1	4	Russel	R.B.	0	0	0	0.50	25
1	4	Hartsell	Samuel	200	0	300	0.00	0
1	4	Rickard	W.B.	50	0	50	0.00	0
1	4	Risner	WM.	0	0	0	0.00	0
1	4	Donovan	A.C.	200	0	200	0.00	0
1	5	Guiraud	Louis	600	0	600	0.00	0
1	5	Rinehart	P.F.	200	0	200	0.00	0
1	5	Eulor	?P.	0	0	0	0.00	0
1	5	Alden	Howell	300	0	300	3.00	150
1	5	Alden	E.	50	0	20	0.00	0
1	5	Dudley	Geo.	50	0	50	0.00	0
1	5	Milligan	Jas.	0	0	0	0.00	0

ED	P	LAST_NAME	FIRST_NAME	AC_MOWN	AC_UNMOWN	TONS_HAY	AC_POTATOE	BUSH_POTAT
1	5	Fiffe	Obe.	0	0	0	0.00	0
1	5	Rich	N.A.	100	0	40	0.00	0
1	5	Binkley	John	40	0	35	0.00	0
1	6	Johnston	Oliver	100	0	65	0.00	0
1	6	Johnston	WM.	40	0	55	0.00	0
1	6	Nelson	Lars	0	0	0	0.00	0
1	6	Weston	Geo.	200	0	125	0.00	0
1	6	Weaver	Jos.	20	0	0	0.00	0
1	6	Miller	David	200	0	150	0.00	0
1	6	Merts	WM.	0	0	0	0.00	0
1	6	Rogers	Jas. E.	0	0	0	0.00	0
1	6			0	0	0	0.00	0
1	6	Smith, Purcell		200	0	100	0.00	0
1	7	Eddy Brothers		0	0	0	0.00	0
1	7	Becham	Henry C.	0	0	0	0.00	0
1	7	Tremayne	John	40	200	50	0.00	0
2	1	Wadley	Mary & Sons	100	2300	75	0.00	0
2	1	Spurlock	Obediah	0	0	0	0.00	0
2	1	Chalmers	Harold	500	3500	500	0.00	0
2	1	Guiraud	Mary	100	0	100	0.00	0
2	1	Guiraud	Joseph	0	0	175	0.00	0
2	1	Guiraud	Joseph	0	0	100	0.00	0
2	2	Feringer, Rink		250	750	275	0.00	0
2	2	Rishaburger	Henry	0	0	0	0.00	0
2	2	Harrington	J.C.	200	2240	200	0.00	0
2	2	Spinney	Benjamin F.	370	3850	200	0.00	0
2	2	Rogers	Joseph	150	1130	100	0.00	0
2	2	Rayner	James B.	50	850	50	0.00	0
2	2	?		15	145	12	5.00	200
2	2	Stoll	Frederick	50	110	50	12.00	500
2	2	Smith	E.J.	15	455	15	5.00	200
2	2	Swan	Richard	65	255	65	0.00	0
2	3	Bysong	Joseph	2	158	2	0.00	0
2	3	Clarkson	Ann	12	148	12	0.00	0
2	3	Vermillion	WM.	0	0	0	0.00	0
2	3	Stoll	Frank	2	158	2	0.00	400
2	3	Messenger	Ortero	0	0	0	0.25	130
2	3	Horn	John	0	0	0	0.00	0
2	3	Pulver	Frank C.	6	154	5	0.00	0
2	3	North	George	0	0	0	0.00	0
2	3	Row	John	5	150	5	0.00	0
2	4	Fluman	Gottlieb	15	285	15	5.00	275
2	4	Badger	John	12	150	12	0.00	0
2	4	Hiwan	Thomas	5	155	5	5.00	275
2	4	McLaughlin	Sarah A.	25	295	25	0.00	175
2	4	Krebill	Henry	20	140	20	0.00	0
2	4	?	Alexander	5	155	5	0.00	0
2	4	Mahoney	Michael	50	270	50	0.00	0
2	4	Krebill	Henry	14	146	14	2.00	100
2	4	Kelley	Jacob	300	312	8	0.00	100

ED	P	LAST_NAME	FIRST_NAME	AC_MOWN	AC_UNMOWN	TONS_HAY	AC_POTATOE	BUSH_POTAT
2	4	Herman	John	0	0	0	0.00	0
2	5	Baker	David	200	520	200	0.00	0
2	6	Duberry	Willa	0	0	0	0.00	0
2	6	Duberry	Lilley	20	740	20	1.00	50
2	6	Williams	John	40	400	40	1.00	50
2	6	Allen	?	40	280	60	3.00	160
2	6	Allen	Addie	5	75	5	0.50	150
2	6	Farnum	WM.R.	30	290	60	0.00	0
2	6	Bonis	Lawrence	30	830	60	0.00	0
2	6	Packer	G.W.	200	0	200	0.00	0
2	6	Hawkins	Joseph	10	70	10	0.00	0
2	6	Link	James R.	150	370	150	0.00	0
2	7	Borden	Timothy	0	1160	200	0.00	0
2	7	?	John	10	310	10	0.00	0
2	7	Stout	Albert	0	0	0	0.00	0
2	7	Slater	S.S.	600	1900	500	0.00	0
2	7	Wilson	W.V.	0	0	0	0.00	0
2	7	Crosier	Edwin R.	100	220	100	0.00	0
2	7	McCartney	WM.	300	190	250	0.00	0
2	7	Borden	Mary	100	2100	100	0.00	0
2	7	Troppe	George	80	360	168	0.00	0
2	7	Dunbar	Thomas	30	1570	40	0.00	0
2	8	Dunbar	James	25	415	25	0.00	0
2	8	Dunbar	Charles	20	300	20	0.00	0
2	8	Pike	E.	100	180	135	0.00	0
2	8	Miller	WM.	50	110	50	0.00	0
2	8	Monaghan	Peter	100	200	100	0.00	0
2	8	Coats	Raymond	0	0	0	0.00	0
2	8	Whitten, Geddes		275	525	275	0.00	0
2	8	?	Henry	50	110	50	0.00	0
2	8	Ratcliff	Benjamin	65	1225	150	0.00	0
2	8	Lee	James	25	295	20	0.00	0
2	9	Case	E.L.	250	230	150	0.00	0
2	9	Wyatt	John	0	0	0	0.00	0
2	9	Baker	David	200	320	200	0.00	0
2	9	Harriman	Clark	100	60	75	0.00	0
2	9	Litmer	Fred J.	300	340	250	0.00	0
2	9	Craig	W.H.	130	30	100	0.00	0
2	9	Head	W.R.	500	500	500	0.00	0
2	9	Crockett	Joseph	300	400	300	0.00	0
2	9	Read	Edwin F.	100	100	100	0.00	0
2	9	Tyler	Samuel	260	200	175	0.00	0
2	10	McCartney	Frank W.	50	110	50	0.00	0
2	10	Lasell	Samuel	100	60	70	0.00	0
2	10	Peabody	Lelon	100	190	60	0.00	0
2	10	Holthusen	WM. M.	35	285	35	0.00	0
2	10	Votz	John	90	230	75	0.00	0
2	10	Shattinger	Henry	100	540	100	0.00	0
2	10	Hyatt	Thomas	100	0	4	0.00	0
2	10	Smith	James J.	3	0	4	1.00	175

ED	P	LAST_NAME	FIRST_NAME	AC_MOUN	AC_UNMOUN	TONS_HAY	AC_POTATOE	BUSH_POTAT
2	10	Stow	WM. J.	0	0	0	0.00	0
2	10	Kline	David	0	0	0	0.00	0
2	14	Lavack	Charles	100	220	100	0.00	0
2	14	Bolinger	Webster	150	930	150	0.00	0
2	14	Wadsworth	Frederick M.	50	700	50	0.00	0
2	14	Reichenecker	Albert	10	1191	7	0.00	0
2	14	Link, Lee	James, WM.	50	640	50	0.00	0
2	14	Nickerson	Charles	0	0	0	4.00	464
2	14	Burns	WM. M.	150	250	150	0.00	0
2	14	O'Neil	Daniel	150	690	150	0.00	0
				0	0	0	0.00	0
				12341	46947	11665	81.00	5296

## PART IV

1885 CENSUS  
PRODUCE

ED	P	LAST_NAME	FIRST_NAME	HORSES	MULES	OXEN	MILCHCOWS	OTHER_COWS	SHEEP	SWINE	POULTRY
1	1	Lowe	Charles W.	13	1	7	5	28	Y	0	8
1	1	Humferson	Edgar	10	0	2	3	0	N	0	4
1	1	Sweet	J.K.	20	0	0	12	0	N	0	50
1	1	Radford	M.C.	3	0	0	17	60	N	0	0
1	1	Dixon	J.M.	8	4	0	7	50	N	0	9
1	1	Parmelle	J.D.	0	2	0	12	35	N	1	40
1	1	Shoemaker	R.P.	7	2	0	3	22	N	0	0
1	1	Haver	L.C.	50	0	0	0	800	N	0	12
1	1	Sweek	J.L.	15	0	0	3	1000	N	0	30
1	1	Funk	W.H.	4	1	0	10	40	N	0	5
1	2	Mulock	J.P.	75	0	0	1	6000	N	2	25
1	2	Abrams	Clara	0	0	0	0	0	N	0	0
1	2	Asher	J.R.	2	1	0	0	0	N	0	0
1	2	Lloyd	W.C.	0	0	0	5	0	N	0	15
1	2	Aulstrum	E.M.	21	5	0	5	20	Y	12	56
1	2	Scott	Mrs. S.A.	5	0	0	3	500	N	1	12
1	2	Davis	Charles	4	0	0	5	50	N	3	20
1	2	Goodnight	Joseph	5	1	0	8	1	N	1	40
1	2	Dell	Mary	4	0	0	4	11	N	8	40
1	3	Littleton	W.A.	10	2	0	10	225	N	0	44
1	3	Tremayne	Richard	10	0	0	15	450	N	9	50
1	3	Hartsell	Joseph	4	0	0	15	125	N	1	0
1	3	Bender	John	8	0	0	12	300	N	1	6
1	3	Berry	WM.	6	0	0	20	70	N	1	24
1	3	?		3	0	0	2	48	N	1	12
1	3	Witcher	John R.	40	0	0	21	1200	N	0	0
1	3	?		11	0	0	0	193	N	0	24
1	3	O'Brien	John	40	0	0	0	400	N	0	0
1	3	Gross	Thomas	11	0	0	6	100	N	2	10
1	4	Tremayne	Harry	8	0	0	8	42	N	0	24
1	4	Turner	Charles	12	0	0	0	0	N	0	0
1	4	Robbins	Thomas	23	0	0	7	250	Y	1	25
1	4	Sims	J.B.	30	0	0	9	400	N	0	15
1	4	Pruden	L.H.	12	0	0	4	6	N	0	12
1	4	Russel	R.B.	5	1	0	6	60	Y	2	50
1	4	Hartsell	Samuel	75	4	0	20	1000	Y	5	50
1	4	Rickard	W.B.	7	0	0	50	50	N	0	24
1	4	Risner	WM.	0	0	0	3	3	N	1	33
1	4	Donovan	A.C.	25	0	0	3	200	N	0	0
1	5	Guiraud	Louis	45	0	0	5	13	Y	0	100
1	5	Rinehart	P.F.	65	0	0	6	500	N	3	50
1	5	Eulor	?P.	4	0	0	0	0	N	0	12
1	5	Alden	E.	15	0	0	3	7	N	3	8
1	5	Dudley	Geo.	16	0	0	5	9	N	0	12
1	5	Milligan	Jas.	2	0	0	4	14	N	1	18
1	5	Fiffe	Obe.	18	0	0	0	0	N	0	0

ED	P	LAST_NAME	FIRST_NAME	HORSES	MULES	OXEN	MILCHCOWS	OTHER_COWS	SHEEP	SWINE	POULTRY
1	5	Rich	N.A.	15	4	0	12	100	N	0	0
1	5	Binkley	John	14	0	0	16	300	N	0	0
1	6	Johnston	Oliver	0	2	0	15	36	N	10	6
1	6	Johnston	WM.	3	0	0	0	0	N	0	0
1	6	Nelson	Lars	1	2	4	15	21	N	2	24
1	6	Weston	Geo.	6	0	0	3	197	N	0	12
1	6	Weaver	Jos.	7	0	0	11	34	N	2	24
1	6	Miller	David	12	2	0	5	165	N	0	6
1	6	Merts	WM.	9	0	0	5	90	N	4	15
1	6	Rogers	Jas. E.	50	0	0	0	0	N	0	0
1	6			5	0	0	4	80	N	0	0
1	6	Smith, Purcell		8	0	0	0	0	N	0	0
1	7	Eddy Brothers		65	0	0	0	2176		0	0
1	7	Becham	Henry C.	38	0	0	0	800		0	0
1	7	Tremayne	John	3	0	0	0	0		0	12
2	1	Wadley	Mary & Sons	15	0	6	3	5	Y	0	15
2	1	Spurlock	Obediah	35	0	0	0	0	N	0	0
2	1	Chalmers	Harold	15	0	0	0	0	N	0	0
2	1	Guiraud	Mary	0	0	6	7	600	Y	3	20
2	1	Guiraud	Joseph	0	0	0	0	0	N	0	0
2	1	Guiraud	Joseph	0	0	0	0	0	N	0	0
2	2	Feringer, Rink		11	0	0	1	2	Y	1	7
2	2	Rishaburger	Henry	8	0	0	4	250	N	2	21
2	2	Harrington	J.C.	25	2	0	0	0	N	7	50
2	2	Spinney	Benjamin F.	28	0	0	6	150	N	0	0
2	2	Rogers	Joseph	30	1	0	20	400	Y	0	40
2	2	Rayner	James B.	20	0	0	14	600	N	0	0
2	2	?		4	0	0	13	19	N	2	30
2	2	Stoll	Frederick	13	0	0	15	94	N	1	13
2	2	Smith	E.J.	0	0	0	0	40	N	0	65
2	2	Swan	Richard	8	0	0	35	38	Y	0	0
2	3	Bysong	Joseph	7	0	0	10	15	N	0	0
2	3	Clarkson	Ann	6	1	0	25	27	N	10	40
2	3	Vermillion	WM.	0	0	0	0	0	N	0	0
2	3	Stoll	Frank	1	1	0	3	10	N	0	24
2	3	Messenger	Ortero	3	1	0	3	0	N	0	0
2	3	Horn	John	0	0	0	3	13	N	3	12
2	3	Pulver	Frank C.	15	0	0	4	4	N	1	30
2	3	North	George	0	0	0	2	5	N	0	0
2	3	Row	John	2	0	0	0	0	N	0	0
2	4	Fluman	Gottlieb	0	0	0	20	100	N	0	0
2	4	Badger	John	17	0	0	6	19	N	0	0
2	4	Hiwan	Thomas	2	0	0	7	31	N	0	0
2	4	McLaughlin	Sarah A.	14	0	0	18	57	N	0	19
2	4	Krebill	Henry	11	0	0	12	0	N	0	0
2	4	?	Alexander	1	0	0	13	18	N	0	0
2	4	Mahoney	Michael	10	0	0	0	60	N	0	0
2	4	Krebill	Henry	10	0	0	2	2	N	0	18
2	4	Kelley	Jacob	6	0	0	10	117	N	0	40
2	4	Herman	John	1	0	0	0	0	N	0	0
2	5	Baker	David	6	0	0	0	0	N	0	0

ED	P	LAST_NAME	FIRST_NAME	HORSES	MULES	OXEN	MILCHCOWS	OTHER_COWS	SHEEP	SWINE	POULTRY
2	6	Duberry	Willa	4	0	0	5	201	N	0	20
2	6	Duberry	Lilley	6	0	0	4	96	N	1	27
2	6	Williams	John	4	2	0	12	92	N	0	60
2	6	Allen	?	4	4	0	22	33	N	5	20
2	6	Allen	Addie	0	0	0	4	8	N	1	15
2	6	Farnum	WM. R.	2	0	0	2	7	N	0	0
2	6	Bonis	Lawrence	4	0	0	20	74	N	2	12
2	6	Packer	G.W.	20	0	0	10	400	N	0	30
2	6	Hawkins	Joseph	0	0	0	0	5	N	0	0
2	6	Link	James R.	26	0	0	12	1200	N	0	0
2	7	Borden	Timothy	24	0	0	3	157	N	0	20
2	7	?	John	4	0	0	35	71	N	0	12
2	7	Stout	Albert	2	0	0	2	0	N	0	0
2	7	Slater	S.S.	25	4	0	7	203	N	0	0
2	7	Wilson	W.V.	1	0	0	0	0	N	0	0
2	7	Crosier	Edwin R.	10	1	0	8	47	N	1	18
2	7	McCartney	WM.	20	0	0	25	75	N	8	30
2	7	Borden	Mary	21	1	0	6	114	N	2	15
2	7	Troppe	George	8	0	0	18	54	N	0	16
2	7	Dunbar	Thomas	25	0	0	12	238	N	1	25
2	8	Dunbar	James	11	0	0	6	65	N	2	0
2	8	Dunbar	Charles	8	0	0	0	0	N	0	0
2	8	Pike	E.	13	0	0	5	15	N	0	26
2	8	Miller	WM.	0	0	0	5	25	N	0	0
2	8	Monaghan	Peter	8	0	0	40	5	N	0	0
2	8	Coats	Raymond	8	0	0	10	10	N	0	10
2	8	Whitten, Geddes		10	1	0	6	81	N	2	19
2	8	?	Henry	2	0	0	3	22	N	0	0
2	8	Ratcliff	Benjamin	4	0	0	20	30	N	0	0
2	8	Lee	James	15	0	0	12	55	N	11	24
2	9	Case	E.L.	11	0	0	10	90	Y	2	12
2	9	Wyatt	John	7	4	0	35	65	N	2	6
2	9	Baker	David	6	0	0	2	18	N	0	0
2	9	Harriman	Clark	7	0	0	5	145	N	0	0
2	9	Litmer	Fred J.	6	0	0	32	85	N	0	30
2	9	Craig	W.H.	10	0	0	0	10	N	1	12
2	9	Head	W.R.	11	0	0	8	6	N	0	0
2	9	Crockett	Joseph	12	0	0	5	195	N	0	18
2	9	Read	Edwin F.	2	0	0	2	15	N	0	14
2	9	Tyler	Samuel	5	0	0	10	25	N	0	12
2	10	McCartney	Frank W.	2	0	0	2	0	N	0	0
2	10	Lasell	Samuel	0	0	0	12	88	N	2	50
2	10	Peabody	Lelon	4	0	0	7	8	N	2	24
2	10	Holthusen	WM. M.	2	0	0	13	57	N	0	20
2	10	Votz	John	3	0	0	10	20	N	0	12
2	10	Shattinger	Henry	7	0	0	4	10	N	0	0
2	10	Hyatt	Thomas	6	0	0	4	4	N	0	22
2	10	Smith	James J.	6	0	0	2	2	N	0	18
2	10	Stow	WM. J.	0	0	0	5	8	N	0	12
2	10	Kline	David	1	30	0	6	32	N	0	0
2	14	Lavack	Charles	9	0	0	1	64	N	0	0

ED	P	LAST_NAME	FIRST_NAME	HORSES	MULES	OXEN	MILCHCOWS	OTHER_COWS	SHEEP	SWINE	POULTRY
2	14	Bolinger	Webster	0	0	0	0	0	N	0	0
2	14	Wadsworth	Frederick M.	10	0	0	30	90	N	0	0
2	14	Reichenecker	Albert	3	0	0	18	32	N	0	0
2	14	Link, Lee	James, WM.	5	0	0	0	32	N	0	0
2	14	Nickerson	Charles	2	0	0	12	28	N	0	0
2	14	Burns	WM. M.	16	0	0	0	0	N	0	0
2	14	O'Neil	Daniel	17	0	0	5	35	N	0	0
1	5	Alden	Howell	15	0	0	6	10	N	0	12
				1785	87	25	1239	25514		152	2185

## APPENDIX E

### DIVERSIONS, SOUTH PARK DITCHES, 1950-1992

The last of the appendices, the Diversions Database summarizes information about the use of South Park ditches. In Part I, total diversions under each water right are presented decade by decade. In Part II, the amount of land irrigated under each water right and the amount of water applied on an annual basis are summarized decade by decade. The averages in Part II include data for only those years the ditches were in actual use.

Not all ditches in South Park were monitored by the local water commissioner on a regular basis. For some ditches virtually no documentation of use exists, though the ditches were active in irrigating South Park meadows from the time of their inception.

All the information in this section is derived from the records of the Colorado State Engineer - the annual summaries of diversions submitted by local water commissioners, housed in the offices of the Department of Natural Resources in Denver.

Column headings are coded as follows:

DITCH	Name of Ditch
TRANSFER	Name of Transfer
PN	Priority Number
AF_SUM_50s	Sum of Diversions (in acre feet) - 1950s
AF_SUM_60s	Sum of Documented Diversions - 1960s
AF_SUM_70s	Sum of Documented Diversions - 1970s
AF_SUM_80s	Sum of Documented Diversions - 1980s
AF_SUM_90s	Sum of Documented Diversions - 1990s
AC_AVG 1950s	Average Number of Acres Irrigated - 50s

AF_AVG 1950s	Average Amount of Water Diverted (in acre feet) - 1950s
AC_AVG 1960s	Average Acres Irrigated - 1960s
AF_AVG 1960s	Average Water Diverted - 1960s
AC_AVG 1970s	Average Acres Irrigated - 1970s
AF_AVG 1970s	Average Water Diverted - 1970s
AC_AVG 1980s	Average Acres Irrigated - 1980s
AF_AVG 1980s	Average Water Diverted - 1980s
AC_AVG 1990s	Average Acres Irrigated - 1990s
AF_AVG 1990s	Average Water Diverted - 1990s

Under Total Diversions, when numbers decline over time (for example: drop from 4300 in the 1950s, 60s, and 70s, to 1400 in the 1980s), it suggests that the ditch has been transferred out of irrigation and to municipal use. In the case of junior water rights, the decline sometimes suggests improved enforcement.

The information in the Diversions Database can be linked with the Ditches Database in Appendix C.

# PART I

## TOTAL DIVERSIONS SOUTH PARK DITCHES 1950 - 1992

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Alden & Milligan	Augustine	22	5586	5586	5586	5586	5586
Alden & Milligan	High Creek	22	5586	5586	5586	5586	5586
Alkaline	Platte Ansley	205	60	60	60	60	60
Anchor	Janitell	100	4358	4358	4358	4358	4358
Anderson	Coil	135	5306	5306	5306	5306	5306
Anderson Brewer		54	4240	4240	4240	4240	4240
Anderson Brewer		145	3256	3256	3256	3256	3256
Anderson No. 1 (No. 2)	Coil	48	6650	6650	6650	6650	6650
Anderson No. 3	Coil	21	5926	5926	5926	5926	5926
Antero Feeder			0	0	0	0	0
Baker		88	0	0	0	0	0
Baker & Lilley	Johnson, Ralph	51	0	0	0	0	0
Baker & Lilley		51	0	0	0	0	0
Balm of Gilead	Huron	65	0	0	0	0	0
Baton		335	0	0	0	0	0
Beaver	Rocker 7		0	0	0	0	0
Beaver Creek		187	0	0	0	0	0
Beery	Beery	1	18436	18436	18436	18436	18436
Binkley	Black Mountain	107	5426	5426	5426	5426	5426
Binkley No. 2	Black Mountain	92	452	452	452	452	452
Bonnell	Platte Ansley	159	8674	8674	8674	8674	8674
Bonnell Enl No. 1	Platte Ansley	218	0	0	0	0	0
Borden	Borden	3	0	0	0	0	0
Borden Enl	Rock Creek	109	3610	3610	3610	3610	3610
Borden No. 2	Rock Creek	35	4492	4492	4492	4492	4492
Borden No. 2	Borden	35	4492	4492	4492	4492	4492
Boreas No. 2	Link		0	0	0	0	0
Brownlow & Stephens	Beery	29	3432	3432	3432	3432	3432
Brubaker	Janitell	46	9791	9791	9791	9791	9791
Brubaker	Schattinger	46	9791	9791	9791	9791	9791

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Brubaker		46	9791	9791	9791	9791	9791
Burlingame	McNulty	93	6618	6618	6618	6618	6618
Burlingame	Black Mountain	93	6648	6648	6648	6648	6648
Burlingame No. 2	McNulty	222	429	429	429	429	429
Burlingame No. 3	McNulty	223	281	281	281	281	281
Burlington Waste	Beery	404	0	0	0	0	0
Burns & Sessions	Janitell	33	8655	8655	8655	8655	8655
Canon	McDowell	7	24784	24784	24784	24784	24784
Central	Huron	77	6826	6826	6826	6826	6826
Chapelle	McNulty	23	600	600	600	600	600
Cheney Spring		381	0	0	0	0	0
Chet No. 1	Rock Creek	A-50	0	0	0	0	0
Chet No. 2	Rock Creek	A-51	0	0	0	0	0
Chet No. 3	Rock Creek	A-52	0	0	0	0	0
Chet No. 4	Rock Creek	A-53	0	0	0	0	0
Chet No. 5	Rock Creek	A-54	0	0	0	0	0
Chet No. 6	Rock Creek	A-55	0	0	0	0	0
Chet No. 7	Rock Creek	A-56	0	0	0	0	0
Chubb	Antero	195	0	0	0	0	0
Cincinnati	Janitell	103	3107	3107	3107	3107	3107
Cincinnati	Schattinger	103	3106	3106	3106	3106	3106
Como Jim	Rogers, Lucinda	209	0	0	0	0	0
Como Res No. 1		380	0	0	0	0	0
Craig	Janitell	158	2590	2590	2590	2590	2590
Crooked Creek		82	0	0	0	0	0
Crosier		4	0	0	0	0	0
Crosier & Hawxhurst	Rocker 7	39	2099	2099	2099	2099	2099
Crosier & Hawxhurst		39	2099	2099	2099	2099	2099
Crosier & Taylor		68	6876	6876	6876	6876	6876
D. F. Miller		174	5008	5008	5008	5008	5008
D. F. Miller No. 1	Coil	141	0	0	0	0	0
Daniel Fyffe	Badger Basin	25	3380	3380	3380	3380	3380
Demick	Teter	37	6335	6335	6335	6335	6335
Demick Enl No. 1	Teter	132	1527	1527	1527	1527	1527
Demick Enl No. 2		150	0	0	0	0	0
Ditch	Coil	212	0	0	0	0	0
Ditch No. 52	Platte Ansley		0	0	0	0	0
Divine Hill	Huron	164	660	660	660	660	660

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Dixon & Decoursey	High Creek		2702	2702	2702	2702	2702
Donovan	Badger Basin	85	6032	6032	6032	6032	6032
Drake	Antero	149	0	0	0	0	0
Drylake Inlet			0	0	0	0	0
Drylake Inlet No. 2		379	0	0	0	0	0
Drylake Res		375	0	0	0	0	0
Dudley	Beery	181	0	0	0	0	0
Dunbar	Collard	55	6608	6608	6608	6608	6608
Dunbar	Collard	55	6608	6608	6608	6608	6608
Dunbar No. 1	Collard	146	2760	2760	2760	2760	2760
Dunbar No. 1	Collard	146	2760	2760	2760	2760	2760
Dunbar No. 2	Rock Creek	129	2772	2772	2772	2772	2772
Dunbar No. 3	Rock Creek	117	1398	1398	1398	1398	1398
Dunbar No. 3	Borden	117	1398	1398	1398	1398	1398
Eagle Rock			0	0	0	0	0
East Side		165	0	0	0	0	0
Edmiston		278	0	0	0	0	0
Edmondson Seepage	Platte Ansley		0	0	0	0	0
Elisha Alden	High Creek	101	10909	10909	10909	10909	10909
Elisha Alden	Augustine	101	10909	10909	10909	10909	10909
Euhler	Badger Basin	395	196	196	196	196	196
Fehringer No. 1	McDowell	38	8706	8706	8706	8706	8706
Fehringer No. 1 Enl No. 1	McDowell	381	0	0	0	0	0
Fehringer No. 1 Enl No. 2	McDowell	A-252	0	0	0	0	0
Fehringer No. 2	McDowell	84	12586	12586	12586	12586	12586
Fehringer No. 2 Enl No. 1	McDowell	384	0	0	0	0	0
Fehringer No. 2 Enl No. 2	McDowell	A-250	0	0	0	0	0
First Field	Badger Basin	399	1336	1336	1336	1336	1336
Flume			0	0	0	0	0
Foster	Huron	66	7606	7606	7606	7606	7606
Four Mile (#176)	Beery	176	848	848	848	848	848
Four Mile (#9)	Four Mile	9	11003	11003	11003	11003	11003
Four Mile No. 1	Badger Basin	303	1420	1420	1420	1420	1420
Four Mile No. 2	Badger Basin	304	836	836	836	836	836
Four Mile, 1st Enl (#190)	Four Mile	190	0	0	0	0	0
Franks	High Creek	78	4380	4380	4380	4380	4380
Fremont	Furnan	236	1988	1988	1988	1988	1988
Fritz	Huron	81	6230	6230	6230	6230	6230

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Funk		336	577	577	577	577	577
Furman Waste Water		414	0	0	0	0	0
Garden		153	0	0	0	0	0
Gibson		130	993	993	993	993	993
Gibson Enl No. 1		175	0	0	0	0	0
Guiraud	McDowell	6	18275	18275	18275	18275	18275
Guiraud 3T	McDowell	6	3564	3564	3564	3564	3564
Guiraud 3T		6	0	0	0	0	0
Guiraud No. 1	McDowell	6	3411	3411	3411	3411	3411
Guiraud No. 1	McDowell	330	416	416	416	416	416
Guiraud No. 2	McDowell	6	3526	3526	3526	3526	3526
Guiraud No. 2	McDowell	368	392	392	392	392	392
Hall No. 1		264	0	0	0	0	0
Hall No. 2		265	0	0	0	0	0
Harland	Indian Mountain	86	8946	8946	8946	8946	8946
Harland Extension	Indian Mountain	191	504	504	504	504	504
Harrington & Rickards	Huron	197	8572	8572	8572	8572	8572
Harrington South	Huron	177	4452	4452	4452	4452	4452
Harris	Badger Basin	138	2468	2468	2468	2468	2468
Harry L. Sweet	Walker	268	0	0	0	0	0
Hartsel Four Mile	Badger Basin	202	2380	2380	2380	2380	2380
Haver No. 1	Walker	20	11253	11253	11253	11253	11253
Haver No. 1		20	11253	11253	11253	11253	11253
Haver No. 2	Walker	64	6568	6568	6568	6568	6568
Haver No. 3	Walker	210	3366	3366	3366	3366	3366
Haver No. 3		210	3366	3366	3366	3366	3366
Hawxhurst	Rocker 7	56	2880	2880	2880	2880	2880
Heeley No. 1		125	0	0	0	0	0
Heeley No. 2		126	0	0	0	0	0
Henry	Schattinger	106	0	0	0	0	0
Henry E. Rogers No. 1	Huron	377	0	0	0	0	0
Henry E. Rogers No. 2	Huron	378	0	0	0	0	0
High Creek No. 2	Badger Basin	302	0	0	0	0	0
High Creek Placer		354	54	54	54	54	54
Holst & Packer		70	6819	6819	6819	6819	6819
Holst No. 1		59	6378	6378	6378	6378	6378
Holst No. 2		97	5728	5728	5728	5728	5728
Holthusen	Johnston, Dixon	54	982	982	982	982	982

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Holthusen	Johnston, Dixon	332	0	0	0	0	0
Holthusen No. 1	Johnston, Dixon	120	0	0	0	0	0
Hopson	Johnston, Dixon	13	0	0	0	0	0
Hopson Enl No. 1	Johnston, Dixon	225	0	0	0	0	0
Hot Springs	Huron	75	10942	10942	10942	10942	10942
Howbert Gulch	Rogers, George	388	0	0	0	0	0
Hubbard	High Creek	60	10638	10638	10638	10638	10638
Hubbard No. 2	McNulty	226	0	0	0	0	0
Island	Walker	63	5922	5922	5922	5922	5922
Island	Jardon	201	0	0	0	0	0
Jackson		279	0	0	0	0	0
Jardon	Huron	A-155	0	0	0	0	0
Jasper		230	0	0	0	0	0
Jefferson Lake		227	0	0	0	0	0
John Radford		217	0	0	0	0	0
Kammer		355	784	784	784	784	784
Kenosha	Rocker 7	196	0	0	0	0	0
Kester Sweet	McNulty	24	22562	22562	22562	22562	22562
Kester Sweet	High Creek	24	22562	22562	22562	22562	22562
Krebill			0	0	0	0	0
Lake	Janitell	A-133	0	0	0	0	0
Lasell	Furman	154	4032	4032	4032	4032	4032
Lavack	Schattinger	74	508	508	508	508	508
Lavack Enl No. 1	Schattinger	87	552	552	552	552	552
Lavack No. 2	Schattinger	80	958	958	958	958	958
Lee No. 1	Rock Creek	61	0	0	0	0	0
Lee No. 2	Rock Creek	72	0	0	0	0	0
Lee No. 3	Rock Creek	192	0	0	0	0	0
Lee No. 4	Rock Creek	194	0	0	0	0	0
Left Hand	Huron	367	0	0	0	0	0
Lilley & Harriman		147	1807	1807	1807	1807	1807
Link		200	3572	3572	3572	3572	3572
Litmer	Janitell	171	990	990	990	990	990
Litmer Enl No. 1		186	0	0	0	0	0
Little Channel	Jardon	157	0	0	0	0	0
Little Channel	Epperson	157	0	0	0	0	0
Love & Raynor	Rogers, George	139	0	0	0	0	0
Love Placer	Four Mile	55	0	0	0	0	0

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Lower Kenosha	Janitell	333	0	0	0	0	0
Main / Hotel	Badger Basin	95	8514	8514	8514	8514	8514
Malice		229	0	0	0	0	0
Marcott			0	0	0	0	0
Marshall			838	838	838	838	838
Mary G. Borden	Rock Creek	36	4382	4382	4382	4382	4382
McCartney	Michigan Creek	199	3683	3683	3683	3683	3683
McCartney		199	3683	3683	3683	3683	3683
McManus	Rock Creek	57	9470	9470	9470	9470	9470
Mesa	Janitell	149A	826	826	826	826	826
Mexican	Badger Basin	193	0	0	0	0	0
Michigan		53	0	0	0	0	0
Michigan Res Feeder		338	0	0	0	0	0
Mikles		168	0	0	0	0	0
Mill	Borden	5	0	0	0	0	0
Miller		174	0	0	0	0	0
Miller & Chapman	Coil	18	7700	7700	7700	7700	7700
Miller & Chapman Ent No. 1	Coil	89	1266	1266	1266	1266	1266
Miller Deyarman	McNulty	320	0	0	0	0	0
Miller Four Mile		358	388	388	388	388	388
Milligan	High Creek	71	4228	4228	4228	4228	4228
Milligan	Augustine	71	4228	4228	4228	4228	4228
Montag Truax		204	1662	1662	1662	1662	1662
Nelson	Augustine	94	0	0	0	0	0
Nelson High Creek	Augustine	198	1814	1814	1814	1814	1814
Nelson No. 2	Augustine	340	0	0	0	0	0
Nelson No. 3	Augustine	347	0	0	0	0	0
O'Brien		182	0	0	0	0	0
O'Neil	Janitell	98	4924	4924	4924	4924	4924
Ohler	Janitell	228	1292	1292	1292	1292	1292
Ohler Gulch	Janitell	83	0	0	0	0	0
Packer	Michigan Creek	123	3521	3521	3521	3521	3521
Packer & Bonis		45	0	0	0	0	0
Packer & Bonis Ent No. 1		73	0	0	0	0	0
Park	Coil	166	4832	4832	4832	4832	4832
Park Gulch		189	0	0	0	0	0
Park Gulch Ent No. 1			0	0	0	0	0
Parmalee & Shoemaker Ent No. 1		121	0	0	0	0	0

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Parmalee & Shoemaker No. 1	Walker	47	8789	8789	8789	8789	8789
Parmalee & Shoemaker No. 2	Walker	76	9999	9999	9999	9999	9999
Parmalee & Shoemaker No. 3	Walker	62	5722	5722	5722	5722	5722
Peabody	Johnston, Dixon	112	1920	1920	1920	1920	1920
Peabody No. 2	Johnston, Dixon	140	2157	2157	2157	2157	2157
Peabody No. 3		206	1426	1426	1426	1426	1426
Pearl Lower	Four Mile	211	1698	1698	1698	1698	1698
Pearl Spring	Four Mile	A-45	0	0	0	0	0
Pearl Upper	Four Mile	224	862	862	862	862	862
Perkins Gulch	Rogers, George	376	0	0	0	0	0
Petrie		118	4098	4098	4098	4098	4098
Pierce	Huron	124	6548	6548	6548	6548	6548
Platte Station		115	3534	3534	3534	3534	3534
Platte Station Enl No. 1		144	0	0	0	0	0
Prince	Augustine	10	13513	13513	13513	13513	13513
Prince Enl No. 1	Augustine	58	0	0	0	0	0
Pruden	Huron	30	0	0	0	0	0
Radford & Wright		152	0	0	0	0	0
Randall		91	9362	9362	9362	9362	9362
Randall & Nicholas	Janitell	34	8174	8174	8174	8174	8174
Randall Enl No. 1		133	1642	1642	1642	1642	1642
Ratcliff No. 1	Rock Creek	12	0	0	0	0	0
Ratcliff No. 2	Rock Creek	17	0	0	0	0	0
Ratcliff No. 3	Rock Creek	44	0	0	0	0	0
Ratcliff No. 4	Rock Creek	119	0	0	0	0	0
Ratcliff No. 5	Rock Creek	122	0	0	0	0	0
Ratcliff No. 6	Rock Creek	155	0	0	0	0	0
Ratcliff No. 7	Rock Creek	156	0	0	0	0	0
Ratcliff No. 8	Rock Creek	162	0	0	0	0	0
Ratcliff No. 9	Rock Creek	163	0	0	0	0	0
Raynor & Edmondson No. 1	Platte Ansley	167	4356	4356	4356	4356	4356
Raynor & Edmondson No. 2	Platte Ansley	105	5299	5299	5299	5299	5299
Raynor & Edmondson No. 3	Platte Ansley	170	4168	4168	4168	4168	4168
Raynor & Edmondson No. 4	Platte Ansley	173	980	980	980	980	980
Raynor & Edmondson No. 5	Platte Ansley	169	3842	3842	3842	3842	3842
Rebecca		188	0	0	0	0	0
Redmon		172	2032	2032	2032	2032	2032
Reinhardt No. 1	Augustine	28	12886	12886	12886	12886	12886

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Reinhardt No. 2	Augustine	136	2446	2446	2446	2446	2446
Reinhardt No. 3	Augustine	137	0	0	0	0	0
Reinhardt No. 4	Augustine	67	0	0	0	0	0
Rheinacher	Janitell	A-77	0	0	0	0	0
Rickards Lower	Huron	178	0	0	0	0	0
Robbins No. 1	Rock Creek	A-32	0	0	0	0	0
Robbins No. 1	Huron	266	0	0	0	0	0
Robbins No. 2	Rock Creek	A-33	0	0	0	0	0
Robbins No. 2	Huron	275	0	0	0	0	0
Robbins No. 3	Rock Creek	A-34	0	0	0	0	0
Robbins Sims	Huron	272	0	0	0	0	0
Rock Creek	Rock Creek	14	0	0	0	0	0
Rock Creek Enl	Rock Creek	27	0	0	0	0	0
Rock Creek No. 1	Rock Creek	79	0	0	0	0	0
Rogers & Miller	Black Mountain	236	1042	1042	1042	1042	1042
Rogers (High Creek)	Black Mountain	231	678	678	678	678	678
Rogers (S Fork)	High Creek	114	1364	1364	1364	1364	1364
Rogers North	Huron	99	10748	10748	10748	10748	10748
Rogers North	Rogers, Lucinda	99	10748	10748	10748	10748	10748
Rogers South	Rogers, Lucinda	160	90	90	90	90	90
Sacramento		208	2602	2602	2602	2602	2602
Sadler	Huron	49	8174	8174	8174	8174	8174
Salt Creek		337	0	0	0	0	0
Schattinger	Janitell	183	0	0	0	0	0
Schattinger Waste	Furman	351	0	0	0	0	0
Sessions	Janitell	127	1180	1180	1180	1180	1180
Sheeprock		179	1152	1152	1152	1152	1152
Sigafus	Trout Creek	19	22839	22839	22839	22839	22839
Sigafus Enl No. 1	Trout Creek	43	0	0	0	0	0
Sigafus Enl No. 2	Trout Creek	69	0	0	0	0	0
Sims	Huron	289	0	0	0	0	0
Skelton	Janitell	131	2820	2820	2820	2820	2820
Slater	Indian Mountain	116	3538	3538	3538	3538	3538
Slater		116	3538	3538	3538	3538	3538
Small	McDowell	7	6228	6228	6228	6228	6228
Small	McDowell	8	0	0	0	0	0
Snyder Creek	Rocker 7		0	0	0	0	0
Souders & Wolfe No. 2		128	838	838	838	838	838

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Souders & Wolfe No. 3		214	592	592	592	592	592
Souders & Wolfe No. 4		207	892	892	892	892	892
Souders & Wolfe No. 5		215	696	696	696	696	696
Souders & Wolfe No. 6		213	558	558	558	558	558
South Side Juniors	Black Mountain		0	0	0	0	0
Spring	Huron	338	0	0	0	0	0
Spring Branch	Platte Ansley	104	0	0	0	0	0
Spring No. 1	Huron	293	0	0	0	0	0
Spring No. 2	Huron	295	0	0	0	0	0
St. Charles		180	0	0	0	0	0
Stevens No. 1	Eleven Mile	15	0	0	0	0	0
Stevens No. 2	Eleven Mile	16	0	0	0	0	0
Stevens No. 3	Eleven Mile	26	0	0	0	0	0
Stevens No. 4	Eleven Mile	32	0	0	0	0	0
Tarryall (Ck)		52	0	0	0	0	0
Taylor		90	6256	6256	6256	6256	6256
Taylor's Jefferson Ck		342	840	840	840	840	840
Temple	Four Mile	A-280	0	0	0	0	0
Thompson	Badger Basin	134	10192	10192	10192	10192	10192
Thompson & Radcliff		96	1110	1110	1110	1110	1110
Thorborg		151	0	0	0	0	0
Three Mile	Huron	365	0	0	0	0	0
Three Mile	Badger Basin	400	0	0	0	0	0
Trevan Lower		219	0	0	0	0	0
Trevan Upper		216	0	0	0	0	0
Troppe	Borden	31	0	0	0	0	0
Trout Creek	Trout Creek	2	0	0	0	0	0
Trout Creek		2	0	0	0	0	0
Turner No. 1	Augustine	389	1584	1584	1584	1584	1584
Turner No. 2	Augustine	397	0	0	0	0	0
Turner Seepage	Augustine	380	0	0	0	0	0
W. H. Miller		221	622	622	622	622	622
W. H. Miller No. 2		185	696	696	696	696	696
W. R. Head	Johnson, Ralph	108	2730	2730	2730	2730	2730
W. R. Head No. 2	Johnson, Ralph	203	0	0	0	0	0
W. R. Head No. 3	Johnson, Ralph	142	631	631	631	631	631
W. R. Head No. 4	Johnson, Ralph	143	944	944	944	944	944
Wadley No. 1		40	0	0	0	0	0

DITCH	TRANSFER	PN	AF_SUM_50s	AF_SUM_60s	AF_SUM_70s	AF_SUM_80s	AF_SUM_90s
Wadley No. 2		41	0	0	0	0	0
Wadley No. 3		50	0	0	0	0	0
Warm Springs		129.5	956	956	956	956	956
Weaver No. 1		113	823	823	823	823	823
Weaver No. 2		184	379	379	379	379	379
Weaver No. 3	McNulty	220	477	477	477	477	477
Weed	Rogers, George	42	0	0	0	0	0
Weed	Jardon	102	0	0	0	0	0
Weed	Epperson	102	0	0	0	0	0
Western	Huron	148	10500	10500	10500	10500	10500
Weston		161	2685	2685	2685	2685	2685
Whitten	Michigan Creek	110	4958	4958	4958	4958	4958
Whitten	Janitell	110	4958	4958	4958	4958	4958
Whitten No. 1		321	844	844	844	844	844
Whitten No. 2	Michigan Creek	322	1754	1754	1754	1754	1754
Whitten No. 3	Michigan Creek	323	2268	2268	2268	2268	2268
Whitten No. 4	Michigan Creek	324	480	480	480	480	480
Wilkin	Rock Creek	11	0	0	0	0	0
William A. Thomas	Janitell	276	0	0	0	0	0
Winkler	Black Mountain	297	0	0	0	0	0

# PART II

## ACRES IRRIGATED AND AVERAGE AMOUNT OF WATER DIVERTED SOUTH PARK DITCHES 1950 - 1992

DITCH	TRANSFER	PRIOR_NO	AC_AVG	AF_AVG	AC_AVG	AF_AVG	AC_AVG	AF_AVG	AC_AVG	AF_AVG	AC_AVG	AF_AVG
			1950s	1950s	1960s	1970s	1980s	1990s	1990s	1990s	1990s	1990s
Alden & Milligan	Augustine	22	200.00	558.60	200.00	558.60	200.00	558.60	200.00	558.60	200.00	558.60
Alden & Milligan	High Creek	22	200.00	558.60	200.00	558.60	200.00	558.60	200.00	558.60	200.00	558.60
Alkaline	Platte Ansley	205	100.00	60.00	100.00	60.00	100.00	60.00	100.00	60.00	100.00	60.00
Anchor	Janitell	100	100.00	484.22	100.00	484.22	100.00	484.22	100.00	484.22	100.00	484.22
Anderson	Coil	135	431.25	663.25	431.25	663.25	431.25	663.25	431.25	663.25	431.25	663.25
Anderson Brewer		54	420.60	424.00	420.60	424.00	420.60	424.00	420.60	424.00	420.60	424.00
Anderson Brewer		145	0.00	407.00	0.00	407.00	0.00	407.00	0.00	407.00	0.00	407.00
Anderson No. 1 (No. 2)	Coil	48	311.67	665.00	311.67	665.00	311.67	665.00	311.67	665.00	311.67	665.00
Anderson No. 3	Coil	21	250.00	592.60	250.00	592.60	250.00	592.60	250.00	592.60	250.00	592.60
Antero Feeder			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baker		88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baker & Lilley	Johnson, Ralph	51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baker & Lilley		51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balm of Gilead	Huron	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Baton		335	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver Creek	Rocker 7	187	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beery	Beery	1	840.00	1843.60	840.00	1843.60	840.00	1843.60	840.00	1843.60	840.00	1843.60
Binkley	Black Mountain	107	320.00	602.89	320.00	602.89	320.00	602.89	320.00	602.89	320.00	602.89
Binkley No. 2	Black Mountain	92	320.00	452.00	320.00	452.00	320.00	452.00	320.00	452.00	320.00	452.00
Bonnell	Platte Ansley	159	586.25	1084.25	586.25	1084.25	586.25	1084.25	586.25	1084.25	586.25	1084.25
Bonnell Ent No. 1	Platte Ansley	218	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borden	Borden	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Borden Ent	Rock Creek	109	200.00	401.11	200.00	401.11	200.00	401.11	200.00	401.11	200.00	401.11
Borden No. 2	Rock Creek	35	283.33	449.20	283.33	449.20	283.33	449.20	283.33	449.20	283.33	449.20
Borden No. 2	Borden	35	283.33	449.20	283.33	449.20	283.33	449.20	283.33	449.20	283.33	449.20
Boreas No. 2	Link		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Brownlow & Stephens	Beery	29	266.67	572.00	266.67	572.00	266.67	572.00	266.67	572.00	266.67	572.00
Brubaker	Janitell	46	1500.00	979.10	1500.00	979.10	1500.00	979.10	1500.00	979.10	1500.00	979.10



DITCH	TRANSFER	PRIOR_NO	AC_AVG 1950s	AF_AVG 1950s	AC_AVG 1960s	AF_AVG 1960s	AC_AVG 1970s	AF_AVG 1970s	AC_AVG 1980s	AF_AVG 1980s	AC_AVG 1990s	AF_AVG 1990s
Ditch No. 52	Platte Ansley		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Divine Hill	Huron	164	380.00	220.00	380.00	220.00	380.00	220.00	380.00	220.00	380.00	220.00
Dixon & Decoursey	High Creek		256.25	337.75	256.25	337.75	256.25	337.75	256.25	337.75	256.25	337.75
Donovan	Badger Basin	85	553.33	603.20	553.33	603.20	553.33	603.20	553.33	603.20	553.33	603.20
Drake	Antero	149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drylake Inlet			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drylake Inlet No. 2		379	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Drylake Res		375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dudley	Beery	181	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dunbar	Collard	55	410.00	660.80	410.00	660.80	410.00	660.80	410.00	660.80	410.00	660.80
Dunbar	Collard	55	410.00	660.80	410.00	660.80	410.00	660.80	410.00	660.80	410.00	660.80
Dunbar No. 1	Collard	146	200.00	345.00	200.00	345.00	200.00	345.00	200.00	345.00	200.00	345.00
Dunbar No. 1	Collard	146	200.00	345.00	200.00	345.00	200.00	345.00	200.00	345.00	200.00	345.00
Dunbar No. 2	Rock Creek	129	60.00	308.00	60.00	308.00	60.00	308.00	60.00	308.00	60.00	308.00
Dunbar No. 3	Rock Creek	117	50.00	174.75	50.00	174.75	50.00	174.75	50.00	174.75	50.00	174.75
Dunbar No. 3	Borden	117	50.00	174.75	50.00	174.75	50.00	174.75	50.00	174.75	50.00	174.75
Eagle Rock			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
East Side		165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Edmiston		278	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Edmondson Seepage	Platte Ansley		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elisha Alden	High Creek	101	425.00	1212.11	425.00	1212.11	425.00	1212.11	425.00	1212.11	425.00	1212.11
Elisha Alden	Augustine	101	425.00	1212.11	425.00	1212.11	425.00	1212.11	425.00	1212.11	425.00	1212.11
Euhler	Badger Basin	395	150.00	98.00	150.00	98.00	150.00	98.00	150.00	98.00	150.00	98.00
Fehringer No. 1	McDowell	38	711.11	967.33	711.11	967.33	711.11	967.33	711.11	967.33	711.11	967.33
Fehringer No. 1 Enl No. 1	McDowell	381	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fehringer No. 1 Enl No. 2	McDowell	A-252	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fehringer No. 2	McDowell	84	700.00	1258.60	700.00	1258.60	700.00	1258.60	700.00	1258.60	700.00	1258.60
Fehringer No. 2 Enl No. 1	McDowell	384	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fehringer No. 2 Enl No. 2	McDowell	A-250	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
First Field	Badger Basin	399	187.50	222.67	187.50	222.67	187.50	222.67	187.50	222.67	187.50	222.67
Flume			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foster	Huron	66	550.00	845.11	550.00	845.11	550.00	845.11	550.00	845.11	550.00	845.11
Four Mile (#176)	Beery	176	160.00	169.60	160.00	169.60	160.00	169.60	160.00	169.60	160.00	169.60
Four Mile (#9)	Four Mile	9	420.00	1100.30	420.00	1100.30	420.00	1100.30	420.00	1100.30	420.00	1100.30
Four Mile No. 1	Badger Basin	303	331.00	177.50	331.00	177.50	331.00	177.50	331.00	177.50	331.00	177.50
Four Mile No. 2	Badger Basin	304	90.00	104.50	90.00	104.50	90.00	104.50	90.00	104.50	90.00	104.50
Four Mile, 1st Ent (#190)	Four Mile	190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DITCH	TRANSFER	PRIOR_NO	AC_AVG 1950s	AF_AVG 1950s	AC_AVG 1960s	AF_AVG 1960s	AC_AVG 1970s	AF_AVG 1970s	AC_AVG 1980s	AF_AVG 1980s	AC_AVG 1990s	AF_AVG 1990s
Frankie	High Creek	78	411.11	486.67	411.11	486.67	411.11	486.67	411.11	486.67	411.11	486.67
Fremont	Furman	236	750.00	284.00	750.00	284.00	750.00	284.00	750.00	284.00	750.00	284.00
Fritz	Huron	81	250.00	623.00	250.00	623.00	250.00	623.00	250.00	623.00	250.00	623.00
Funk		336	0.00	577.00	0.00	577.00	0.00	577.00	0.00	577.00	0.00	577.00
Furman Waste Water		414	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Garden		153	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gibson		130	60.00	124.13	60.00	124.13	60.00	124.13	60.00	124.13	60.00	124.13
Gibson Ent. No. 1		175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Guiraud	McDowell	6	400.00	1827.50	400.00	1827.50	400.00	1827.50	400.00	1827.50	400.00	1827.50
Guiraud 3T	McDowell	6	0.00	891.00	0.00	891.00	0.00	891.00	0.00	891.00	0.00	891.00
Guiraud 3T		6	137.50	0.00	137.50	0.00	137.50	0.00	137.50	0.00	137.50	0.00
Guiraud No. 1	McDowell	6	0.00	379.00	0.00	379.00	0.00	379.00	0.00	379.00	0.00	379.00
Guiraud No. 1	McDowell	330	110.10	208.00	110.10	208.00	110.10	208.00	110.10	208.00	110.10	208.00
Guiraud No. 2	McDowell	6	0.00	391.78	0.00	391.78	0.00	391.78	0.00	391.78	0.00	391.78
Guiraud No. 2	McDowell	368	125.00	392.00	125.00	392.00	125.00	392.00	125.00	392.00	125.00	392.00
Hall No. 1		264	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hall No. 2		265	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Harland	Indian Mountain	86	850.00	894.60	850.00	894.60	850.00	894.60	850.00	894.60	850.00	894.60
Harland Extension	Indian Mountain	191	0.00	168.00	0.00	168.00	0.00	168.00	0.00	168.00	0.00	168.00
Harrington & Rickards	Huron	197	583.33	857.20	583.33	857.20	583.33	857.20	583.33	857.20	583.33	857.20
Harrington South	Huron	177	322.50	445.20	322.50	445.20	322.50	445.20	322.50	445.20	322.50	445.20
Harrie	Badger Basin	138	150.00	308.50	150.00	308.50	150.00	308.50	150.00	308.50	150.00	308.50
Harry L. Sweet	Walker	268	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hartsel Four Mile	Badger Basin	202	264.29	340.00	264.29	340.00	264.29	340.00	264.29	340.00	264.29	340.00
Haver No. 1	Walker	20	180.00	1125.30	180.00	1125.30	180.00	1125.30	180.00	1125.30	180.00	1125.30
Haver No. 1		20	180.00	1125.30	180.00	1125.30	180.00	1125.30	180.00	1125.30	180.00	1125.30
Haver No. 2	Walker	64	200.00	656.80	200.00	656.80	200.00	656.80	200.00	656.80	200.00	656.80
Haver No. 3	Walker	210	311.67	561.00	311.67	561.00	311.67	561.00	311.67	561.00	311.67	561.00
Haver No. 3		210	311.67	561.00	311.67	561.00	311.67	561.00	311.67	561.00	311.67	561.00
Hawxhurst	Rocker 7	56	224.44	288.00	224.44	288.00	224.44	288.00	224.44	288.00	224.44	288.00
Heeley No. 1		125	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heeley No. 2		126	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Henry	Schattinger	106	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Henry E. Rogers No. 1	Huron	377	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Henry E. Rogers No. 2	Huron	378	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Creek No. 2	Badger Basin	302	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High Creek Placer		354	190.00	54.00	190.00	54.00	190.00	54.00	190.00	54.00	190.00	54.00

DITCH	TRANSFER	PRIOR_NO	AC_AVG		AF_AVG		AC_AVG		AF_AVG		AC_AVG		AF_AVG		AC_AVG		AF_AVG	
			1950s	1950s	1950s	1950s	1960s	1960s	1960s	1960s	1970s	1970s	1970s	1970s	1980s	1980s	1980s	1990s
Holst & Packer		70	200.00	681.90	200.00	681.90	200.00	681.90	200.00	681.90	200.00	681.90	200.00	681.90	200.00	681.90	200.00	681.90
Holst No. 1		59	300.00	637.80	300.00	637.80	300.00	637.80	300.00	637.80	300.00	637.80	300.00	637.80	300.00	637.80	300.00	637.80
Holst No. 2		97	200.00	716.00	200.00	716.00	200.00	716.00	200.00	716.00	200.00	716.00	200.00	716.00	200.00	716.00	200.00	716.00
Holthusen	Johnston, Dixon	54	245.00	196.40	245.00	196.40	245.00	196.40	245.00	196.40	245.00	196.40	245.00	196.40	245.00	196.40	245.00	196.40
Holthusen	Johnston, Dixon	332	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Holthusen No. 1	Johnston, Dixon	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hopson	Johnston, Dixon	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hopson Enl No. 1	Johnston, Dixon	225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hot Springs	Huron	75	530.00	1094.20	530.00	1094.20	530.00	1094.20	530.00	1094.20	530.00	1094.20	530.00	1094.20	530.00	1094.20	530.00	1094.20
Howbert Gulch	Rogers, George	388	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hubbard	High Creek	60	520.00	1063.80	520.00	1063.80	520.00	1063.80	520.00	1063.80	520.00	1063.80	520.00	1063.80	520.00	1063.80	520.00	1063.80
Hubbard No. 2	McNulty	226	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Island	Walker	63	125.00	592.20	125.00	592.20	125.00	592.20	125.00	592.20	125.00	592.20	125.00	592.20	125.00	592.20	125.00	592.20
Island	Jardon	201	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jackson		279	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jardon	Huron	A-155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jasper		230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jefferson Lake		227	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
John Radford		217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kammer		355	43.33	261.33	43.33	261.33	43.33	261.33	43.33	261.33	43.33	261.33	43.33	261.33	43.33	261.33	43.33	261.33
Kenosha	Rocker 7	196	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kester Sweet	McNulty	24	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20
Kester Sweet	High Creek	24	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20	1048.00	2256.20
Krabill			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lake	Janitell	A-133	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lasell	Furman	154	164.29	576.00	164.29	576.00	164.29	576.00	164.29	576.00	164.29	576.00	164.29	576.00	164.29	576.00	164.29	576.00
Lavack	Schattinger	74	0.00	254.00	0.00	254.00	0.00	254.00	0.00	254.00	0.00	254.00	0.00	254.00	0.00	254.00	0.00	254.00
Lavack Enl No. 1	Schattinger	87	0.00	276.00	0.00	276.00	0.00	276.00	0.00	276.00	0.00	276.00	0.00	276.00	0.00	276.00	0.00	276.00
Lavack No. 2	Schattinger	80	425.00	239.50	425.00	239.50	425.00	239.50	425.00	239.50	425.00	239.50	425.00	239.50	425.00	239.50	425.00	239.50
Lee No. 1	Rock Creek	61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lee No. 2	Rock Creek	72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lee No. 3	Rock Creek	192	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lee No. 4	Rock Creek	194	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Left Hand	Huron	367	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lilley & Harriman		147	100.00	200.78	100.00	200.78	100.00	200.78	100.00	200.78	100.00	200.78	100.00	200.78	100.00	200.78	100.00	200.78
Link		200	305.56	396.89	305.56	396.89	305.56	396.89	305.56	396.89	305.56	396.89	305.56	396.89	305.56	396.89	305.56	396.89
Litmer	Janitell	171	131.43	123.75	131.43	123.75	131.43	123.75	131.43	123.75	131.43	123.75	131.43	123.75	131.43	123.75	131.43	123.75

DITCH	TRANSFER	PRIOR_NO	AC_AVG 1950s	AF_AVG 1950s	AC_AVG 1960s	AF_AVG 1960s	AC_AVG 1970s	AF_AVG 1970s	AC_AVG 1980s	AF_AVG 1980s	AC_AVG 1990s	AF_AVG 1990s
Litmer Ent No. 1		186	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Little Channel	Jardon	157	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Little Channel	Epperson	157	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Love & Raynor	Rogers, George	139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lowe Placer	Four Mile	55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lower Kenosha	Janitell	333	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Main / Hotel	Badger Basin	95	760.00	851.40	760.00	851.40	760.00	851.40	760.00	851.40	760.00	851.40
Malice		229	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marcott			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Marshall			150.00	167.60	150.00	167.60	150.00	167.60	150.00	167.60	150.00	167.60
Mary G. Borden	Rock Creek	36	206.25	438.20	206.25	438.20	206.25	438.20	206.25	438.20	206.25	438.20
McCartney	Michigan Creek	199	1050.00	368.30	1050.00	368.30	1050.00	368.30	1050.00	368.30	1050.00	368.30
McCartney		199	1050.00	368.30	1050.00	368.30	1050.00	368.30	1050.00	368.30	1050.00	368.30
McManus	Rock Creek	57	210.00	947.00	210.00	947.00	210.00	947.00	210.00	947.00	210.00	947.00
Mesa	Janitell	149A	48.00	165.20	48.00	165.20	48.00	165.20	48.00	165.20	48.00	165.20
Mexican	Badger Basin	193	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Michigan		53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Michigan Res Feeder		338	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mikles		168	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mill	Borden	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miller		174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miller & Chapman	Coil	18	400.00	770.00	400.00	770.00	400.00	770.00	400.00	770.00	400.00	770.00
Miller & Chapman Ent No. 1	Coil	89	300.00	126.60	300.00	126.60	300.00	126.60	300.00	126.60	300.00	126.60
Miller Deyarman	McNulty	320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miller Four Mile		358	100.00	97.00	100.00	97.00	100.00	97.00	100.00	97.00	100.00	97.00
Milligan	High Creek	71	335.00	422.80	335.00	422.80	335.00	422.80	335.00	422.80	335.00	422.80
Milligan	Augustine	71	335.00	422.80	335.00	422.80	335.00	422.80	335.00	422.80	335.00	422.80
Montag Truax		204	120.00	237.43	120.00	237.43	120.00	237.43	120.00	237.43	120.00	237.43
Nelson	Augustine	94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nelson High Creek	Augustine	198	300.00	259.14	300.00	259.14	300.00	259.14	300.00	259.14	300.00	259.14
Nelson No. 2	Augustine	340	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nelson No. 3	Augustine	347	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O'Brien		182	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O'Neil	Janitell	98	500.00	547.11	500.00	547.11	500.00	547.11	500.00	547.11	500.00	547.11
Ohler	Janitell	228	240.00	161.50	240.00	161.50	240.00	161.50	240.00	161.50	240.00	161.50
Ohler Gulch	Janitell	83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Packer	Michigan Creek	123	1050.00	352.10	1050.00	352.10	1050.00	352.10	1050.00	352.10	1050.00	352.10

DITCH	TRANSFER	PRIOR_NO	AC_AVG 1950s	AF_AVG 1950s	AC_AVG 1960s	AF_AVG 1960s	AC_AVG 1970s	AF_AVG 1970s	AC_AVG 1980s	AF_AVG 1980s	AC_AVG 1990s	AF_AVG 1990s
Packer & Bonis		45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Packer & Bonis Ent No. 1		73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Park	Coil	166	500.00	604.00	500.00	604.00	500.00	604.00	500.00	604.00	500.00	604.00
Park Gulch		189	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Park Gulch Ent No. 1			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parmalee & Shoemaker Ent No. 1		121	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Parmalee & Shoemaker No. 1	Walker	47	300.00	878.90	300.00	878.90	300.00	878.90	300.00	878.90	300.00	878.90
Parmalee & Shoemaker No. 2	Walker	76	520.00	999.90	520.00	999.90	520.00	999.90	520.00	999.90	520.00	999.90
Parmalee & Shoemaker No. 3	Walker	62	200.00	635.78	200.00	635.78	200.00	635.78	200.00	635.78	200.00	635.78
Peabody	Johnston, Dixon	112	127.78	213.33	127.78	213.33	127.78	213.33	127.78	213.33	127.78	213.33
Peabody No. 2	Johnston, Dixon	140	169.44	239.67	169.44	239.67	169.44	239.67	169.44	239.67	169.44	239.67
Peabody No. 3		206	100.00	237.67	100.00	237.67	100.00	237.67	100.00	237.67	100.00	237.67
Peart Lower	Four Mile	211	100.00	283.00	100.00	283.00	100.00	283.00	100.00	283.00	100.00	283.00
Peart Spring	Four Mile	A-45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Peart Upper	Four Mile	224	100.00	123.14	100.00	123.14	100.00	123.14	100.00	123.14	100.00	123.14
Perkins Gulch	Rogers, George	376	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Petrie		118	560.00	455.33	560.00	455.33	560.00	455.33	560.00	455.33	560.00	455.33
Pierce	Huron	124	350.00	935.43	350.00	935.43	350.00	935.43	350.00	935.43	350.00	935.43
Platte Station		115	340.00	504.86	340.00	504.86	340.00	504.86	340.00	504.86	340.00	504.86
Platte Station Ent No. 1		144	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prince	Augustine	10	480.00	1351.30	480.00	1351.30	480.00	1351.30	480.00	1351.30	480.00	1351.30
Prince Ent No. 1	Augustine	58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pruden	Huron	30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Radford & Wright		152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Randall		91	1000.00	936.20	1000.00	936.20	1000.00	936.20	1000.00	936.20	1000.00	936.20
Randall & Nicholas	Janitell	34	900.00	817.40	900.00	817.40	900.00	817.40	900.00	817.40	900.00	817.40
Randall Ent No. 1		133	0.00	410.50	0.00	410.50	0.00	410.50	0.00	410.50	0.00	410.50
Ratcliff No. 1	Rock Creek	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 2	Rock Creek	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 3	Rock Creek	44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 4	Rock Creek	119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 5	Rock Creek	122	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 6	Rock Creek	155	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 7	Rock Creek	156	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 8	Rock Creek	162	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ratcliff No. 9	Rock Creek	163	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Raynor & Edmondson No. 1	Platte Ansley	167	587.50	544.50	587.50	544.50	587.50	544.50	587.50	544.50	587.50	544.50

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Raynor & Edmondson No. 2	Platte Ansley	105	300.00	588.78	300.00	588.78	300.00	588.78	300.00	588.78	300.00	588.78
Raynor & Edmondson No. 3	Platte Ansley	170	125.00	521.00	125.00	521.00	125.00	521.00	125.00	521.00	125.00	521.00
Raynor & Edmondson No. 4	Platte Ansley	173	250.00	108.89	250.00	108.89	250.00	108.89	250.00	108.89	250.00	108.89
Raynor & Edmondson No. 5	Platte Ansley	169	200.00	480.25	200.00	480.25	200.00	480.25	200.00	480.25	200.00	480.25
Rebecca		188	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Redmon		172	240.00	508.00	240.00	508.00	240.00	508.00	240.00	508.00	240.00	508.00
Reinhardt No. 1	Augustine	28	530.00	1288.60	530.00	1288.60	530.00	1288.60	530.00	1288.60	530.00	1288.60
Reinhardt No. 2	Augustine	136	60.00	305.75	60.00	305.75	60.00	305.75	60.00	305.75	60.00	305.75
Reinhardt No. 3	Augustine	137	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reinhardt No. 4	Augustine	67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rheinacher	Janitell	A-77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rickards Lower	Huron	178	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins No. 1	Rock Creek	A-32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins No. 1	Huron	266	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins No. 2	Rock Creek	A-33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins No. 2	Huron	275	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins No. 3	Rock Creek	A-34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Robbins Sims	Huron	272	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Creek	Rock Creek	14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Creek Enl	Rock Creek	27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rock Creek No. 1	Rock Creek	79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rogers & Miller	Black Mountain	236	130.00	173.67	130.00	173.67	130.00	173.67	130.00	173.67	130.00	173.67
Rogers (High Creek)	Black Mountain	231	125.00	339.00	125.00	339.00	125.00	339.00	125.00	339.00	125.00	339.00
Rogers (S Fork)	High Creek	114	300.00	272.80	300.00	272.80	300.00	272.80	300.00	272.80	300.00	272.80
Rogers North	Huron	99	300.00	1194.22	300.00	1194.22	300.00	1194.22	300.00	1194.22	300.00	1194.22
Rogers North	Rogers, Lucinda	99	300.00	1194.22	300.00	1194.22	300.00	1194.22	300.00	1194.22	300.00	1194.22
Rogers South	Rogers, Lucinda	160	1250.00	90.00	1250.00	90.00	1250.00	90.00	1250.00	90.00	1250.00	90.00
Sacramento		208	308.57	371.71	308.57	371.71	308.57	371.71	308.57	371.71	308.57	371.71
Sadler	Huron	49	1436.00	817.40	1436.00	817.40	1436.00	817.40	1436.00	817.40	1436.00	817.40
Salt Creek		337	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Schattinger	Janitell	183	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Schattinger Waste	Furman	351	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sessions	Janitell	127	170.00	196.67	170.00	196.67	170.00	196.67	170.00	196.67	170.00	196.67
Sheeprock		179	300.00	576.00	300.00	576.00	300.00	576.00	300.00	576.00	300.00	576.00
Sigafus	Trout Creek	19	1200.00	2283.90	1200.00	2283.90	1200.00	2283.90	1200.00	2283.90	1200.00	2283.90
Sigafus Enl No. 1	Trout Creek	43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sigafus Enl No. 2	Trout Creek	69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DITCH	TRANSFER	PRIOR_NO	AC_AVG				AF_AVG				AC_AVG				AF_AVG			
			1950s				1960s				1970s				1980s			
Sims	Huron	289	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Skelton	Janitell	131	233.33	352.50	233.33	352.50	233.33	352.50	233.33	233.33	352.50	233.33	352.50	233.33	352.50	233.33	352.50	352.50
Slater	Indian Mountain	116	0.00	353.80	0.00	353.80	0.00	353.80	353.80	0.00	0.00	353.80	0.00	0.00	353.80	0.00	353.80	353.80
Slater		116	0.00	353.80	0.00	353.80	0.00	353.80	353.80	0.00	0.00	353.80	0.00	0.00	353.80	0.00	353.80	353.80
Small	McDowell	7	175.00	622.80	175.00	622.80	175.00	622.80	622.80	175.00	622.80	175.00	622.80	175.00	622.80	175.00	622.80	622.80
Small	McDowell	8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Snyder Creek	Rocker 7		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Souders & Wolfe No. 2		128	210.83	119.71	210.83	119.71	119.71	210.83	119.71	210.83	119.71	210.83	119.71	210.83	119.71	210.83	119.71	119.71
Souders & Wolfe No. 3		214	25.00	98.67	25.00	98.67	25.00	98.67	25.00	98.67	25.00	98.67	25.00	98.67	25.00	98.67	98.67	98.67
Souders & Wolfe No. 4		207	161.25	148.67	161.25	148.67	161.25	148.67	161.25	148.67	161.25	148.67	161.25	148.67	161.25	148.67	148.67	148.67
Souders & Wolfe No. 5		215	95.00	116.00	95.00	116.00	95.00	116.00	95.00	116.00	95.00	116.00	95.00	116.00	95.00	116.00	116.00	116.00
Souders & Wolfe No. 6		213	25.00	186.00	25.00	186.00	25.00	186.00	25.00	186.00	25.00	186.00	25.00	186.00	25.00	186.00	186.00	186.00
South Side Juniors	Black Mountain		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spring	Huron	338	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spring Branch	Platte Ansley	104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spring No. 1	Huron	293	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Spring No. 2	Huron	295	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
St. Charles		180	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stevens No. 1	Eleven Mile	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stevens No. 2	Eleven Mile	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stevens No. 3	Eleven Mile	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stevens No. 4	Eleven Mile	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tarryall (Ck)		52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Taylor		90	254.44	695.11	254.44	695.11	254.44	695.11	254.44	695.11	254.44	695.11	254.44	695.11	254.44	695.11	695.11	695.11
Taylor's Jefferson Ck		342	104.00	168.00	104.00	168.00	104.00	168.00	104.00	168.00	104.00	168.00	104.00	168.00	104.00	168.00	168.00	168.00
Temple	Four Mile	A-280	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thompson	Badger Basin	134	800.00	1274.00	800.00	1274.00	800.00	1274.00	800.00	1274.00	800.00	1274.00	800.00	1274.00	800.00	1274.00	1274.00	1274.00
Thompson & Radcliff		96	800.00	1110.00	800.00	1110.00	800.00	1110.00	800.00	1110.00	800.00	1110.00	800.00	1110.00	800.00	1110.00	1110.00	1110.00
Thorborg		151	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Three Mile	Huron	365	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Three Mile	Badger Basin	400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Treva Lower		219	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Treva Upper		216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Troppe	Borden	31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trout Creek	Trout Creek	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trout Creek		2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turner No. 1	Augustine	389	180.00	198.00	180.00	198.00	180.00	198.00	180.00	198.00	180.00	198.00	180.00	198.00	180.00	198.00	198.00	198.00

DITCH	TRANSFER	PRIOR_NO	AC_AVG 1950s	AF_AVG 1950s	AC_AVG 1960s	AF_AVG 1960s	AC_AVG 1970s	AF_AVG 1970s	AC_AVG 1980s	AF_AVG 1980s	AC_AVG 1990s	AF_AVG 1990s
Turner No. 2	Augustine	397	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Turner Seepage	Augustine	380	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W. H. Miller		221	95.50	77.75	95.50	77.75	95.50	77.75	95.50	77.75	95.50	77.75
W. H. Miller No. 2		185	95.00	139.20	95.00	139.20	95.00	139.20	95.00	139.20	95.00	139.20
W. R. Head	Johnson, Ralph	108	807.14	303.33	807.14	303.33	807.14	303.33	807.14	303.33	807.14	303.33
W. R. Head No. 2	Johnson, Ralph	203	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W. R. Head No. 3	Johnson, Ralph	142	160.00	78.88	160.00	78.88	160.00	78.88	160.00	78.88	160.00	78.88
W. R. Head No. 4	Johnson, Ralph	143	686.67	104.89	686.67	104.89	686.67	104.89	686.67	104.89	686.67	104.89
Wadley No. 1		40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wadley No. 2		41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wadley No. 3		50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warm Springs		129.5	200.00	318.67	200.00	318.67	200.00	318.67	200.00	318.67	200.00	318.67
Weaver No. 1		113	50.00	102.88	50.00	102.88	50.00	102.88	50.00	102.88	50.00	102.88
Weaver No. 2		184	75.00	47.38	75.00	47.38	75.00	47.38	75.00	47.38	75.00	47.38
Weaver No. 3	McNulty	220	64.00	95.40	64.00	95.40	64.00	95.40	64.00	95.40	64.00	95.40
Weed	Rogers, George	42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weed	Jardon	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Weed	Epperson	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Western	Huron	148	1200.00	1166.67	1200.00	1166.67	1200.00	1166.67	1200.00	1166.67	1200.00	1166.67
Weston		161	302.50	335.63	302.50	335.63	302.50	335.63	302.50	335.63	302.50	335.63
Whitten	Michigan Creek	110	100.00	619.75	100.00	619.75	100.00	619.75	100.00	619.75	100.00	619.75
Whitten	Janitell	110	100.00	619.75	100.00	619.75	100.00	619.75	100.00	619.75	100.00	619.75
Whitten No. 1		321	48.57	105.50	48.57	105.50	48.57	105.50	48.57	105.50	48.57	105.50
Whitten No. 2	Michigan Creek	322	40.00	219.25	40.00	219.25	40.00	219.25	40.00	219.25	40.00	219.25
Whitten No. 3	Michigan Creek	323	40.00	252.00	40.00	252.00	40.00	252.00	40.00	252.00	40.00	252.00
Whitten No. 4	Michigan Creek	324	0.00	240.00	0.00	240.00	0.00	240.00	0.00	240.00	0.00	240.00
Wilkin	Rock Creek	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
William A. Thomas	Janitell	276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winkler	Black Mountain	297	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## APPENDIX F

### CONVERSIONS

1 AF (acre foot)	325,851 gallons
1 cfs (cubic foot per second)	646,300 gallons per day
	448.8 gallons per minute
1 cfs for 24 hours	1.9835 acre feet per day
1 gpm (gallon per minute)	0.002 cfs
2 gpm	0.004 cfs
3 gpm	0.007 cfs
4 gpm	0.009 cfs
5 gpm	0.011 cfs
6 gpm	0.013 cfs
7 gpm	0.016 cfs
8 gpm	0.018 cfs
9 gpm	0.020 cfs
10 gpm	0.022 cfs
15 gpm	0.033 cfs
20 gpm	0.044 cfs
25 gpm	0.056 cfs
50 gpm	0.111 cfs
100 gpm	0.222 cfs
250 gpm	0.555 cfs
500 gpm	1.111 cfs
1000 gpm	2.228 cfs

## APPENDIX G

### DISTRICT 23 WATER COMMISSIONERS

<u>Years of Appointment</u>	<u>Water Commissioner</u>
1888	William H. Powless
1889 - 1893	M.R. Hanlin
1893 - 1895	Lent Hall
1895 - 1897	Walter Singleton
1897 - 1899	Lent Hall
1899 - 1901	E.E. DeCoursay
1901 - 1905	Lent Hall
1905 - 1909	David Collard
1909 - 1913	Alonzo Wright
1913 - 1915	W.A. Craig
1915 - 1917	Jacob Desserich
1917 - 1924	F.E. Lilley
1925 - 1945	Jacob Desserich
1945 -	William Metz
1950 - 1963	C. Axel Carlson
1964	Joe Clayton
1965	O. Peterson
1968 - 1972	Art Wentz
1972 - 1976	Wes Hayman
1977 - 1992	Mark Curry
1992 -	Denise Paprocki

**APPENDIX H**  
**CASE NUMBERS**  
**SOUTH PARK WATER TRANSFERS, 1933-1992**

<u>Transfer</u>	<u>Case Number</u>
Augustine	CA No. 3684 and CA No. 3705
Badger Basin	W-9234-78
Beery	W-7739-74
Black Mountain	84-CW-010
Borden	CA No. 1974
Coil	W-9448-78
Collard	88-CW-228
Furman	88-CW-262
Fourmile	80-CW-313
High Creek	W-7931-75
Huron	W-7595-74
Indian Mountain	84-CW-065
Janitell	W-7936-75
Johnston, Dixon	86-CW-223
McDowell	W-8345-76
McNulty	79-CW-274
Michigan Creek	88-CW-263
Platte Ansley	W-9242-78(B)
Rock Creek	84-CW-57
Rocker Seven	84-CW-56
Schattinger	84-CW-055
Teter	86-CW-222
Trout Creek	W-9242-78(A)
Walker	79-CW-351