

The Ecological History of the City of Rocks National Reserve Part I: The Human Archive

Prepared by Lesley Argo Morris
Utah State University

March 2006



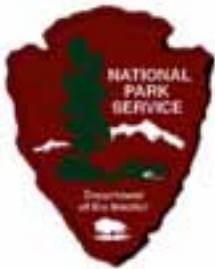
Photo by Timothy O'Sullivan, 1868

Courtesy of the National Archives and Records Administration

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EXECUTIVE SUMMARY

Historical ecology is an interdisciplinary field of study that seeks to understand the changes in the landscape over time. This kind of historical knowledge is essential for setting management priorities, policies, and in restoration efforts. Historical ecology requires a two phase project design. The first phase involves gathering information from the human archive by collecting and examining written and oral documentation of historic conditions. The second phase involves gleaned information from the biological archive using such methods as dendrochronology (tree ring analysis), packrat midden analysis (fossilized rodent nests), palynology (pollen analysis), or soil phytolith analysis (fossilized plant cells). The overall purpose of this project is to reconstruct an ecological history for the City of Rocks National Reserve (CIRO). Specifically, the goal is to determine the changes in vegetation along the California Trail corridor within the Reserve from approximately 1840 to present with a focus upon the period of peak pioneer travel (1843-1869). This report represents the summary of the information that was collected during the first phase of this project – the human archive.

During this first phase, information regarding historic conditions was collected from archival sources, emigrant diaries, oral histories, fire records and historic photography. Sources for this review included management plans, records, reports and archives from: the City of Rocks National Reserve, the Bureau of Land Management Burley District Office, the Idaho State Bureau of Land Management, the United States Department of Agriculture Sawtooth National Forest Twin Falls Supervisor's Office, the United States Department of Agriculture Forest Service Region 4 Office, the South Idaho Press, the Idaho State Historical Society, the Cassia County Historical Society, the Utah State Historical Society, the Merrill Mattes Library, the Utah State University Library, the National Archives and Records Administration Regional Office in Seattle, WA, and the main branches in College Park, MA and Washington D.C..

Emigrant diaries offered a rich source of description for the City of Rocks and the surrounding area. A collection of 100 diaries, recollections, and excerpts were examined for any mention of fire, vegetation, weather, wildlife and similar information that could be used to understand historic conditions in the area. The names of the diarists were compiled in a database and linked to scanned copies of each entry in a digital searchable database provided with this report. In addition to previous recordings and transcriptions of oral histories, interviews were conducted with 30 past and present residents of the area, landowners, permittees and CIRO employees. The discussion focused upon what the participant remembered or had been told about the historic conditions of CIRO and the surrounding area. The 29 tapes (nearly 42 hours of recorded interviews) and a database with links to release forms and transcriptions of previous oral histories were submitted with this report to be housed at the CIRO reference library located in Almo. Finally, historic photos from within the City of Rocks were also obtained. The sites of the original photo were relocated for over half of the historic photo collection and a current image was taken (known as repeat photography). Over 100 historic photos from archival sources, a set of over 60 repeated photos and a replica Holmes stereoscope with three stereoviews from 1868 within the CIRO were provided with this report.

It is important to note that many factors influence vegetation change and they are all occurring simultaneously throughout time. Therefore, the causes are difficult to tease apart and rarely is there a single factor for vegetation change. Variables influencing vegetation dynamics include: climate, soils, herbivory, livestock grazing, land use such as dry land farming or herbicide treatments, recreation, erosion, fire and the lack of fire, insects and parasites, road

building and other disturbances. The historic information gathered from these resources revealed that the City of Rocks has multiple layers of historic land uses which, coupled with a changing climate and combinations of the variable listed above, have brought about a great deal of vegetation change since the era of the California Trail.

Some have argued that the heavy livestock numbers and use during the westward migration on the California Trail must have profoundly changed the vegetation in the area. This study does not find any evidence to support that assertion. In fact, there was no evidence from the emigrant diaries, guides or reports of the time to indicate that the nearly 25 years of emigration changed the vegetation in the City of Rocks. The arrival of the emigrants into the City of Rocks was shown to be largely in the late summer and fall. Great Basin bunchgrasses are most vulnerable to overgrazing in the early spring and have mostly seeded by that time. Although there was probably less feed toward the end of a season of use, there was no indication in the diaries, guides or reports of the time that the use was changing the available feed over the decades of trail. Furthermore, oral histories and other documentation indicate that the land still had areas that were lush with grasses at the time of settlement a decade later. The diaries did demonstrate, however, a changing climate (particularly temperature) since the overland emigration.

The California Trail era came to a close around 1869 and there was nearly a decade before permanent settlement began to occur in the City of Rocks and surrounding valleys. This settlement was accompanied by the influx of the large cattle companies from Nevada and Utah into southern Idaho. Archival documents and oral histories described herds of cattle that were “too large to count” and a drought in the late 1800s that left the land dusty and denuded of vegetation. The winter of 1889 wiped out the large cattle herds and devastated the industry. While the understory was reportedly overwhelmed by the grazing and drought, the woody species (e.g. sagebrush and the pinyon juniper woodlands) probably fared much better. In addition to release from competition, the lack of fire could have aided in the recruitment and increasing density of shrubs and woodlands.

Meanwhile, the federal government was encouraging homesteading and dry farming in the new territories of the semi-arid west. A wave of settlement, cultivation and fence building washed over the City of Rocks in the early 1900s. Dry farming meant the most favorable sites for sagebrush steppe were cleared and plowed for cultivation. Soon after, another drought and a drop in grain prices pushed the settlers off of their farms. The native sagebrush-steppe can take nearly a half century to recover from this kind of disturbance. It was not until the 1960s that the area saw a return to above average precipitation. In the meantime, invasive species established in the fallow fields, the seed banks were already depleted and forage values continued to decline. After World War II, land agencies and private property owners set out to increase forage values using crested wheatgrass and other introduced species. Once again, the historic dry farming areas and other places with vigorous native vegetation were cleared and seeded. Soil erosion, gully formation and a lowering of the water table may have already been underway. The vegetation and the landscape of today is a product of all these historic variables acting in concert.

In the two phase project design of historical ecology, the first step necessarily informs the second. The environmental history compiled during this first phase of research will be very useful for generating hypotheses and examining the biological archive in the second phase. The coming field work and biological evidence will enhance further interpretation of the information reported here.

INTRODUCTION

Historical ecology is an emerging and interdisciplinary field of study that seeks to explain the changes and the processes that have created current landscapes through a synthesis of information derived from human records and biological data (Russell 1997). Because ecosystems are dynamic, understanding their function requires an integration of the sequence or order of change and the mechanisms that produce them (Crumley 1994). The resulting ecological histories of landscapes are important for understanding conditions at a particular point in time, the range of variability within the landscape, and reference conditions. They are particularly useful in restoration efforts (Egan and Howell 2001) and for setting management priorities and goals (Swetnam et al. 1999). Historical ecology requires a two phase project design. The first phase involves gathering information from the human archive by collecting and examining written and oral documentation of historic conditions. The second phase involves gleaning information from the biological archive using such methods as dendrochronology (tree ring analysis), packrat midden analysis (fossilized rodent nests), palynology (pollen analysis), or soil phytolith analysis (fossilized plant cells).

The purpose of this project is to construct an ecological history in the City of Rocks National Reserve (CIRO) in south central Idaho. Specifically, the goal is to determine the changes in vegetation along the California Trail corridor within the Reserve from approximately 1840 to present with a focus upon the period of peak pioneer travel (1843-1869). This report represents the summary of the information that was collected during the first phase of this project – the human archive. Field reconnaissance and biological data collection will be conducted in the second phase of the study.

Information regarding historic conditions was collected from archival sources, emigrant diaries, oral histories, fire records and historic photography. A comprehensive review of archival documents was undertaken to collect any available information concerning historic conditions within the Reserve and the surrounding area. Oral histories have been gathered from existing sources and over 30 interviews were conducted with longtime residents of the area and CIRO employees. Discussion focused upon what the participant remembered or had been told about the historic conditions of CIRO. Historic photos of the CIRO were also collected. A set of these photos were retaken from the same vantage point (repeat photography) for comparison.

Study Area

The City of Rocks National Reserve (CIRO) is jointly managed under a cooperative agreement between the National Park Service and Idaho Department of Parks and Recreation. Prior to becoming a National Reserve in 1988, the City of Rocks consisted of approximately 28% Bureau of Land Management, 4% State, 21% US Forest Service and 47% private land (Daugherty 1988). A recent federal purchase of the private land surrounding Register Rock has increased the Reserve's portion, but private in-holdings still make up a large portion of the City of Rocks National Reserve (Wallace Keck, personal communication 2005). The City of Rocks National Reserve contains approximately 14,320 acres of the Great Basin Desert Region in southern Idaho near the town of Almo, nestled within the Albion Mountains. The elevation reaches from 5,400 feet in the valley floors to 8,867 feet on Graham Peak (Daugherty 1988). The vegetation ranges from sagebrush steppe, pinyon-juniper woodlands, mountain mahogany chaparral to limber pine forest with riparian habitat traversing all of these zones.

There are still many unanswered questions about the earliest human inhabitants at the CIRO (Chance and Chance 1992). The earliest identified cultural materials within the City of Rocks date back to 4,000 years ago, but most information about the peoples inhabiting the area comes from contact with fur trappers, explorers, emigrants and ethnographic studies much later (Chance and Chance 1990). By that time (about 150 years ago) there were two overlapping Shoshoni cultures around the City of Rocks described as the "pedestrian" desert peoples and the "mounted" northern groups who hunted buffalo with horses (Chance 1989, p. 4). What is clear, however, is that the "Northwestern Shoshoni" near the City of Rocks were using the area for fall pinyon nut harvesting and hunting until sometime in the mid 1900s (Chance and Chance 1989) even after being forced onto the Fort Hall Indian Reservation in 1869 (Madsen 1980).

Although the Raft River area contained beaver and other fur bearing wildlife, the City of Rocks must not have been a significant source because it was not described in the diaries and journals of the well known trappers (Historical Research Associates [HRA] 1996). However, it most certainly did show up in the descriptions by emigrants on the Oregon-California Trail (Wells 1990). The City of Rocks contains segments of two important routes used for overland emigration (HRA 1996). The California Trail enters the Reserve from the east (near Almo) and continues southwest to where it joins with the Salt Lake Alternate entering through Emigrant Canyon in the southeast portion of the Reserve (See Figure 1). Descriptions in emigrant diaries of the Reserve's granite rock formations as "peculiar shapes from 5 to 100 feet high" and

“resembling old ruins or dilapidated buildings” make it easy to tell when the narrator has entered what eventually is known as the City of Rocks (Wells 1990, pg. 4).

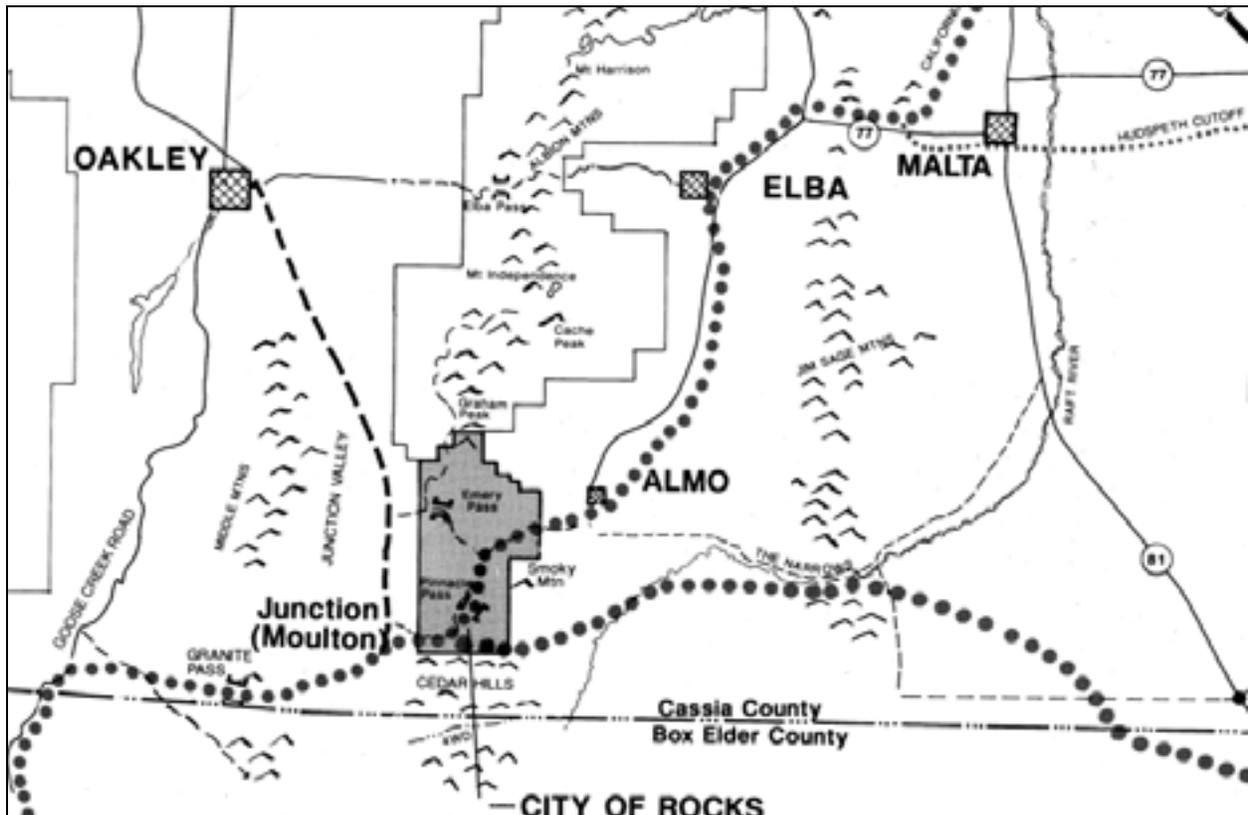


Figure 1: Vicinity Map. The California Trail (●●●) old Fort Hall Road joins with the Hudspeth Cutoff near Malta and with the Salt Lake Alternate in the southern portion of the Reserve.

The first wagon train passed through the Reserve in 1843 (HRA 1996). Travel peaked during the Gold Rush for a few years from 1849 to 1852 and then slowed (Unruh 1978) but remained an important transportation route across the American West until the completion of the transcontinental Union Pacific Railroad in 1869 (HRA 1996). The railroad did not take the City of Rocks completely off the transportation routes. The railhead in Kelton, Utah had important connections to the mining communities further north in Idaho. The Boise-Kelton Stage route followed from Salt Lake City along the Salt Lake Alternate to a stage station in the City of Rocks, over Lyman Pass and on into Boise for a total distance of 240 miles (Chance and Chance 1993, HRA 1996). The stage route was abandoned by 1883 when the Oregon Short Line reached the Snake River Valley (Chance and Chance 1993, HRA 1996).

The Reserve has also been an important area for livestock grazing and homesteading. Commercial herds of sheep and cattle were trailed through the City of Rocks beginning in the

1850s (Little 1994). James Q. Shirley first used the area as a home base for stock in the late 1860s (HRA 1996, Little 1994). By the late 1880s several large livestock operations out of Nevada were ranging cattle through the Reserve and surrounding lands (Little 1994). Although the Homestead Act was passed in 1862, the first homesteader did not arrive within the City of Rocks until 1882 when Charles Lunsford made his claim in the Circle Creek Basin (HRA 1996). Homesteading and dry land farming were active in the Reserve from 1909 to 1920 when the settlers began to move away, reportedly due to failing springs and water sources (HRA 1996).

The Albion Range, in the northern portion of what is now the City of Rocks, became a Forest Reserve in 1905 and a part of the newly created US Forest Service in 1907 as the Minidoka National Forest (Little 1994). In 1953, it was incorporated into the Sawtooth National Forest (Little 1994). The remaining unpatented lands were under General Land Office jurisdiction. That area was open to unregulated livestock grazing until passage of the Taylor Grazing Act in 1934 when the Grazing Service (renamed the Bureau of Land Management in 1946) began overseeing the range (HRA 1996).

Formal recognition of the unique granite formations and the City of Rock's historical significance to America's westward expansion began in 1957 when the school section was classified as an Idaho State Park (HRA 1996). In addition, it was designated as a National Historic Landmark in 1964 and as a National Natural Landmark in 1974 (HRA 1996). The current boundaries of the City of Rocks National Reserve were established in 1988 (Public Law 100-696). Under concurrent status as a unit in the National Park System and Idaho State Parks, the City of Rocks National Reserve has received 80,000 to 97,000 visitors annually during the early to mid 1990s (USDI –NPS 1994). There are a number of recreational activities available in the Reserve including camping, hiking, horseback riding, mountain biking, hunting and historical trail sightseeing. The most popular reason for visiting, however, seems to be the availability of world class sport rock climbing (USDI – NPS 1994). The reserve was well on its way to international recognition in the late 1970s and surely peaked as a rock climbing destination in the late 1980s with the publication of the first CIRO climbers guide (HRA 1996).

Climate

Climate can be one of the most influential factors driving vegetation change. Vegetation is very sensitive to climate and even small variations can create large changes in plant communities and structure (Sprugel 1991, Allen and Breshears 1998). However, climate also has a confounding influence in analysis of historical vegetation because it, too, is changing over

time (Millar and Woolfenden 1999). This is particularly true when looking at long lived species of trees and as one moves further back in time when there were significant regional or global climatic variations (Millar and Woolfenden 1999).

Another difficult issue climate introduces is the timing and impacts of the Little Ice Age. The Little Ice Age was a generally cool period in the Northern Hemisphere from approximately 1400-1900AD (Millar and Woolfenden 1999). Though the drop in average temperature was only estimated to be 1°C, it had marked impacts upon ecosystems in North American, Europe and other parts of the globe (Roberts 1998). This Little Ice Age further complicates the interpretation of vegetation change over the last 200 years because it coincides with the European exploration and settlement in most of the Intermountain West. It is difficult to tease apart the impacts of humans from the climate in historic vegetation studies (Millar and Woolfenden 1999). Information regarding climate is, therefore, an important consideration in historical ecology. As such, the analysis of known climate variables for this study area will be discussed now and used in discussions throughout the following chapters.

There are no long term climate data stations within the City of Rocks National Reserve. The nearest rain gauge (T15S R24E, section 25 SE¼ SW¼) was installed by the Bureau of Land Management in 1984 (Smokey Mountain Grazing Summary, BLM 1990). Therefore, climate data from the nearest stations at Oakley, Malta and Strevell are often used as proxies for the climate figures at the Reserve (e.g. Jackson 1995). Data from the Oakley station is used here because it offers a relatively good proxy for climate information given the similarity in elevation of the valleys (4,584 feet in Oakley and 5,400 feet in CIRO) and because of positioning among mountain ranges. Its approximation for higher elevations is, of course, less reliable but there are no long term weather data stations available at those locations. Furthermore, the Oakley climate data contains the longest running data set for the area. As a proxy location, therefore, it can provide some useful information about the long term precipitation and temperature trends in the area.

Climate data for Oakley, Idaho was obtained from the Western Regional Climate Center (WRCC) (on line at www.wrcc.dri.edu/climatedata.html). This dataset represents 92 years of measurements both monthly and annually from 1914 to 2005. Precipitation trends in the Great Basin generally show a marked pattern of winter maximum and summer minimum due to winter storms that develop off the Pacific coast (Miller et al. 1994, WRCC 2006). The Oakley station (and the City of Rocks), however, is part of the eastern portion of Idaho that show maximum monthly amounts in summer and minimums in the winter due to moisture from storms

originating from the south in the Gulf of Mexico and the Caribbean region (WRCC 2006). The average total monthly precipitation at the Oakley station shows a peak during the months of April, May and June (See Figure 2). This increased proportion of April-September precipitation in the eastern portion of the sagebrush steppe region has been used to explain the predominance of grass species in some areas (Stoddart 1941).

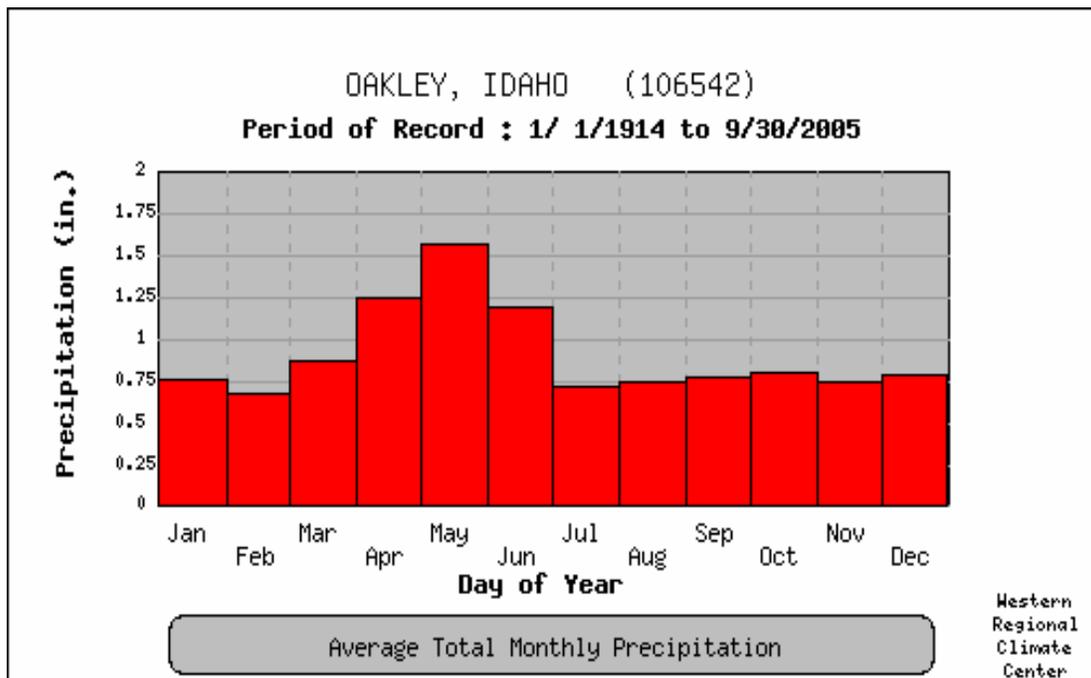


Figure 2: Average Total Monthly Precipitation (Reprinted from WRCC 2006)

Graphs of annual precipitation can be very “noisy” and difficult to interpret. Therefore, a common method for identifying trends is the 5 year running average (Bahre and Shelton 1993). The 5 year running average for the Oakley dataset was calculated and graphed (See Figure 3). The mean annual precipitation over the period of record was 10.88 inches. This graphs shows that there were peaks in precipitation in the 1910s and into the early 1920s when it began to decline rapidly. This period of lower than average precipitation lasted from the early 1920s until the early 1930s when it began to climb. It did not, however, rise to average precipitation again until about 1942. There was a short (two years) period of above average precipitation and then it dipped back below average again from about 1944 through to 1960. The decade of the 1960s enjoyed above average levels of precipitation with a short slump in the early 1970s. The first half of the 1980s was marked by above average peaks followed with below average levels in the latter part of the decade. The 1990s, once again, received precipitation levels not seen since the 1960s.

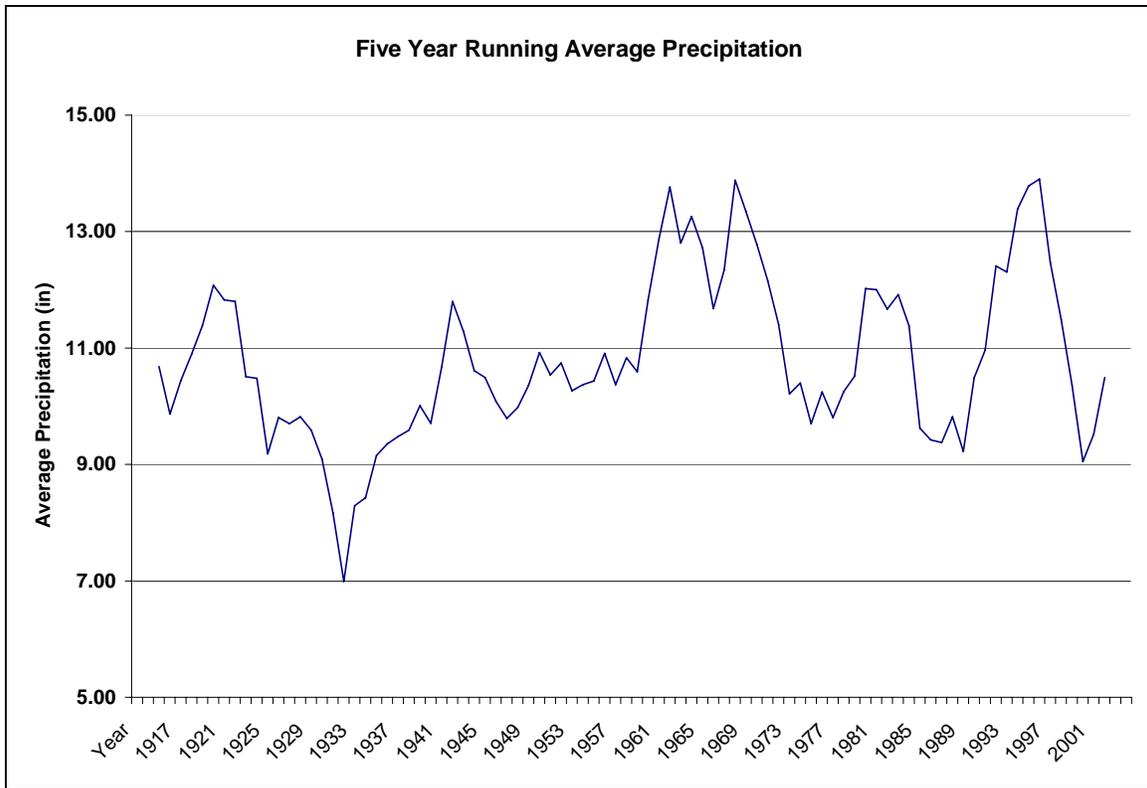


Figure 3: Five Year Running Averages of Precipitation (from WRCC data, 2006)

As the data set demonstrates, temperatures can be highly variable in the region. The annual mean temperature is 48.4° F with a maximum of 105°F and a minimum of -27°F. The extremes and averages in temperature are graphed in Figure 4. Other information about extremes in climate outside the dataset from WRCC can be found in the literature, reports and historical accounts of the area. For example, there was reportedly a drought from 1886-1891 (Minidoka National Forest History [MNF History] 1941) and 1882, 1886 and 1889 have been called the “endless winters” (HRA 1996). The “disastrous winter” of 1889-1890 is well known across the region (Young and Sparks 2002). In a description of the winter of 1888, Dick D’Easum said “the mercury froze on a red hot stove and the kids played marbles with the quicksilver” (Idaho World 1982). Other information about regional climate has been revealed through tree ring analysis. For example, work in the Great Basin region by Antevs (1938) shows the years of 1853,1862,1864,1868, and 1890-93 were rainfall maxima and the 1840s, 1869, 1871, 1889, 1898 were minima for precipitation. There is not a local tree ring study for long term climate in the City of Rocks.

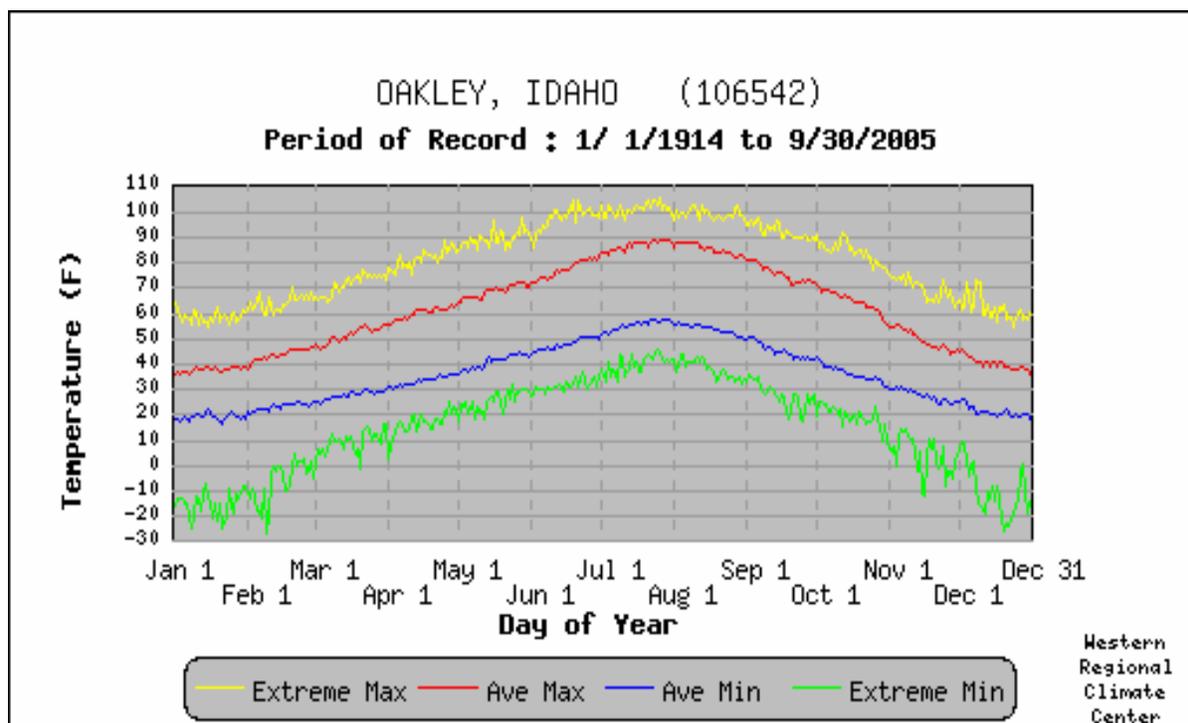


Figure 4: Temperature Maximum, Minimum and Averages (WRCC 2006)

In addition to the impacts of variable precipitation and temperature upon vegetation over time, there can also be feedback between precipitation and vegetation. For example, the greater the density of sagebrush, the more snowfall it intercepts, and the more likely it is to evaporate through sublimation without contributing to soil moisture (Hull and Klomp 1974, West 1989). Similar feedback can occur within conifer stands as well (Moore and McCaughey 1997). This climate data and these processes offer a backdrop to the information concerning historic conditions and vegetation change contained in the following chapters.

Plant and Animal Names Used in This Report

This kind of research involves mostly the reporting and use of common names for both plants and animals. Historical accounts such as early surveys, diaries and oral histories used common names and did not record (and may not have known) the Latin names of the flora and fauna they described (Mason 1963). Many of the common names, however, have become an accepted part of the vernacular and are well known enough in the area to be ascribed a scientific species name. For example, when someone referred to pinyon pine it was most likely *Pinus monophylla* as there are no other pinyon pine species in the area. The common names of juniper or cedar refer to the same genus of tree, however, there is more than one species present in the area. The issue becomes even more complicated when discussing sagebrush which has at least seven genus, at least four separate species, two subspecies and three variations in the area that

are all commonly referred to as “sagebrush”(See Appendix 1). The same kind of issue develops with animal names. Therefore, throughout this report, the common names are used as they were reported within the various archival documents and oral histories. A list of plant names with the possible scientific names that they refer to is provided in Appendix 1. This list was created using the Plant List for the City of Rocks National Reserve nomenclature (John 1995) to avoid any further inconsistencies in identification.

The remainder of this report is organized as follows: Chapter 1, Archival Documents, will summarize the historical material found in agency files and archives from around the country. Chapter 2, Emigrant Diaries, will focus upon the diary references that were collected for this report. Chapter 3, Oral Histories, will summarize the results from previously transcribed and recently conducted interviews with long time residents and City of Rocks National Reserve employees. Finally, Chapter 4, Repeat Photography, will discuss the historic photos collected for this project and the repeated images printed in this report. Each chapter will introduce the type of evidence and its limitations, discuss the methods for finding it and the results of that effort. One digital copy of appendices 2-5 were provided with the original report as per the task agreement for this project.

CHAPTER 1 - ARCHIVAL DOCUMENTS

Introduction

Archival documents are an important resource for examining changes in the landscape over time (Mason 1963, Gruel 1985, Galatowitsch 1990 and others). The Historical Research Associates ([HRA] 1996) report and others offered a comprehensive look at the cultural history of the City of Rocks National Reserve so this work need not be repeated (Haines 1972, Wells 1990, Chance and Chance 1993, and others). Several of the same sources were used as archival documents in this report, however, they were examined with the specific purpose of looking for environmental conditions and changes. These reports and others from the Intermountain West tend to characterize human activity and settlement, particularly livestock grazing, as environmentally destructive. For example, there is a common assertion that cattle are the sole mechanism for soil degradation and fish losses (Chance and Chance, 1992) and the main driver of vegetation change within the Reserve (Little 1994, HRA 1996). A comprehensive study of land use history and landscape change within the Reserve, therefore, is very much needed to provide a broader context for understanding the environmental changes and management implications. A fuller understanding of the causes of change can illuminate the inherent limits within a system that are important for assisting agencies in setting management priorities and goals (Swetnam et al. 1999).

Any archival research, either human or biological, faces the problem of a “fading record” where the information becomes less frequent and less reliable with time or is simply not available (Swetnam et al. 1999). Many times archival searches do not provide what the researcher was hoping to find or, in the most unfortunate of cases, the records have been lost. This was certainly the case during this research endeavor. Countless letters, pages and documents were reviewed that simply did not provide information regarding the historic environment. Sometimes, the information was lost, misplaced, or unable to be located. When it comes to agency files, more recent information is often more complete and the historic files are tidbits that have been saved somehow, somewhere by someone. The National Archives only have what has been sent to them and agencies are perpetually overwhelmed with paperwork and files. Therefore, archival work is never truly complete and more may be “found” in the future.

This chapter discusses methods, sources and information located during the archival documents review. It is arranged chronologically in attempt to make it both readable and logical with sections on: Native American Use and Occupation, European Exploration and Emigration, the Period of Settlement, the Beginning of Regulation, the Period of Range Management and

Recognition and Recreation. Each section provides a brief history and definitional context for the information, reports on the records search and summarizes what was found.

Methods

In an effort to locate archival material that would be useful in determining historic conditions in the Reserve, I searched through all available documents pertaining to the City of Rocks at locations including: Bureau of Land Management Burley District Office, Twin Falls USDA Forest Service Supervisor's Office, National Archives and Records Administration Pacific Alaska Region Office in Seattle, Cassia County Historical Society, Idaho State Historical Society, Bureau of Land Management State office in Boise, Natural Resource Conservation Service District office in Burley and State office in Boise, National Archives and Records Administration in College Park Maryland and in the District of Columbia, Utah State University Special Collections and Archives, and the City of Rocks National Reserve resource library. Most of the documents mentioned in this chapter have been scanned at 300dpi using a Canon CanoScan LiDE 60 into an Adobe Acrobat format and linked to a searchable database prepared in Microsoft Access. The exceptions were those documents already in possession of the Reserve and oversized maps and tract book copies. One copy of this digitally searchable database has been provided to the Reserve with this report (See Appendix 2) as well as one paper copy of all oversized documents.

Native American Use and Occupation

Several archaeological studies have been commissioned by the City of Rocks National Reserve to research the cultural history of the Native Americans in the area (Chance 1989, Chance and Chance 1990, Chance and Chance 1992). Even so, there are still many unanswered questions about the earliest human inhabitants at the Reserve (Chance and Chance 1992). The earliest identified cultural materials within the City of Rocks date back to 4,000 years ago but, most information about the peoples inhabiting the area comes from contact with fur trappers, explorers, emigrants and ethnographic studies much later (Chance and Chance 1990). By that time (about 150 years ago) there were two overlapping Shoshoni cultures around the City of Rocks described as the "pedestrian" desert peoples and the "mounted" northern groups who hunted buffalo on horses (Chance 1989). At that time, the "Northwestern Shoshoni" near the City of Rocks were using the area for fall pinyon nut harvesting and hunting until well into the late 1900s (Chance and Chance 1989) even after being forced onto the Fort Hall Indian

Reservation in 1869 (Madsen 1980). In addition, the Northern Shoshone were believed to have been collecting many harvestable berries and plants (Chance and Chance, 1992), fishing (Chance 1989) and grazing horses and some cattle within and around the City of Rocks prior to Euro-American emigration (Little 1994).

It is widely accepted now that many Native Americans were “managing” grazing lands and food resources with fire before European settlement (Miller et al. 1994). There were no specific accounts found of the Shoshone burning the land within the City of Rocks. Chance (1989) does provide a story by Maude Moon about when a fire went out of control. There is one mention of fire in the emigrant diaries in the Goose Creek Range, however, Kilgore (1850) does not speculate as to how or why these fires were ignited (See Chapter 2). Given that the pinyon nut harvest was so important in the Shoshone diet, it would seem counterintuitive to set fire to these trees because they do not typically survive a fire. However, recent work from the Sierra Nevada region in California suggests that the Timbisha Shoshone were managing the pinyon trees by pruning low branches and thinning to prevent loss by fire (Anderson 2005). There is no evidence yet to suggest that this occurred in the City of Rocks, however, it deserves consideration given how little is known about the fire history and the Native American use in the Reserve.

More work is needed to understand the role and impact of the Shoshone on the City of Rocks before the European emigration and settlement. This knowledge is highly susceptible to the issues of a fading record discussed previously. At the time this report was written, no contacts for oral histories had been located at the Fort Hall Indian Reservation. Therefore, this information is still quite limited. Continuing work by the author in field studies and through fire history research will hopefully provide more information about some of these very interesting issues of early land use.

European Exploration and Emigration

The first European people to have potentially entered the City of Rocks were the fur trappers in the early 1800s. Hunt (1989) speculated that Joseph Redford Walker may have made his way through the City of Rocks as early as 1834. Unfortunately, many of these trappers either did not make it into the City of Rocks or did not describe their trips into the Reserve (HRA 1996, Hunt 1989). Similarly, there is no record of the exact route that Joseph Chiles followed in 1842 although he very likely could have passed through the City of Rocks (Hunt 1989). The honor of being the first to open the route from Fort Hall through the City of Rocks, therefore, goes to

Joseph Walker in 1843 (Hunt 1989). The Salt Lake Alternate was opened in 1848 almost by happenstance when returning members of the Mormon Battalion met up with the party of Samuel Hensley that had just cut into the City of Rocks due to a bad storm (Hunt 1989). Unfortunately, these earliest wagon trains did not leave behind descriptive records of their journeys. It was the emigrants who followed by the thousands through these newly opened wagon routes who left the best record of the conditions along these historic trails.

The California Trail era lasted from about 1843 until 1869 when the transcontinental railroad was completed (HRA 1996). Emigration peaked in the early 1850s and then waned in the following decades (Unruh 1978). Many of these intrepid emigrants left behind journals, diaries and other written recollections of their journey. This unique and informative resource is discussed separately in Chapter 2.

There were several other sets of records from this time period that were potential sources for information about the conditions of the land at that time – the Pacific Wagon Roads office and the King Survey.

The Pacific Wagon Roads office

During the mid 1800s, the US federal government was engaged in active expansion across the western continent. The Mexican-American War of 1846-48 and subsequent Louisiana Purchase, the discovery of gold in California in 1849, and the push to populate new states and territories all contributed to the creation of the Pacific Wagon Roads Office under the Secretary of the Interior (Harstad 1966). Usually handled by U.S. Army military engineers, this move to civilian contractors was made for efficiency because the military engineers were said to be too interested in “botany, geology and mineralogy” (Jackson 1952, p. 163). The Secretary of the Interior was responsible for appointing Superintendents over roads requisitioned by acts of Congress. The Fort Kearney, South Pass, and Honey Lake Wagon Road survey and construction was enabled by Congress in 1857 (Jackson 1952). Although William McGraw was the first Superintendent for the construction of this road, the road was more commonly referred to as the “Lander Road” or “Lander Cutoff” because of the work done under the second Superintendent, Frederick Lander (Harstad 1966).

Review of Records of the Office of the Secretary of the Interior Relating to Wagon Roads, 1857-1887, at the National Archives and Records Administration did not reveal any descriptions of the area. However, it can be inferred from the fact that the area surrounding the City of Rocks was explored and no other route was suggested that the Reserve offered the best

junction for the wagon roads. This would have required that the City of Rocks be able to provide adequate water and feed as emigrants made their way across the West (Lander 1861).

The King Survey

The exploration of the Fortieth Parallel was enabled by Congress in 1867. The fortieth parallel actually runs south of the Idaho border through the upper two thirds of Utah (Wilkins 1988). Even so, it appears that King and a small crew (including his photographer) made it into the Reserve in 1868 because the Records of the King Survey at the National Archives and Records Administration contained the earliest known photographs of the City of Rocks. A set of six photos were taken by Timothy O'Sullivan in the City of Rocks. Although the records of the King Survey did not offer any description of this trip, they were most likely in the Reserve around September of 1868 when they went to explore the "supposed coal beds along Goose Creek" (Records of the King Survey 1868, Wilkins 1988). King mentioned taking the stage from Rock Creek back to his Salt Lake camp in October of that year but he provided no further detail or description in his letters and reports from the expedition (Records of the King Survey 1868). The only record of King's visit to the City of Rocks, then, was the startlingly vivid images by O'Sullivan that were originally produced on 9 x 12 inch glass plate negatives (See Plates 1-4 in Chapter 4).

Period of Settlement

As settlement of the new US territories progressed, the federal government required surveys of the lands to be homesteaded. The General Land Office was created in 1812 to survey the national lands for settlement and disposal (Galatowitsch 1990). A standard survey consisted of a Township (thirty-six square miles with one-mile square sections within it) that were aligned north-south on meridians and east-west on baselines (Galatowitsch 1990). The township lines were surveyed first and then the interior section lines. In Idaho, these surveys were conducted from 1866 through 1925. The surveys and notes were given to each state upon completion. When the Grazing Service and General Land Office were joined to form the Bureau of Land Management in 1946, these records and the responsibility for public land surveys were given to that agency (Galatowitsch 1990).

For the City of Rocks, the earliest survey was conducted by Allen Thompson in 1878 (See Table 1) of the township boundaries that bisect the Reserve (See Figure 5). The earliest section line survey was in T15S R24E in 1878 by Allen Thompson with the others completed in

1880s and into the early 1890s (See Table 2). Although additional section line surveys were carried out in all four of the townships (See Table1) in 1914, 1923, 1942 and 1945, none of these were within the boundaries of the current Reserve. The next set of surveys conducted within the Reserve boundaries did not occur until the 1950s. Copies of only the earliest surveys (listed in Tables 1 & 2) were obtained for this study because they are cost prohibitive and more comprehensive information regarding vegetation in the 1950s can be obtained from other sources (e.g. aerial photos).

The field notes that accompany these earliest surveys are useful for the descriptions of vegetation, soils, and other landscape features that they note. With the exception of two buildings (said to be the property of George Lunsford and Stephen Jones), these notes described the land in the City of Rocks prior to the wave of permanent settlement in the early 1900s. The information contained within the field notes is summarized below by township and section surveys.

Table 1: Township surveys completed by the Office of the Surveyor General in the City of Rocks National Reserve

TOWNSHIP	DATE
T 15S R 23 E	
Allen Thompson	1878
J.R. Glover	1884
T 15S R 24 E	
Allen Thompson	1878
T 16S R23E	
Allen Thompson	1878
T 16S R 23E	
Allen Thompson	1878

Table 2: Section surveys completed by the Office of the Surveyor General in the City of Rocks National Reserve

TOWNSHIP	DATE	SECTIONS
T 15S R 23 E		
J.R. Glover	1884	13,14,23,24,25,26,35,36
T 15S R 24 E		
Oscar Sonnenkalb	1886	19,20,29,30,31,32
Allen Thompson	1878	20,29,32
T 16S R23E		
Frank Riblett	1892	1,2,11,12,13,14,23,24
T 16S R 23E		
Oscar Sonnenkalb	1886	6,7,18,19

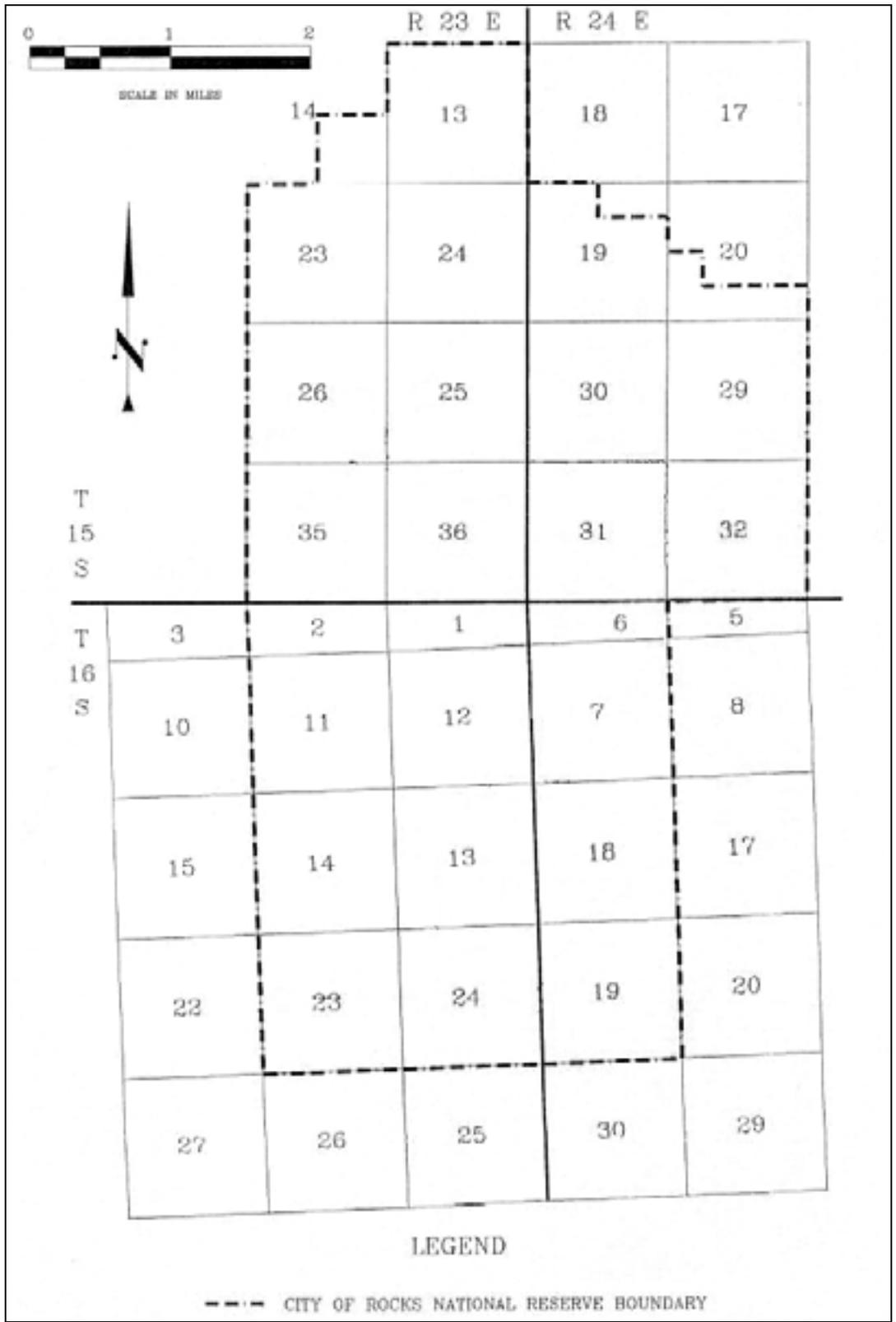


Figure 5: Township Map of the City of Rocks National Reserve (Adapted from HRA 1996)

Township Surveys

Between T15S R23E and T15S R24E

Allen Thompson surveyed this line in May, 1878. Starting from between section 31 and 36 (See Figure 5 for townships and sections within the Reserve), he described the line as “good grass with scattered mahogany”. As he made his way into the rougher, rocky portions along section 30 and up into section 19, he did not describe much in the way of vegetation. Then, between sections 13 and 18, at the base of Graham Peak he mentioned an undergrowth of “myrtle” (it is unclear what species this refers to, perhaps a choke cherry). J. R. Glover surveyed the same line around June of 1884. He did not mention any grass or myrtle. His basic description was the same for the entire line, “Timber juniper and vegetation sagebrush”.

Between T15S R23E and T16S R23E

Allen Thompson surveyed between these two townships in May, 1878. He described the entire line through the City of Rocks as having “good grass” and did not make any mention of timber. His general description of the T15S R23E was, “contains but very little land suitable for farming, is generally hilly and mountainous. The township is well adapted for grazing.” In 1884, J.R. Glover surveyed the same line between the two townships. He offered the same description of this land as he did previously, “Timber juniper and vegetation sagebrush”. Having surveyed the entirety of Township 15S R23E, he concluded, “The land along this line is mountainous excepting the eastern part, which is rolling and a small level valley in the central part. The soil is 2nd rate, producing sagebrush and in the valley, excellent bunchgrass. Timber of juniper is found in the eastern part and willow along the creeks. The Townships on each side are well watered by numerous streams which cross the line, the principal of which is Junction Creek, leaving southeasterly. An old stage road crosses the line.”

Between T15S R24E and T16S R24E

Allen Thompson also surveyed this portion of the Township line in the City of Rocks in May, 1878. He described “good grass” in the valley between sections 6 and 31 and then scattering juniper and mahogany as he ascended Smokey Mountain between sections 5 and 32. As a general description, he offered, “This Township contains a fair proportion of first rate land for farming, is well watered by numerous (illegible) streams which plenish (?) water for irrigation. The Township is well adapted for grazing, will advise of a large settlement and should therefore be subdivided.”

Between T16S R23E and T16S R24E

Allen Thompson also surveyed this township boundary in May, 1878. He described all “good grass” with no mention of timber until ascending between sections 19 and 24 where there was “scattering juniper and scrubby pine and good grass.”

Section Surveys

T15S R23E

J.R. Glover surveyed the section lines in the northwestern corner of the City of Rocks in September of 1884. He described the presence of timber species in the southern sections as pine, mahogany with undergrowths of the same or sagebrush. It was not until he reached the northern area between sections 13 and 14 that he mentioned fir and between 14 and 23 that he mentioned aspen. He said there was no timber along the western boundary of what became the Reserve on section 35 or between section 26 and 35. Scattering pine picks up again with a sagebrush understory along the western boundaries of section 26 and 23. He made no mention of grasses. This may be due to the fact that he was surveying in September.

T15S R24E

Allen Thompson surveyed the section lines making up the eastern border to the City of Rocks in June of 1878. From the top of Smokey Mountain he described “scattering mahogany and juniper, into scattering sage and good grass”. Between the sections 29 and 20, he described “good grass, scattering sage” and no timber. Oscar Sonnenkalb surveyed the remaining inner section lines in this township in October of 1886. Descending into the valley between sections 31 and 32, Sonnenkalb described coming out of scattering cedars into the Circle Creek basin with cottonwoods and willows along the creek. He mentioned a “sagebrush plain” between sections 30 and 31 with willow brush growing along the creek. Otherwise, the descriptions along these section lines include “dense cedars, pines and undergrowth of the same” from the mountain tops to the lower hills. The exception is between sections 29 and 30 where he said there was “no timber”. Interestingly, between sections 31 and 32, Sonnenkalb encountered a fence and cultivated land just before the “road from Raft-River Settlement”. Clara Cambell did not patent that land until 1911 and did not move onto it until 1909 (Homestead Records). This must be an area cultivated by either Stephen Jones or George Lunsford who were listed as living in sections 30 and 31 by Sonnenkalb. Lunsford’s property was closest so he was most likely the owner. Sonnenkalb offered this general description:

“This part of the township 15S of Range 24E B.M. contains a variety of land from plains to mountains and the soils ranges from 1st rate to 4th rate. There are two basins, called coves, surrounded by high mountain ridges and framed with

perpendicular and high granite and marble cliffs and peaks, which give to this part of the country a very picturesque and peculiar appearance and are the case for its name, viz: 'City of Rocks'. The mountain ranges have an average altitude of 350 feet and are covered with cedar and pinion pine timber, which give a good material for fencing and is valuable as fire-wood. The rock is partly basaltic, partly granite and marble rock, both very coarse grained. The soil is rocky – 4th rate on the mountains, gravelly – 3rd rate on the foot hills, partly alluvial – 1st and 2nd rate in the bottom. The two basins are called 'Cove' the northern one. 'Circle of City of Rocks, the southern one.'

T16S R23E

Frank Riblett surveyed the interior section lines in this township in October of 1892. The vegetation was highly varied throughout the southwest portion of the Reserve. Between sections 1 and 2, Riblett found an aspen thicket that he described as "undergrowth of aspen". There was "mahogany brush" along the western boundary of the Reserve on section 2 but "no timber" through section 11 and section 23. Along the western side of section 14, however, Riblett described dense junipers and pinyon. He even used a 10 inch diameter juniper for a marker tree. There was juniper between sections 23 and 14 as well. The entire southern boundary of the Reserve along sections 23 and 24 contained "no timber" and "dense sagebrush". This description was also used following north between sections 23 and 24, 13 and 14. By the intersection between 11 and 12, scattered juniper have picked up again. There was also "no timber and dense sagebrush" between sections 11 and 14, 12 and 13, and 13 and 24 with the exception of a "few juniper on the east end".

T16S R24E

Oscar Sonnenkalb completed these section line surveys in October of 1886. He described much of this area through the Cedar Hills as having hilltops and hillsides covered with dense cedar and pine growth with pine undergrowth. It was only between sections 7 and 18 that he said there was "no timber". On the slopes of Smokey Mountain between section 6 and 7 he mentioned "dense cedar, pine and mahogany". He offered a rather lengthy but full description of the Township:

"This part of the township is generally mountainous and is situated on the irregular formed and rocky mountain ranges north and near head waters of Raft-River. There are 3 distinctly separate main ridges, running nearly westerly and raising to an altitude of from 400 to 500 feet above Raft Rive bottom; small creeks in narrow canons running between them with easterly course, all empty into Raft-River. In the western parts of secs. 6, 7, and in sec.18 is a mountain basin. The soil is mainly rocky – 4th rate in the higher and mountainous parts, gravelly – 3rd rate in the foothills of the eastern mountain slope and in the basin above mentioned, and 1st and 2nd rate in small spots along the creeks. The mountains produce sufficient grasses and herbs to render this part of the township

a good range for stock. The hills are covered with a dense growth of cedars, mahoganies and pinion pines of smaller size and produce here and there heavy timber of cedars with dense undergrowth of same. Mountain mahogany bushes grow on top of the ridges and cottonwood brush along the creeks and in groves around small springs in the higher mountains. The timber is valuable for fencing and as fire wood for house use. The bedrock is of basaltic character. There are estrusive (?) ledges of granite and coarse marble. Iron, Lead and Silver Ore was found in small pieces of float almost everywhere on the surface of ridges. There are two small creeks in the township, one of them running dry in fall season – one rich sulphur spring was found in sec. 30. No settlements have been made in the part of the township.”

The field notes from these surveys offer an interesting and methodical first glance at the land in the City of Rocks prior to major settlement. There were several curious observations that emerged from a review of these notes. It was unclear what species the authors refer to as “myrtle”. There was no mention of pinyon pine being on the top of Smokey Mountain and there was no mention of aspen in the northwest portion of the Reserve until between the very furthest north sections of 13 and 14. When it was discussed at lower elevations (between 1 and 2), the aspen was described as “undergrowth”. In fact, many of the tree descriptions as “undergrowth” lead one to believe that they were generally quite small. Field reconnaissance and dendrochronology during the second phase of the study will be useful in further interpretation of this material.

Homesteads

Settlement within the City of Rocks began just after the town of Almo in the late 1870s (Little 1994, HRS 1996, Wells 1990 and others). The first land entry was George Lunsford who reported building a house and moving on the land in 1882 (Homestead Records) and patented his claim in 1888 (See Table 3). Research into the names, dates and sections of the homesteads within the City of Rocks National Reserve was completed by the Historical Research Associates, Inc. (1996). This report mapped out the names, patent dates and locations of all the homesteads (See Figure 6). The first few homestead claims within the Reserve were filed in the Circle Creek basin area. There were only three filed under the original Homestead Act and two under the Desert Homesteads Act. It was not until the Forest Homestead Act of 1906 and when the Enlarged Homestead Act came to Idaho 1909 that settlement really began to spread within the Reserve (See Figure 7).

The increase in settlement was also largely a part of the spread of dry land farming into the region. Dry land farming is the practice of cultivation without irrigation (Widtsoe 1910).

Table 3: Homesteaders in the City of Rocks National Reserve

Name	Year of Patent
George Lunsford	1888
George Davis	1900
Mary Ann Tracy	1905
Margaret A. Hansen	1909
Clara Campbell	1911
Thomas Faichild	1915
John W. Moon	1916
Samuel P. Mikesell	1916
Walter M. Mooso	1916
Martha M. (Rogers) Garner	1916
Charles Freckleton	1916
John T. Hansen	1917
John J. Flowers	1917
Frank J. Trunkey	1918
James R. Eames	1918
Charles Fairchild	1918
John F. Holley	1919
Merritt A. Osterhaut	1919
Sherman B. Wilcox	1919
Eugene Durfee	1919
Stella Holley	1920
Elizabeth (Barker) Campbell	1921
Henry L. Jones	1922
Thomas Shomaker	1924
Joseph R. Moon	1925
Ernest W. Sparks	1918 & 1927

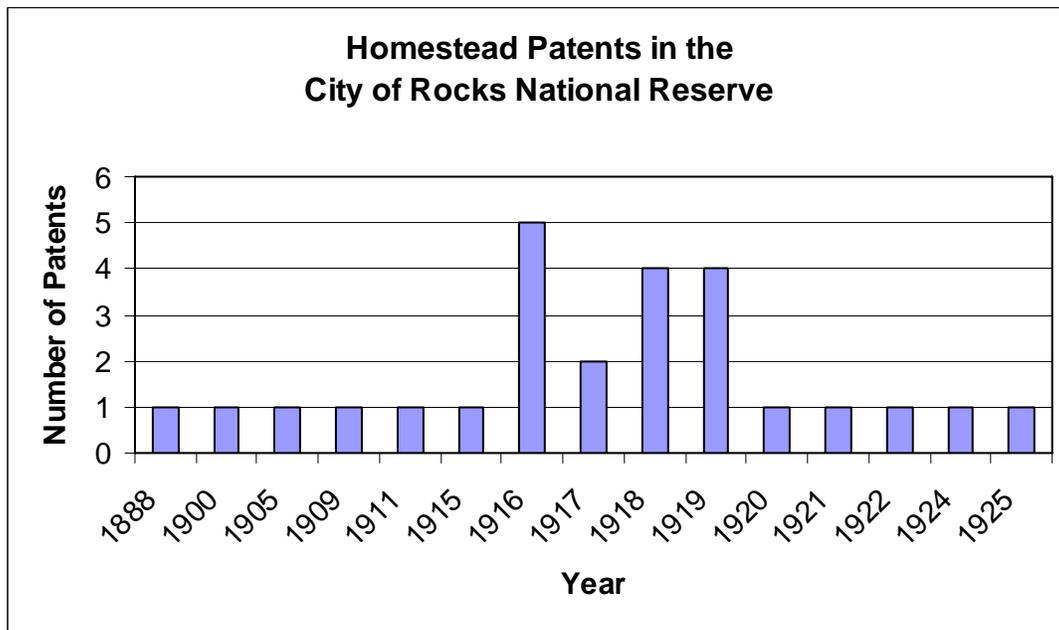


Figure 7: Homestead Patents in the City of Rocks National Reserve

General guidelines from when the style was first being employed called for alternately plowing to a depth of 7 to 10 inches so as to avoid a hardpan (MacDonald 1911), removing all vegetation but the crop so that there was no competition for water, and then summer fallowing and rotating so as to store the water in the soil for production use (Widtsoe 1910). Early books from research on the subject encouraged locating dry farms where there were stands of native grass and the sagebrush was particularly tall and robust (Widtsoe 1910). This land use practice was popular and productive in the Reserve until the late 1910s when there was a reported drop in rainfall (HRA 1996) and the ground water suddenly disappeared in 1920 (Weldon no date). This subnormal rainfall and a drop in wheat prices ended the dry-farm boom in 1920 and 1921 (Minidoka National Forest History [MNF History] 1941). The climate data for this region clearly showed declining precipitation beginning around 1918 and into the early 1920s (See Figure 3).

Most of these homesteaders put at least part of their land into cultivation as winter wheat, barley, or oats and had some areas of irrigated garden production (Homestead Records). These and other kinds of improvements were used as part of the “proving up” for the patent (Homestead Records). At the time the patents were filed, the homesteaders had collectively cleared and/or cultivated approximately 1,266 acres of land within the City of Rocks National Reserve (Homestead Records). However, they likely cleared and cultivated more land after filing. Cultivation can be the most drastic disturbance of sagebrush steppe areas with recovery taking nearly a half century (Tisdale and Hironaka 1981). Historic dry land farming can

influence vegetation through declining soil fertility (Bracken 1940), increasing erosion (Bolton et al. 1993), and aiding in the introduction of invasive and weedy plant species (Piemeisel 1938). Areas of historic cultivation can have altered plant diversity and lowered potential for reoccupation of the site by native species (Piemeisel 1938, Sanders 1996). For example, several areas that have been cultivated in the Reserve contain little or no native vegetation (Sander 1996, personal observation 2005). Historic cultivation is visible on the landscape for many years (See Plate 23 in Chapter 4).

Another form of “proving up” on a patent was to demonstrate improvement by fencing. The homesteaders in the City of Rocks made good use of the timber described in the General Land Office Surveys for fence posts. According to the Minidoka National Forest History (1941), “large quantities of posts and poles” were given away under free use permits to hundreds of settlers during the height of the dry-farming era about 1914. Using descriptions from the Homestead Patents in the City of Rocks National Reserve, somewhere around 54 miles of fencing may have been erected in the Reserve during this era. Most of the patents described fencing with posts 1 rod apart (16.5 feet) and only two claimed fences at 2 rods distance (33 feet). Given these approximations, some 16,520 posts would have been needed for fencing in the Reserve alone. A good juniper tree for a post was approximately 7 feet tall with at least a 4 inches in diameter (Malta CCC Report 1941). This former land use was spotted by a surveyor for the Bureau of Land Management in 1952 when he described an area that was “...cut over for posts (approximately 10% of volume) and many small openings containing air within the stand” (Range Surveys 1952).

The period of settlement was also accompanied by the beginning of the big cattle companies and the range wars (Little 1994). Cattle and sheep had been trailed through the City of Rocks National Reserve beginning in the California Trail era (Little 1994). Earliest known cattle drive was documented by Cyrus Loveland in 1850 (Little 1994, See Loveland 1850). Kit Carson trailed sheep through the City of Rocks in 1853 (Wentworth 1948) and Mrs. Benjamin Ferris reported a band of 4,000 sheep in the same year (Ferris 1856). The cattle industry in the area was believed to have precipitated in 1869 when James Q. Shirley summered a herd near the City of Rocks (Little 1994). Little (1994) stated that the settlers in the City of Rocks and Almo area only had a few cows and were nothing like the numbers that came out of the bigger ranches in Nevada and Utah. For example, the consolidated ranches of Sparks and Tinnin in 1881 ran an estimated 175,000 cattle “from Junction Valley in the east to the Bruneau River on the west and from Snake River to the north to Humboldt Wells in Nevada” (Little 1994, p. 18). In Utah, the

Bar M Ranch owned by Charles Crocker had 75,000 head that ranged into Idaho and the Raft River valley (Little 1994).

Mr. Taylor of Almo and many others say, when they came to the country, their horses or cattle could be turned any place and would fill up in short time. Then came the large herds of cattle, so numerous that no one counted them.” (MNF Report 1949, section VIII)

The Minidoka National Forest reported as many as 230,000 head of cattle and several thousand head of horses in the mid 1880s (MNF History 1942).

New mining discoveries in Idaho and continued development of the railroads opened new markets and the livestock industry boomed in the region (Little 1994). All of the livestock industry during these early years engaged in year-round grazing and did not supplement their feed in the winter (Little 1994, Young and Sparks 2002). In the winter months in the Great Basin, large herds of cattle were moved into the desert playas of Nevada for grazing there (Young and Saprks 2002). This level and season of use was beginning to take its toll on the range around the City of Rocks:

“...the range began to show signs of overcrowding; there were thousands of five and six-year old steers on the range, and too many breeding animals.” (Walgamot, quoted in MNF History 1941, p. 4)

“According to statements of oldtimers, the sagebrush plains and foothills were densely carpeted with bunchgrass....Overgrazing, together with the droughts of 1886 and 1891 seriously depleted these valuable forage plants which were in many cases supplanted by sage.” (MNF History 1941, p. 4)

Great Basin bunchgrasses do not fair well under high stocking rates and early spring season use when they are most vulnerable (Tisdale and Hironaka 1981, Miller et al 1994). Young and Sparks (2002) argued that this intense use before the turn of the century began to kill off the grasses in the Great Basin that rely on seed for reproduction and, over the decades of heavy use, the seed bank became depleted and could not replenish the populations. Based on the above descriptions, this was likely the case in and around the City of Rocks as well (See also the drought section in Oral Histories).

The harsh winters and droughts in the late 1880s took a large toll on the local livestock industry (MNF History 1941, Little 1994, Durfee no date). From 1886 until 1891, there was a reported drought that “dried up creeks” and left “vegetation wilted to the ground” (Durfee no date). It was the winter of 1889-1890 that really brought the most damage. Little (1994) called it the great “equalizer” because it brought a rise to the sheep industry whose flocks had better

survived the winter. Beginning in 1891, sheep began to spread and there were reportedly 85,000 head of sheep in the area by 1895 (MNF History 1941). Although they never regained the pre-1891 numbers, cattle and sheep had both increased by 1900 and overgrazing was prevalent once again (MNF History 1941).

The infamous winter had an effect on the range as well. Young and Sparks (2002) speculated that this period following the great white winter strongly favored shrub production in the Great Basin because two decades of heavy grazing on the perennial grasses had largely depleted their seed banks and the grasses could not take advantage of the 1890-1893 increase in precipitation. Woody species such as juniper and sagebrush, on the other hand, had already become established and were poised to make further gains from the increase in precipitation. This winter also precipitated another change in land use as it was clearly necessary to begin supplementing livestock in the winters with hay (Young and Sparks 2002).

The Beginning of Regulation

The impact of these multiple uses imposed by new settlement helped to initiate the system of the Forest Reserves in the early 1900s. In 1906, the Raft River Forest Reserve was created (MNF History 1941). It contained the Goose Creek Division (later known as the Albion Division) including the Albion Mountains and the northern sections of what became the City of Rocks National Reserve (MNF History 1941). Another name change in 1907 created the National Forests out of the Forest Reserves. Then, in 1908, the Raft River and Cassia Forest Reserves became the Minidoka National Forest (MNF History 1941). The Albion Ranger District of the Minidoka National Forest contained 79,956 acres (MNF Report 1949). The Minidoka Forest included several areas within Idaho and Northern Utah. The portion of the City of Rocks that was part of the National Forest would have been part of the Albion Division of the Minidoka forest.

Some of the best and longest running records come from the USDA Forest Service because they are the oldest management agency in the area and because this agency was generally fastidious about record keeping. The portion historically managed by the Forest Service managed make up only 21% of the area within the Reserve, however, the information provides insight into the conditions and concerns of the time. Historical records of the Minidoka National Forest are housed at the National Archives and Records Administration Pacific Alaska Regional Office in Seattle, WA, and in the USDA Forest Service Region 4 Office in Ogden, UT. Historical records from the Twin Falls Supervisors office could not be located.

In 1905, the Minidoka forest reported 150,000 head of sheep (MNF Report 1909). In 1907, what was then known as the Raft River National Forest, reported having 3,042 cattle and 14,665 sheep (USFS Report on Grazing 1907). The first attempts by the Forest Reserves at regulation of grazing were made in 1906 when permits were required. Seasonal use was from April 1 through November 30 for cattle and June 15 to October 31 for sheep. In a 1909 report, Forest Supervisor William McCoy lamented that , “control was 20 years late, and the effects of forest fires, wasteful cutting of timber, and overgrazing of the range will be felt for years” (MNF 1909, p. 12). He stated that the range would accommodate “only 50% of the number of stock it would years ago” (MNF Report 1909, p.12). Despite their efforts, overgrazing was still an issue in the early 1920s (MNF History 1941).

Wild horses had also begun to increase in number by the time of the creation of the Forest Reserves and were believed to have contributed to the overall downward trend in range conditions (MNF Report 1949). A massive effort to rid the range of wild horses was initiated in the 1920s. Some 3,000 head of horses were rounded up from the foothills surrounding the Minidoka National Forest and several thousand were removed from the Forest lands in 1928 (MNF History 1941). Since 1924, 300 horses were eliminated from the grazing allotment that included portions of the City of Rocks (MNF Report 1929). The wild horses were reportedly “taken care of” by 1930 (MNF Report 1949).

The new Forest Reserves (and later the National Forest) were not only responsible for timber management and livestock grazing but also their wildlife resources. Wildlife Management reports for the Minidoka National Forest from 1918 to 1950 were found at the National Archives and Records Administration Pacific Alaska Regional Office in Seattle, WA. The reporting was not consistent or thorough enough for quantitative analysis, however, it did provide a qualitative glimpse at what was happening with several important species over time in the area (Minidoka National Forest Wildlife Reports 1918-1950).

The reports began in 1918 with concern about protecting and increasing the deer population on the Minidoka Forest. The Minidoka National Forest (1941) reported that deer were killed and hauled like cordwood in the late 1890s but were depleted by the time the forest reserves were created. In 1918, there were said to be 20 deer. They were successful in increasing the herd by closing the forest to hunting from 1910 through 1929. The Forest Supervisor, S. Stewart, recognized in the 1930s that “Sheep growers individually and thru their county predatory animal control boards have reduced coyotes, bobcats, lynx and mountain lion very materially the past three or four years. It is this feature which appears largely responsible

for the apparent increase in deer the last year or two". Deer were said to number close to 6,000 on the forest by 1935 and a special hunt was initiated in 1936 to cut the numbers (MNF History 1941).

By 1946, some adjacent ranchers were complaining about damaged crops and competition for feed on the ranges. High concentrations of deer in 1948 were becoming a concern in the Almo Park area where there was evidence of "highlining" (eating the browse off to the maximum height an animal can reach) on the mahogany, bitterbrush, juniper, wild cherry, and other browse species. That same year there was 84% hunter success. By 1949, "mahogany above the City of Rocks" had been "seriously highlined" as well. The Range Report from that same year confirmed deep concerns about the condition of all range types within the forests. By 1950, they estimated 3,000 head of deer on the Albion Division alone.

Predators were tracked through out the reports as well. Two wolves were reported in the Albion division in 1924. As mentioned previously, predator control of mountain lion, coyote, bobcat and lynx was widely praised in the late 1920s and early 1930s. Interestingly, porcupines were included on the list of predatory animals starting in the early 1930s. An estimated 274 porcupine were killed in 1934 on the entire Minidoka. There were reportedly 125 porcupines killed on the Albion Division in 1940. In 1945, "an intensive campaign against porcupines was conducted" and the ranger suggested that control work should continue. Porcupines were reported to be a prevalent problem where the USFS had planted trees (MNF History 1941). The ring tailed cat was added to the list in 1940 although none were ever reported. In 1944, there was an expressed desire to "maintain state bounty on Mt. lion because they are taking a heavy toll on deer and sheep". There were several reports of about 5 black bear on the Albion division in the 1940s. Coyotes were reportedly "getting bad again" in 1942. By 1947, baiting stations with "1080" (or Thallium) were put out for coyotes. The baiting effort was recorded as successful in 1948 as there were little or no sheep losses reported and "no coyote signs around deer herds". The decrease in predators was again attributed to assisting in the rapid increase of deer over the next two years.

There were concerns over other game animals as well including birds, elk and rabbit. In particular, the game birds were an issue as early as 1918. The sage hens and grouse were both decreasing alternatively in the early 1910s and 1920s as they were alternatively protected or listed for open season (the report does not specify between hens and grouse). By 1930, it was reported that grouse were "very rarely seen anymore." The populations became so much of a concern that the Idaho portion of the forest was declared a bird sanctuary in 1931 (MNF History

1941) and all forms of hunting were prohibited. Some of the foresters reported that crows and magpies were having an impact on the bird's nests in the early 1930s. Still, by 1945, there was no recovery in the game bird populations. Some of the problem was attributed to cold wet springs in the 1940s that were bad for the nests and hatches. It was not until 1948 that there were reported increases in game birds on the Albion division. Although Elk were planted in 1915, they reportedly "did not prosper" on the Albion division. Finally, an epidemic of tularemia was believed to have knocked back the jackrabbit population in 1933 when they "disappeared wholesale from some sections".

Deer were not the only animal to go through drastic changes on the Minidoka National Forest. In 1925, six beavers were reported on the forest. In 1936, beavers were reportedly "numerous on Big Cottonwood and Sawmill" but there was no mention of them within the Reserve. The 1944 ranger suggested that it would be "good to see some beaver planted in Almo creek". The number slowly climbed over two decades until 100 beavers were reported in 1945. By 1947, beavers were, "becoming established in most of the drainages over the entire district...Almo Creek above the Forest Boundary to the mouth of Piney Creek shows much beaver activity." By this time, there were 200 beavers and a growing concern that they would kill the few remaining aspen stands. An effort was started in 1948 to remove beavers but the reports did not specify where on the forest.

Almo creek was stocked with 5,000 fry in 1920 and 1924 (no species names provided). Immediately, there was concern that fish were being destroyed by getting into irrigation ditches. In 1921, Forest Ranger Henry Smith reported, "The canals in the vicinity of this Division are badly in need of screening and seem to be the most important factor to be considered in maintaining normal supply of fish. Canals along the banks of Clyde, Cassia, Almo and Howell Creeks should be screened". The reports were unclear as to when this stocking was discontinued. There was one indication that local residents complained about fish getting in their canals. Then, in 1942, the forest ranger recommended that stocking of fish in mountain streams should be reinstated if it was done well above the irrigation intakes. One report mentioned the need to build small reservoirs or dams along the streams to keep the fish alive through the season but said the locals did not like the idea of blocking irrigation water. It was unclear from the reports if this initiative was ever revisited. There was no indication from the reports that cattle destroyed the streams or contributed to the disappearance of the fish.

Period of Range Management

Land that was not patented remained under the General Land Office jurisdiction. That area was open to unregulated livestock grazing until passage of the Taylor Grazing Act in 1934. Under this new system, land within the City of Rocks that was not under the National Forests, privately owned or state property was managed by the Grazing Service as the Raft River Grazing District No. 2 (Grazing District Map 1939). The management of these lands was turned over to the newly created Bureau of Land Management (BLM) in 1946 and has been managed by the Burley District Office since that time. A records search was conducted at the BLM Burley District Office and at the National Archives and Records Administration Regional Office in Seattle, WA. Range surveys in this southern end of the district were not completed until 1952 and adjudication was not made until the mid 1950s (BLM Range Surveys 1952, BLM Junction Adjudication File 1955, See also Delmar Vail Oral History). Range utilization and trend studies were carried out by the BLM on most of these allotments throughout the 1980s (BLM Allotment files). There are 8 allotments (or portions of them) contained within the boundary of the Reserve (Sanders 1996). In addition, there was a Soil Vegetation Inventory and Mapping effort completed for each allotment in 1980 and 1981. Grazing Evaluation Summaries from 1984 to 1988 were copied for the 5 allotments that cover the California Trail view shed areas (Sparks Basin allotment is private land within the Reserve). Copies of the Range Improvement Atlas are included as oversized copies with this report.

At the same time as the passage of the Taylor Grazing Act, the United States was suffering a widespread drought and nationwide economic depression. The Civilian Conservation Corps (CCCs) was created by President Roosevelt in 1933 (MNF History 1941). These federally funded laborers were set to work in a variety of projects across the nation. The Minidoka National Forest reported that nearly all the campgrounds and picnic areas on their forest were built by the CCCs (MNF History 1941). There was no indication, however, of which or any specific projects were completed within what became the Reserve. The National Forest also sent workers out on a lodgepole pine beetle elimination project in the Cassia Division but there was no mention of insect infestations or work being conducted on the Albion Division (MNF History 1941).

After abandonment of the dry farms in the 1920s, much of this land was slow to revert back to natural vegetation and the forage production was very limited (Sanders 1996). Drought in the 1930s further exacerbated the range conditions (MNF History 1941, See Figure 3 in the Introduction). A good deal of this land was “re-cleared of brush and seeded to crested

wheatgrass” (Sanders 1996, p. 3). Much like dry land farming, the seeding projects were encouraged to be undertaken in areas where “vigorous stands of sagebrush” could be found because it was an indication the site was “productive and generally favorable for seeding” (Hull 1973). It was suggested that seeding be carried out using seed drills or other equipment at depths from ¼ to ½ inch (Hull 1973). Land management agencies and many private land owners in the area and in the City of Rocks employed this method of seeding (BLM Allotment records, See also Chapter 3). Crested wheatgrass seeding continued through at least the 1960s (See Plate 23 in Chapter 4). Many of the old seeded areas are still visible and producing (Sanders 1996, personal observation 2005). In fact, the Big Sagebrush/Crested wheatgrass type covered an estimated 4,932 acres in 2005 and was the largest cover type recorded in the Reserve (Wilson 2005).

The advent and use of crested wheatgrass came at a time when range conditions were reportedly in very bad shape (Sanders 1996, USFS Report 1949). The Albion District reported 4,225 cattle and horses and 2,080 sheep in 1949 (MNF Report 1949). In 1949, the Albion District described the conditions of its range types. The “sagebrush type” (making up 41%) was in fair to poor condition with increasing annual weeds and grasses, lessening plant vigor, loss of top soil, and shoestring and gully erosion. Aspen stands (making up only 15%) were reportedly in very poor condition and “denuded of all palatable species of grasses and weeds.” There was reportedly no reproduction and some “patches” were dying out. They also reported that sheet erosion and weed invasions indicated an urgent need for corrective measures. That same report said that the aspen stands in the upper reaches of Almo Creek were in trouble. An area of about 900 acres was reseeded in Almo Park in 1947 and a fence was put up around 3,200 acres in the same location. The “timber type” (making up 23%) was listed as poor to fair. The “grass type” (making up 21%) was reported to have erosion of up to four inches judged by pedastalled plants. There seemed to be a general concern about the loss of top soil and productivity. There were reportedly 2,200 deer on the Albion division and stockmen complained that they were taking a toll on the forage. The USFS believed the district was best adapted to cattle rather than sheep grazing and there was a push to switch permits from sheep to cows.

As with the National Forests, by the 1940s, many new, introduced and invasive plant species established in the valleys. A particularly troublesome one was the poisonous forb, halogeton. In 1945, both John Ward and Oscar Jones together lost over 1,500 sheep to halogeton poisoning after they moved their bands onto winter range in the Raft River Valley (Young et al. 1999). The cause of death was described by John Ward,

I had lost a few sheep for several years in and around the area west of the Bridge school house. On a day in November, 1945, a band of 1300 of my sheep were move into this halogeton area about noon. By 2 or 3 o'clock that afternoon, the sheep were sick and began to die immediately, of the 1,300 head, 1,000 died that afternoon in that area and the remainder died later on." (Quoted in Young et al. 1999, p. 14).

Other weedy species that thrived in areas of soil disturbances (such as roadsides, heavily grazed lands and fallow agricultural fields) had likely already made their way into the Reserve. These included such species as Russian thistle, tumble mustard, flixweed and cheat grass (Piemeisel 1938, also see Chapter 3 and Plate 13 in Chapter 4). Cheat grass was already on the Minidoka National Forest by the 1920s (USFS Report 1923). Bulbous bluegrass was another species that was generally recommended in reseeding efforts, however, not in southern Idaho (Hull 1973). It was used for aerial seeding in nearby Gooding in 1943 (Hull et al. 1948). Bulbous bluegrass was included in the plant list created for the City of Rocks by Jones (1995), therefore, it has been present in the Reserve for at least ten years.

A new use was added by the BLM in 1957 when it decided to sell pinyon pine for Christmas trees to the public. Prior to this program, tree sales were exclusively to commercial cutters. A woodland inventory for pinyon pine and juniper was conducted in 1958 (BLM Woodland Inventory, 1958). Commercial cutting was discontinued in 1961 due to popularity of the Christmas tree sales and an estimated 600 trees were cut annually (based on permit sales) during the program (BLM Christmas Tree Management Plan [BLM-CTMP] 1981). In 1961, there was already concern about the current level of use:

The lack of replanting and stand improvement has deprived the area to a point where future Xmas tree cuttings would, in a short time, eliminate the area of pinyon pine and leave it open for complete invasion of junipers (John F. Kenny, BLM Burley District Report 1961, pg. 1)

The Burley District pursued some experimental plot thinning and improvements in the early 1960s to try to increase the yield and quality of the smaller pinyon pines favored for Christmas trees (BLM Memo 1965). The program proved very popular but the tree sales were discontinued in 1968 due to concerns with over-harvesting and a need for inventory data (BLM-CTMP 1981).

The BLM considered options for reinstating the tree sales in 1981 due to increased pressure from the public and in an attempt to get control of illegal cutting (BLM-CTMP 1981). Following a 1981 inventory and analysis, the program switched to bi-annual sales of about 500 pinyon pine alternating with juniper tree sales in the early 1980s to "ensure good management and availability in the years to come" (BLM Press Release 1986). In 1983, a multi-agency

meeting was held between the Burley BLM District, the Sawtooth National Forest, the Salt Lake BLM District, and the Idaho State BLM office to discuss Christmas tree management programs, ways to “curb the theft of pinyon” and how to coordinate yield to meet the public demand (BLM Report of Meeting 1983). At the time the Burley District’s inventory had been completed and an allowable cut of an estimated 250 trees per year had been established. After a study was conducted to determine the ages of the pinyon trees, the Christmas tree cutting program was abandoned for a few years and reinstated with about 100 to 120 trees cut per year (Jim Tharp, BLM personal communication 2006).

In the mid 1980s, another concern emerged over the pinyon pine in the City of Rocks and surrounding area. The black stain fungus (*Verticicladiella spp.*) had infected some of the pinyon pine. According the BLM report (1986), the black stain spread through root contact and usually spread radially from the center of the infected cluster of trees. It tends to kill older trees and affected pinyons are often invaded by the Ips beetle prior to death (BLM Condition Report 1986). Aerial photos were flown at a scale of 1”=6,000’ and were ground truthed by a pathologist, an entomologist and the Burley District Forester. At that time, it was also reported that the aspen were “suffering from a foliar pathogen and insects” because they were “overmature and need to be regenerated.” A recent baseline study of the quaking aspen in the City of Rocks National Reserve suggested that regeneration in the stands was not being suppressed by the lack fire or by overgrazing and that there was a “relative absence” of invasion and overtopping by other trees (Batten et al. 2005, p. 7).

Recognition and Recreation

Formal recognition of the unique granite formations and the City of Rock’s historical significance to America’s westward expansion began in 1957 when the school section was classified as an Idaho State Park (HRA 1996). In addition, it was designated as a National Historic Landmark in 1964 and as a National Natural Landmark in 1974 (HRA 1996). Reports of “vandalism” and “indiscriminate “use of off road vehicles and firearms, hiking and camping and poor climbing practices” were said to have damaged the rocks as well (Wolf 1987). The current boundaries of the City of Rocks National Reserve were established in 1988 (Public Law 100-696). Under concurrent status as a unit in the National Park System and Idaho State Parks, the City of Rocks National Reserve has received 80,000 to 97,000 visitors annually during the early to mid 1990s (USDI –NPS 1994). A number of recreational activities are available in the Reserve including camping, hiking, horseback riding, mountain biking, hunting and historical

trail sightseeing. The most popular reason for visiting, however, seems to have been for the world class rock climbing (USDI – NPS 1994). The reserve was well on its way to international recognition in the late 1970s and surely peaked as a rock climbing destination in the late 1980s with the publication of the first CIRO climbers guide (HRA 1996).

Under new management, the City of Rocks has seen changes and regulation of recreation as new campgrounds, water facilities, restrooms and trails were constructed. The roads have been maintained and several projects were initiated in the 1990s to control erosion of trails, roads and staging areas for rock climbers (Brad Shilling 2005, See Chapter 3). Visitation continues to rise since the Reserve installed signs on the major highways, initiated a new phone reservation system for campgrounds, purchased new property within the City of Rocks, and begun construction of an equestrian campground on the east side of the Smokey Mountains (Wallace Keck 2005, See Chapter 3). Some of the impacts from the increased recreation and visitation have begun to appear (See Chapter 3).

CHAPTER 2 - EMIGRANT DIARIES

Introduction

The current literature regarding the California Trail has covered a variety of topics from the role of gender (Faragher 1979) to crime (Reid 1997). There have been explorations into emigrant perceptions of the land in the Snake River Plains (Boag 1993) and of the potential forage along the historic Santa Fe Trail (Goodman 2005). There has not been, however, an examination of the consequences of overland migration upon the land through the City of Rocks. This chapter examines emigrant diaries for references to the City of Rocks National Reserve in order to gain an understanding of what the environmental conditions were like during the era of overland emigration. In addition, the following questions were investigated: Did the environmental conditions at the cross roads of the trails change over time with use as a major transportation corridor? And, did the overland emigration leave a lasting change in the vegetation at the City of Rocks? This type of exploration using California Trail emigrant diaries appears to be unique, however, diaries and traveller's reports are a recognized way of gathering information on historical conditions (Vale 1975, Gruel 1985, Kay 2001 and 2003a, Liphshitz and Biger 2001). In previous publications, such journals have been used to examine such wide spread topics as the concentration of wildlife along the route of Lewis and Clark's exploration (Kay 2001) to the distribution of Aleppo pine in Jerusalem (Liphshitz and Biger 2001).

Journals, therefore, can provide important and insightful information, but these kinds of data do have limitations. Journal entries are subject to the bias of the author (Kay 2001). This bias can include the way in which they describe an event or a scene and also what event and scenes they choose to describe. There is a secondary bias that can emerge in the use of diary excerpts wherein the person who is examining the historical account quotes only the sections that are favorable to his or her previous assumptions (Kay 2001). These types of biases may never be completely eliminated, however, the methods in this examination took attempted to avoid these pitfalls by not just quoting excerpts, gathering as many full diaries as possible, and using a wide sample so as to include the opinions of many observers.

Methods

The search for diaries included work at the Merrill Mattes Library, the Utah State University Library and Special Archives, Utah State Historical Society, and the Trails of Hope project published online by Brigham Young University and through the interlibrary loan system. The search at the Merrill Mattes Library was aided by Jim Riehl of the Oregon California Trails Association (OCTA). Although the OCTA database was not available on line to the general public, Mr. Riehl agreed to conduct a place name search in their database using the terms: City of Rocks, Pyramid Rocks, Steeple Rocks and Pyramid Circle. This search provided close to 250 references which were subsequently looked up in the holdings of the Merrill Mattes library in Missouri. In addition, I also searched for any potential diary reference at the Merrill Mattes Library by names and parts of names on the inscriptions within the Reserve using the study by Brown (2004). Some of the diaries at the library were published accounts and others were copies in part or in whole from the research of Merrill Mattes. Diaries and recollections (accounts written after the journey was completed) were copied where they referred to areas from Raft River to Goose Creek (or at least Deep Creek to Goose Creek on the Salt Lake Alternate) so as to include the entire area and provide a somewhat larger view of the information.

The entire collection was scanned into an Adobe Acrobat format at 300 dpi using a Cannon CanoScan LiDe 60. Some of the scanned copies include notations in Merrill Mattes's handwriting as well as my notations of the library index reference and notes concerning dates or months so that information would not be lost if printed out of context from the database. These scanned copies were hyperlinked to a Microsoft Access database by the diarist's last name. The database includes first and last names of the author, the year the diarist was writing, the date (as could be best determined) when the diarist reached the City of Rocks National Reserve, and whether or not he or she camped or "nooned" within the Reserve. In addition, if the diary was published, the title, editor and publication date was provided so that the full publication could be relocated by other researchers. This entire searchable database was included in this report on a disc in Appendix 3.

This database was used to examine the make-up of the collection by year, decade, arrival date and how many camped or nooned within the Reserve. The paper copies were organized by year, by month within the year and by days within the month. Systematic notes were taken from the diaries regarding any mention of: climate conditions, vegetation, water sources, animals, and fire. They were then analyzed in order to garner information on trends in vegetation, water or climate change throughout a year and across many years of use.

Results

The search yielded 79 full diary entries, 16 diary excerpts and 5 recollections for a total of 100 entries for analysis in the database. The collection represents a 25 year time span from 1846 to 1871 (See Figure 8). There are 31 entries from the 40s, 62 entries from the 50s, 6 entries from the 60s and 1 from the 70s. This breakdown by decade and even by year within the decade of the 1850s closely follows what is known about the actual numbers of emigrants upon the trails during those years (Unruh 1978). When examined by the diarist's arrival within the City of Rocks, the entries also reflect what is written about the timing of the overland emigration. Most of the emigrants did not arrive in the City of Rocks until at least July (47) or August (37). A few arrived in April, May and June (See Figure 9), however, these earliest arrivals had overwintered in Salt Lake City. Even those who passed in June did not arrive until at least mid June (June 13th). Only about one quarter of the entries (25) explicitly stated that they camped in the City of Rocks. Thirteen of the diarists reported that they nooned in the City of Rocks. The remainder either camped or nooned nearby or did not specifically mention either way. I also collected and examined 10 emigrant guides spanning the period from 1845 through 1858. Several of the guides offer descriptions of the City of Rocks and many times these descriptions were repeated word for word in emigrant diaries (Wells 1990).

The City of Rocks offered a spectacular landmark upon the trail that had both advantages and disadvantages for this type of analysis. It was extremely advantageous in that it was fairly simple to establish when the diarists arrived at the Reserve because they rarely passed through without describing the rock formations. On the other hand, it was inconvenient for the analysis of environmental change because many of the diarists describe nothing but the rocks even though they offer great descriptions (or at least some) of the land, water and condition of the area before and after this phenomenal landmark. Therefore, it was useful that so much of the collection included full diaries so that environmental information could be gleaned from the descriptions just before and just after passing through the Reserve. An analysis of the diaries by day within the month and months within the calendar year revealed that these journals can, in fact, record changes in the landscape over time. For example, Burbank (1849) talked about the stream in

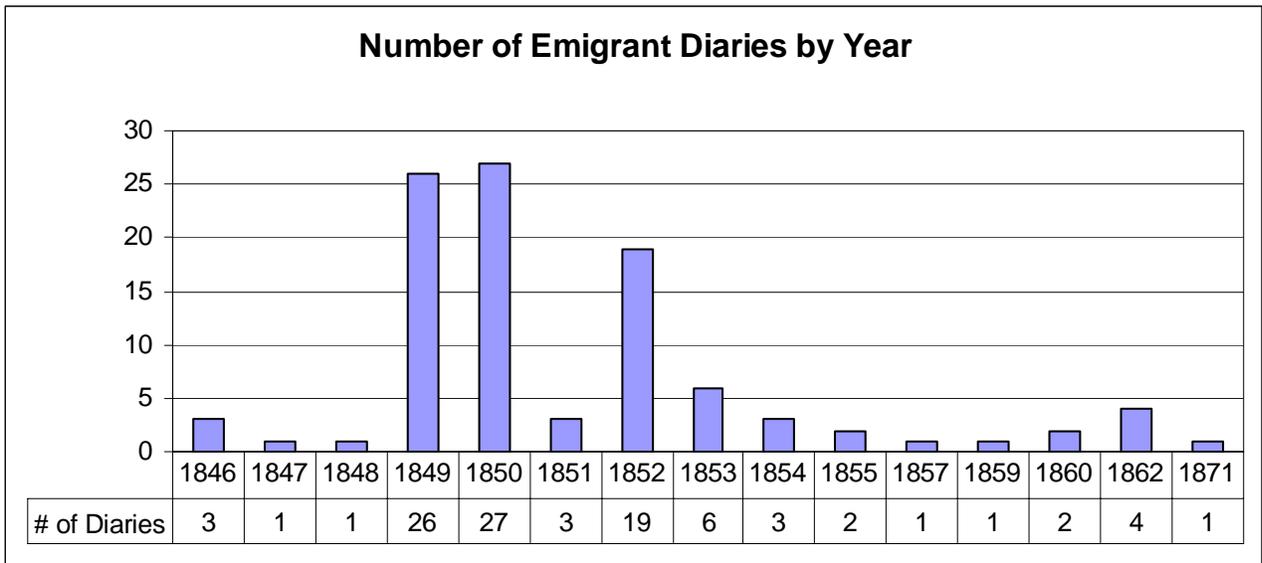


Figure 8: Emigrant Diaries by Year

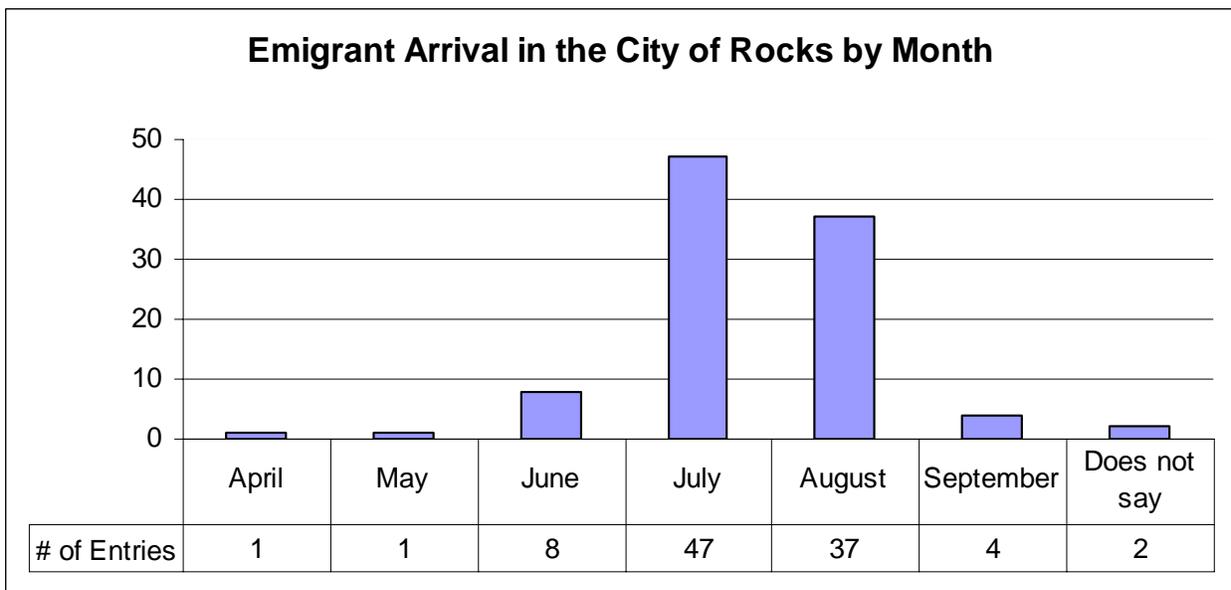


Figure 9: Monthly totals for Emigrant Arrival in the City of Rocks National Reserve

Junction Valley being in a “drying up attitude” on August 4, 1849. Then, Bernard Reid passed the stream on August 11 that same year and says it is “dry now” but that he can “tell it had water in it probably just two days before”. A summary of the information found in these diaries is provided in the following sections: vegetation, climatic conditions, water, animals, fire and other topics. The map from the Introduction (See Figure 1) can be used to locate some areas mentioned in the diaries.

Vegetation

The City of Rocks was a recognizable land mark along the overland emigration route and was described by many diarists making it relatively easy to know when they have arrived there. A good portion of the diary entries were mostly descriptions of daily activities, travel and points of interest to the diarist. Water, grass and fuel were the most important resources along the trail for the emigrants and, therefore, there were persistent references to them through out their journey. When the emigrants reached the City of Rocks, the unique rock formations became their primary focus of description. There were some descriptions, however, from within the City of Rocks National Reserve. James William Evans (1850) camped at the junction of the Salt Lake Alternate near a cedar grove and said the grass was “tolerable good”. The crevices over pinnacle pass were said to have cedar bushes (Bruff 1849). The Circle Creek basin was more often mentioned specifically. Loveland (1850) described Circle creek as thickly set with willows. Carpenter (1857) described it as about an acre level with a good size stream (1857). Woodham (1854) said it was covered in a “velvet sod” and Mothersead (1855) said it had “good grass but no wood.” Matthews (1852), on the other hand, said the ground was “thickly overgrown with sage”. Grass in the City of Rocks was mentioned 14 times in this collection in months from July through September. There was no recognizable trend or change in the grass descriptions even over the seasons. For example, the grass was described as both the “finest” and “tolerable” during the month of July. In addition, there was no recognizable trend in the grass descriptions over the many years.

The mountains surrounding the City of Rocks were often described as “covered with evergreen cedars” (Dalton, 1852), pine and cedars (Variel 1852) or bare with exception of a few cedars (Sharp 1852). In 1853 there were more of these similarly phrased reports of “mountains are covered with pine and cedar” (Williams 1853) and “mountains covered with pine and cedar trees” (Ward 1853). The repetition of this description almost seems as though it is quoted out of Horn’s Overland Guide where it stated, “It is surrounded by mountains which are covered with

pine and cedar trees and is altogether a beautiful and picturesque scene” except that it was published in 1853 after some of these diaries were written. It was not uncommon, however, for emigrants to quote out of the guides they carried with them (Wells 1990).

Much of what can be gathered from the diaries about the vegetation was from descriptions just before and right after they passed through the Reserve. Before the City of Rocks, many wagon trains camped within sight of what became Castle Rock State Park, near the town of Almo, or somewhere between the towns of Elba and Almo. There were at least 26 references to the grass prior to entering the City of Rocks in the Raft River valley area. Sawyer (1850) described the valleys within the Raft River drainage as alternating between luxuriant wild wheat and barley and wild sage. She attributed these fluctuations to differences in soil throughout the valleys. Similarly, Carpenter (1857) described the Raft River valley with willows along the stream banks and sagebrush on the hillsides. Decker (1849) was impressed by its “high grass”. Jones (1850) moved his oxen off the road in the Raft River valley to camp and feed on the grasses. Delano (1849) fed himself with the currants he picked along the Raft River and described the valley as marshy. Perkins (1849) found what he believed were “Wethersfield onions” that sprouted from seeds tossed by emigrants (they were not wild garlic because he described those separately). While camped in the Raft River valley, emigrants burned willows and some sage for fuel (Burbank 1849).

Similarly, if traveling from the Salt Lake Alternate, a common camp prior to entering the City of Rocks was near the Raft River Narrows (many refer to this as DeCassure creek or something similar). Hays (1848) recalled picking currants along the “DeCassure”. They reportedly burned cedar and pine (Fuller 1849) or sagebrush (Benson 1849) at camps along the Salt Lake Alternate route. This route, winding its way from Salt Lake City through the deserts north of the lake, seemed to have been less favorable according to the descriptions. It was along this route that emigrants complained of the heat and sulfur springs. Thissell (1849) was completely unimpressed by the “god forsaken” land where “water was poor and food scarce”.

After the City of Rocks, many camped in the Junction Valley near streams in the valley or by spring sites on the way through to Granite Pass. Most of the diarists mention camping at Goose Creek. There were 11 references made to the grass in the Junction Valley and they ranged from good to poor. Along the Goose Creek, there were also at least 11 references to grass in the collection. This camp seemed to be the most affected by the heavy travel. There were at least 6 references over a decade to the grass being “eaten of” by August near this popular camp site. Cole (1852) complained as early as July that he had to “go up the mountain for feed”. The year

1852 was the peak of overland travel. Mostly, it was by the end of a full season in August that the emigrants began to say that they had to go off the road to find feed because everything near water was eaten (Wilkins 1849). In 1859, Brown said that the grass was nearly gone and described a new “camp road” that had been created just for finding grass at Goose Creek.

Overall, there were a several mentions of grass being tolerable but no real discussion of the lack of it or being disappointed in the availability of forage through the area until it was late in the season. Furthermore, the examination of the record from the Wagon Roads office lends more credence to the notion that grasses remained stable throughout the decades of overland migration. Lander and his crews from the Pacific Wagon Roads office thoroughly explored around the City of Rocks for routes with the best feed and water available for overland emigrants (Lander 1861). Even after almost 15 years of use as a trail, Lander did not report any reason to divert from or circumvent the City of Rocks. Finally, in 1871, Shirk remembered the grass around the City of Rocks as “splendid” and said that there was “bunchgrass waving like a wheat field” in the Raft River valley.

Climatic Conditions

There were at least 20 direct references to the temperature in the collection. The majority of them mention either being cold (6) or that it freezes (6) while they were around the City of Rocks from the end of June through the end of August. A few described the weather as cool in the morning or evening but warm in afternoon sun (Decker 1849). The cold temperatures must have taken Hale (1849) by surprise since he remarked that “if the last July requires that quantity of clothing I do not know what one would need in January!” Hays (1848) rather enjoyed the low temperatures and described her day on July 31 as “pleasantly cool”. There are 5 diarists that reported it being warm from July through August. Only two diarists complained about it being hot and both had approached the City of Rocks from the Salt Lake Alternate through the deserts north of the Salt Lake (Davis 1850, Kinkade 1849).

The generally cool temperatures were also revealed through the mentions of snow. There were at least 17 diarists who remarked on there being snow on the mountains as they moved through the area all the way from June through September. Morgan (1849) said they had to travel around the snow banks in early May on their way up to Granite Pass. Shepard (1850) had been told there was more snow that year than previously. On the Hudspeth Cut Off, Jones (1850) said that the snow was nearby and yet vegetation was vigorous such that you could “gather ice with one hand and flowers with the other”. In 1871, Shirk said that the winter of 1867 to 1868

was the most severe known with “two feet of snow on the level”. There were also 31 references to rain as emigrants passed through the area in the collection from 1846 to 1860.

Water

Water was perhaps the most popular topic within the diaries of the collection. Obviously water was an extremely important part of surviving the overland journey. However, part of popularity was due to the fact that streams and water crossing were a way by which the emigrants navigated throughout the country. In fact, many of the published guides at the time used water (both springs and streams) to explain the journey. This excerpt describing the area from the Raft River valley to the Circle Creek basin from Platte and Slater’s 1852 guide illustrates.

“....You now cross a number of small streams, with plenty wood, water and grass
7 ½ M. TO THE VALLEY STREAM. In the center of the valley is
3, M. ANOTHER SMALL STREAM. And on the west side is
2, M. ANOTHER LARGER STREAM. You now commence rising the
mountain again, not very steep, through a pass bearing to the left, over a small
ridge
3 ¼ M. A MOUNTAIN STREAM. This stream is not large, but deep and
muddy. Wood & grass here. The stream takes its rise in a cluster of monumental
rocks, which rests their base on the smooth surface and extend upwards hundreds
of feet, presenting a beautiful appearance. Among them, one is called the
STEEPLE ROCK, from its resemblance to a steeple....You now cross a number
of ridges, and streams of water. Road not very good.”(Platte and Slater 1852, p. 9)

There were at least 20 descriptions about the water through the City of Rocks and surrounding area. As the quotation above showed, the stream within the Circle Creek Basin was not considered large but it was said to be a “fine little creek” (Armstrong 1850) of cold water (Loomis 1850) that was perhaps the “coldest in route” (Dalton 1852) and had “good water” (Mothersead 1850). It may have become muddy (as did other streams) as traffic crossed it and stirred up the sediments but the water was, at least, consistent. In 1850, Sawyer realized the streams in Junction Valley were not going to last all year saying “they cannot be permanent”. The streams before the City of Rocks in the Raft River Valley were said to run boldly with water (Evans 1850). Pratt, who traveled through the region twice, said there was better water out in the Junction Valley in July of 1853 than when he was there in 1851. Curiously, emigrant guides said there was no water at the junction of the Fort Hall and Salt Lake Alternate (e.g. Ware 1858, Horn 1853) and the journals did not describe much “but a small puddle to wash hands in”

(Burrell 1854). The spring in Emigrant Canyon, where the stage house was located, was one of the principal advantages for locating it there and that spring is still running.

Animals

The diarists discussed animals quite a bit in their journals. This is probably because animals are dynamic, memorable and an important food source! Most reference to animals tends to be about what they ate. There were at least two diarists that complain that there was little to eat and “almost no game of any kind” in the country (Swain 1849, Cone 1849). Many reported eating trout out of the Raft River and its tributaries (e.g. Williams 1853, Variel 1852). The most interesting meals they reported, however, were the “lobsters” or crawfish and mussels that they caught out of the Raft River at several locations (including “the narrows”).

Other animals that they mentioned seeing included snakes (Delano 1849, Williams 1853), a sand hill crane between Elba and Malta (Burbank 1849), mountain sheep 30 miles north of the City of Rocks (Wagner 1852), badger, brown thrush, magpie, birds and hawks nesting in the rocks at the City of Rocks (Perkins 1849), sage hens, hawks, snipes, ducks and rabbits (Mothersead 1855) and skunks (Williams 1853). Some animals were only heard and not seen. There were several diarists who mentioned hearing wolves at night in camp (Jones, 1850; Ward, 1853) around Goose Creek (Cole 1851, Langworthy 1855) and in the Raft River Valley (Bruff 1849). Another interesting animal sighting was crickets. They are never described within the City of Rocks, however, they were described southeast of Malta (Jones 1850) on the Myers cutoff rode (Gaylord 1850) and near Ogden creek on the road from Salt Lake City (Tolles 1849). Tolles (1849) said the road was mostly covered with crickets and Gaylord (1850) said there were so many it frightened his oxen!

It was difficult to judge how many animals there were in the region since so much relied upon what each person encountered and how they perceived the experience in general. For example, G.C. Cone (1849) said there was “no game this side of Rocky Mountains” and “no fish in the streams”. In 1871, however, Shirk reminisced that there were deer, antelope, bear and elk (!?) and sage hens in abundance around his camp near the City of Rocks.

Fire

Only one diary within the collection mentioned a wildfire in the general area. Kilgore (1850) stated that a fire had burned and was still burning after he passed Granite Pass in July. He did not offer any further speculation as to the cause or the result of the fire.

Other

There were several other subjects of note that did not pertain to environmental conditions but were very interesting for the City of Rocks. One was the use of the area as a “post office” of sorts both in caves (Bruff 1849) and at the junction of the Salt Lake Alternate and the Fort Hall roads where sticks were set up for leaving letters and messages (Delano 1849, Owen 1852). Howell (1849) described a currently familiar sighting of a whirlwind out in Junction Valley. And, finally, there were both deaths and births recorded in the collection. There were graves described at the entrance to the narrow pass heading into Circle Creek basin (Carpenter 1857) and out in the Junction Valley. Ward (1853) wrote that a baby had been born in “Pyramid Circle” within the City of Rocks.

Discussion

There does not appear to be any evidence from this collection that the overland migration significantly changed the vegetation along the California Trail within the City of Rocks National Reserve. The grass may have become less available right along the trail as the season progressed. However, the descriptions do not indicate that there was a shift in the availability of feed and thereby the plant community during this time. Furthermore, Great Basin bunchgrasses are most vulnerable to destruction under grazing pressure during the early spring before they have gone to seed (Miller et al. 1994, Young and Sparks 2002). The timing of the majority of emigrants’ arrival into the area in the late summer and early fall would suggest that even though the numbers may have been intense (high stocking rate), the timing of the use was not particularly detrimental.

What the collection does reveal is that the climatic conditions during this period of time were much different than today. The colder and potentially wetter conditions could have supported more grass and herbaceous vegetation than today. For example, climate data provided in the introduction show that during the period of record (1914 to 2005), there was no time in July or August when temperatures reached below freezing – even in extreme years (See Figure 4). Cooler temperatures could have meant less evaporation of soil moisture. Descriptions of the snow capped mountains from May through September could imply that there was more soil moisture available over the growing season as the snow slowly melted and percolated into the groundwater and through the streams. Overall, it would seem that Hunt’s assessment was correct

“...There might be some long, hot dry sections of trail to be traversed and conditions might vary considerably from year to year, depending on the weather;

but the three approaches could be counted upon to provide the sustenance essential for the animal –dependent wagon trains” (Hunt 1989, p. 14).

Finally, it was interesting that the diarists did not mention but one fire since they consistently arrived during the fire season (late summer to early fall). Photos from 1868 clearly show fire scars on the hill slopes (See Plate 4). Had they witnessed such a fire or seen its impacts soon after, they surely would have noted it because fires would have taken their feed and fuel resources.

CHAPTER 3 – ORAL HISTORIES

Introduction

Oral histories are perhaps the oldest form of gathering historical information. Oral histories are subject to many of the same biases as diaries (See Chapter 2). Memory can be subject to biases based on what one believes to be important or not. There is no acid test for truth in oral histories (Lang and Mercier 1991).

Oral history is very reliable; in some ways it is the most reliable form of historical documentation. The strength of oral history, and the foundation of its reliability, is the source – the expression of honestly held opinions and remembered impressions of personal experiences. (Lang and Mercier 1991, p. 103).

Most oral histories focus upon the things that humans remember well – events. Environmental oral histories, on the other hand, ask people to describe the mundane backdrop behind those events. This kind of information is generally much more difficult for many people to recall. In other words, people tend to remember the actors and the storyline of the play much better than the stage on which they were set. Therefore, environmental oral histories focus not only on descriptions of the land and vegetation but also on what has happened in an individual's lifetime. In this way, oral histories can reveal very important information about the way the land was by looking at the way that people lived, made a living and recreated in a place.

Methods

Oral histories were obtained from existing sources such as the Cassia County and Idaho State Historical Societies, City of Rocks National Reserve files and private parties. In addition to previous recordings and transcriptions, past and present residents of the area, landowners, permittees and City of Rocks National Reserve employees were interviewed. Questions and discussion focused upon what the participant remembered, what they had been told about the historic conditions of the City of Rocks and the surrounding area, how they worked the land and how they played on it (hunting, fishing, etc.). Although there is no longer an Institutional Review Board requirement for human subjects in oral histories (True Rubal, Utah State University, personal communication 2003), a release form was obtained from each participant to ensure his or her permission to record, publish and permanently archive the interviews (See Appendix 5).

It is not easy to come into a community as a stranger and find people who are willing to record an interview about their family and their family's lives. I was very lucky to have help

introducing this project to the community from DeAnn Spencer, Sara Jane Ward, Venna Ward and Janis Durfee. Some people were uncomfortable with the notion of recording a conversation and others were too ill to meet with me at all. So, oral history work is never done and there are always more people who should be interviewed. This kind of work should be continued.

Results

A total of 30 people participated in the oral history portion of this project and four people were interviewed but did not record a tape (See table 4). Participants' ages ranged from their early 40s to their late 90s. The 29 tapes from these interviews (approximately 42 hours of recording) were submitted with this report to be housed at the City of Rocks National Reserve headquarters reference library located in Almo. Three of those tapes include an interview with Jim Lloyd and Stan Lloyd recorded while driving through the City of Rocks. Nine transcriptions of previously recorded or hand written oral histories were also used (See Table 5).

These oral histories revealed very useful and consistent information about the historic conditions in the Reserve that were experienced first hand or that were passed down from previous generations. The histories provide more than just descriptions about what people remember the land looking like. More history and fun stories are provided on these tapes than is included in this summary. The results of the discussion concerning environmental conditions are organized by topic including: water, climate, vegetation, fire, erosion, land use, animals, other changes and some other topics of interest. The names of specific participants are cited parenthetically to substantiate at least one source for the information and to assist with future reference. The parenthetical lists show at least one name who mentioned a topic but they are not a comprehensive tally of all who discussed it. This summary reflects the discussions of what people remembered. If there are any errors in the reporting of this information, they are mine.

Table 4: Oral History Participants

Participant's Name	Connection to the City of Rocks Area
*Vinola Archiblad	Oakley resident, grew up in Almo
Jay Black	Elba resident, early Elba family
Richard Bruesch	Mesa, AZ resident, grew up in Almo, early Almo family
Alan Bruesch	Olympia, WA resident, grew up in Almo, early Almo family
Kent Durfee	Almo resident, early Almo family
Janis Durfee	Almo resident,
Grace Durfee	Almo resident, early Almo family
Larry Edwards	Almo resident, early Almo family
Jack Erickson	Almo resident, early Almo family
Kathryn Erickson	Almo resident,
Ned Jackson	Orem, UT resident, former CIRO Superintendent
Richard Jones	Almo resident, early Almo family
Juanita Jones	Almo resident, CIRO employee, early Almo family
William Jones	Almo resident, permittee, early Almo family
Annalee Jones	Almo resident,
Leona Jones	Almo resident, early Almo family
Wallace Keck	Almo resident, CIRO Superintendent
Klint Lloyd	Almo resident, early Almo family
JuneLloyd	Almo resident, early Almo family
Stan Lloyd	Elba resident, early Elba family
Arlo Lloyd	Elba resident, early Elba family
Jim Lloyd	St. George, UT resident, grew up in Almo, early Almo family
*Michael "Mic" Nicholson	Rupert, ID resident, grew up on Circle Creek Ranch
*Barbara Priest	Burley, ID resident, grandfather homesteaded in City of Rocks
Jim Sheridan	Almo resident, early Almo family
Dorothy Sheridan	Almo resident, grew up in Grouse Creek, early Almo family
Brad Shilling	Almo resident, CIRO employee
Phyllis Tracy	Almo resident, early Almo family
Bob Ward	Almo resident, early Almo family
Nancy Ward	Almo resident,
Venna Ward	Almo resident, CIRO employee, early Almo family
Buddy Ward	Almo resident, early Almo family
Marion Ward	Almo resident, early Almo family
*Olin Ward	Boise, ID resident, property owner in CIRO, early Almo family

* Did not record an interview

Table 5: Oral History Transcriptions

Name	Located on File
Jake & Ida Bruesch	Idaho State Historical Society
Newell Dayley	Idaho State Historical Society
Elbert Durfee	CIRO Headquarters
William Eames	CIRO Headquarters
Leona Jones	CIRO Headquarters
Walter Mooso	Cassia County Historical Society
Alice Jane Durfee Rice	CIRO Headquarters
Jim Sheridan	CIRO Headquarters
Delmar Vail	Idaho State Historical Society

Water

When the pioneer families from Utah began settling the Almo area around 1879 there was lots of water (G. Durfee). In fact, there was so much water the settlers formed a water company to spread it out over the valley (G. Durfee). However, the water has changed and it disappears earlier in the year now so that people have a hard time finding good pastures for their cattle (G. Durfee). After the 1930s, in particular, the community began to rely more on wells. Elbert Durfee bought property out by the Raft River because he knew he could drill wells. The Raft River was said to have changed quite a bit. It used to have more water in it and did not go dry so early in the season (B. Jones, A. Jones, K & J. Durfee, L. Jones). Drought and a lack of snow were listed as potential causes for the lower water in the Raft River (B. & A Jones). It was suggested the water table was dropping overall in the Almo valley (B. Jones, L. Edwards). Some believe that farming practices have changed the water (J. & D. Sheridan) particularly in the Raft River Valley where the water level in the river is currently low. Again, that change is attributed to so many wells and new kinds of irrigation (V. Ward, L. Edwards). People used to spread the water over the land using flood irrigation, but the introduction of center pivot and sprinkler irrigation made it easier to water more land and harder for the underlying water table to be replenished (L. Edwards). Even though there are more wells and irrigation, the community does not raise as much grain as they once did because it takes more water than raising alfalfa (J. Erickson, K. Erickson).

Besides farming and wells, other things have changed water sources as well. At one time, the community believed sheep were spoiling the water and causing a typhoid epidemic (G. Durfee, E. Durfee). Some mentioned increasing pinyon and juniper woodlands as a potential cause for the springs drying up. After the very large fire City of Rocks Fire in 2000, some of those springs were reportedly returning in places like Heath Canyon (V. Ward). Another cause

of change in the water was from an earthquake in the mid 1930s. This earthquake was remembered as occurring anywhere from 1934 to 1937. An earthquake in the early 1930s cracked the walls at Tracy's store (P. Tracy). Jim Lloyd remembered that quake being about 1934. Jay Black said it was in 1937. Either way, that earthquake was said to have made the water more brackish up east of the old rock house by Gene and Neil Durfee's property (D. Jones).

Of course, the residents themselves have also worked to change the water courses by constructing several reservoirs and check dams in the Circle Creek drainage (J. Lloyd). Where the Circle Creek drains out the eastern side of the Reserve, there used to be several reservoirs and pipes that directed the water out onto the alluvial fan just east of the entrance on what was the Lloyd family ranch (now owned by the Tracy family) (J. Lloyd). There was also a reservoir by Gene Durfee's old cabin (near Register Rock and "Y" junction in the road) (J. Lloyd and S. Lloyd). Flooding in what was believed to have been the 1950s broke through several of these dams, destroyed the reservoirs, began the cutting of the deep gullies, and lowered the water table (J. Lloyd, S. Lloyd).

Climate

There were two aspects of climate that were commonly mentioned during the interviews – winters and drought. In general, people believe that the winters have become milder. Winters were severe in the 1800s (G. Durfee). When Grace Durfee first came to Almo, in early 1930s, the snow was so deep they had to go out through the narrows just like the mail routes did (G. Durfee). The community used sleighs to get kids from school and to travel in the winter time (G. Durfee, D. Sheridan). Kids used to ice skate down the stream in the Big Cove in the winter time (A.J. Durfee Rice). There used to be snow by Thanksgiving time when Grace Durfee was growing up in Albion and they had to move to town so they could go to school. Venna Ward had also been told by Wesley Ward that there used to be 2-3 feet of snow on the ground and they had to feed the cows by Thanksgiving. Vinola Archibald said they put their overshoes on in October and their feet did not touch dry ground again until April when she was growing up in Almo. Leona Jones said that the winters have gotten really mild because it used to get well below zero and it used to snow enough to cover the fences so that you could just walk right over them. In the winter of 1949, snow covered the fence posts (at least 6 feet high) out at the Bruesch ranch and they could not plow it (A. Bruesch). The same level of snow again in 1952 made 16 foot high drifts that covered up parts of the buildings and the boys had great fun playing on them (A. Bruesch). Both Bill and Annabelle Jones said the winters must have been harder in the past and

they, too, recalled a particularly bad winter of 1948-49 when they were snowed in at Albion for 30 days.

The other common topic concerning climate was drought. Jay Black recalled his Grandfather Lowe saying it was very dry in Elba in the 1890s and that people went to Cassia Creek for water. Ned Jackson said Wally Taylor also told him about a drought in the late 1890s or early 1900s that lasted for several years and turned the land into a “dust bowl”. He said some of the men skinned the dead cows and sold the hides for 50 cents a piece because the beef was not worth anything. Ned Jackson said Wally Taylor told him the livestock had eaten every bit of vegetation in the valleys during that drought and that it took several years before there was good grazing again.

The drought in the 1930s was particularly hard on the communities surrounding the City of Rocks (See Figure 3 in the Introduction). Jim Lloyd grew up herding sheep in the City of Rocks during the drought years of the 1920s and into the 1930s and he said it was terribly dusty. Stan Lloyd said his parents told him that the depression (also in the 1930s) was bad, but that the drought was worse. In the transcription of Elbert Durfee’s oral history, he said the depression itself did not hit the people of Almo too hard because they were pretty self-sufficient. However, he said the community needed the money they would get from selling a cow to purchase other supplies and that affected the community the worst. Several people recalled the federal government bought cattle just to help people out financially and destroyed them because there was no market during the 1930s drought and depression (E. Durfee, J. Erickson., B. Jones). During the drought in the 1930s, meadows that used to be boggy were dusty and, because they did not have wells, people really suffered (V. Ward). Despite all of the problems, some say that drought may have been the best thing that happened to the area because they started planting crested wheatgrass and Russian wild rye (B. Jones). Beyond the 1930s, a more current drought period over the last ten years has changed things in the valley (G. Durfee). People have to bring cattle in earlier because of the drought and it is said to be impacting the springs (B. & A Jones).

Vegetation

When asked about how the vegetation has changed over time, the most typical responses included decreasing grasses (with the exception of planted grass), increasing sagebrush and increasing brush and trees. For example, when the settlers first arrived in the Raft River valley, it reportedly did not have as much sagebrush and was very grassy until the seasons changed it (G. Durfee). Jim Lloyd remembered Ted King telling him that the grass used to come up to his stirrups on a horse and there were not any sagebrush out in Junction Valley. Ned Jackson said

Elbert Durfee once told him his father said they could barely see his cows when they lay down after eating and there was no sagebrush in the area. Durfee's father would have been moving cattle through the area to summer range in the Snake River plains prior to settlement in the valley (N. Jackson).

Jim Lloyd said that the land was overgrazed and the sagebrush took over so that out by Sparks Basin in the 1920s the range was nothing but "sagebrush and dust" (J. Lloyd). Looking at a photo from on top of Camp Rock (See Plate 5) Jim Lloyd said he recalled that land was all in wheat when he was a kid. He said his dad also cleared all that land when he had it after WWII, seeded wheatgrass, and made it a pasture. Now, it has all gone back to brush. All the sagebrush in the Circle Creek area seems higher than Jim Lloyd remembers it. Michael "Mic" Nicholson and Olin Ward said they had treated the sagebrush on their properties and it comes back just as thick within fifteen to twenty years. Crested wheatgrass was planted in the mid 1940s in the City of Rocks (O. Ward, J. Lloyd) and begun to really gain popularity in the 1950s in the Almo area (B. & N. Ward) and in the cove area (A. Bruesch, R. Bruesch). There was also a large campaign by the Bureau of Land Management to increase forage value through seeding crested wheatgrass (D. Vail). The crested wheatgrass has spread out in some areas where it was not originally seeded (N. Jackson).

Many people discussed the increase in pinyon and juniper as well as other brush such as service berry (R. Bruesch, J. Black, J. Lloyd, S. Lloyd, A. Lloyd, A. Bruesch). For example, Jim Lloyd used to run sheep up onto the "Flint Hill" when he was very small (about 6) because his mother could watch from the ranch to see that he was alright. Now, he says, it is so thick "you couldn't see a giraffe up there". There used to be sagebrush and grass enough for the sheep to pick out on the "Green Hill" and all the slopes were just covered with the yellow docks (or arrowleaf balsamroot) (J. Lloyd, K. and J. Lloyd, V. Archibald). Now, it too is covered in pinyon and juniper trees. The serviceberries on the hills around the Bruesch ranch have also really been increasing (A. Bruesch and R. Bruesch).

The aspen stands seem to have remained relatively stable in peoples' memories with the exception of a potential increase around the hand pump well up by the Bread Loaves (J. Jones) and a decrease down by Register Rock (J. Lloyd, V. Archibald, S. Lloyd). Jim Lloyd described a stand of aspen where the Durfee's homestead cabin used to be in the City of Rocks. There was a dam and a reservoir just below the "Y" or the split in the roads to Emery Canyon and the Twin Sisters. The reservoir held the water table high enough that a nice stand of aspen used to grow there (J. Lloyd, S. Lloyd, V. Archibald). Possibly in the 1940s or 1950s, there was a flood that

broke out the reservoir, cut the channel and lowered the water table so much that the aspen all died. Stan Lloyd also recalled there was a natural die-off a few years back in the aspen and said there were a lot of young ones coming back now.

Vegetation in the City of Rocks can change very quickly from recreational uses such as the staging areas for the rock climbers around some of the rocks (B. Shilling). For example, there was a site that went from “a nice meadow in 1997 to a beach” in about 2-3 years from the trampling of rock climbers (B. Shilling). The City of Rocks really tries to manage these areas to prevent that from occurring (B. Shilling). Another vegetation change that seems to occur quite quickly is the introduction and spread of problem plants. Even since the flora list was completed for the Reserve in 1995, three new exotic species have been discovered (W. Keck). The poisonous plant, halogeton, seemed to come in over night because no one really knew it was there until it killed the Jones’s and the Ward’s sheep (G. Durfee, B & M. Ward, L. Jones). Native plants that are poisonous to the livestock include the larkspur (G. Durfee, J. Jones) and death camas which are known to kill the cattle (D. Jones, B. & N. Ward). Juanita Jones said that poison hemlock is beginning to spread. There are also more and more of the purple mustard in the valleys (K. Durfee, J. Durfee, W. Keck).

Stan Lloyd said his Uncle Hepworth told him that Canada thistle was introduced through the sheep. The Canada thistle seems to be getting worse every year as does the burdock (B. Ward, J. Sheridan). Grace Durfee explained that the pioneers brought in the morning glories (also called bindweed) and they have been spreading. The flag lilies (or wild iris) were a problem in the pastures and had to be hand picked so they could not go to seed (G. Durfee, K. & J. Durfee). Johnson grass or crab grass can also be a problem in the meadow hay (B. & M. Ward). Stan Lloyd remembers seeing his first patch of bur buttercup down by his brother’s property in the 1950s and said now it is everywhere. Jim Lloyd did not remember there being any bur buttercup, but said there was a winter the sheep had sore lips because they got into the Russian thistles. Although not yet sighted in the City of Rocks, there is dyers woad out by Goose Creek and in Junction Valley (B. & N. Ward). Bulbous bluegrass can be seen in the City of Rocks and the earliest sighting of it was about 10 years ago (J. Black).

Fire

Most participants do not remember there being very many fires until more recently (G. Durfee, B. & A. Jones). They usually mentioned the big fire that burned through the City of Rocks in 2000 or another large fire out by Elba in the late 1990s. They said that residents did not

really use fire as a way to clear the land for farming either (G. Durfee, B & M. Ward). Other recent fires that were described include one by what used to be the “snake pit” (or the gravel pit) about ten years ago that was not very big (J. Lloyd, S. Lloyd) and a fire up in the Emery Canyon by the “Loggers spring” (W. Keck, J. Jones, V. Ward). During the drive through the City of Rocks, Jim Lloyd recalled there being a fire on the hillsides above the old Shomaker homestead (around the road up to the Circle Creek overlook) that cleared off the slopes well enough to make it a very nice tobogganing spot when he was about ten (1927). Vinola Archibald also recalled a fire across the road from their family ranch (Lloyd family) when she was small (maybe about 1924 or so) that was started by lightening. The oldest fires that anyone could recall or that they had been told about were around the Big Cove area. Stumps and burned logs can be found in areas their parents and grandparents told them had burned (R. Bruesch, J. Sheridan). There was also evidence of previous fires that could be found on junipers from historic fires before the big one in 2000 took out most of the woodland (N. Jackson). (More information concerning the fires and reports on fires from the oral histories will be included in a companion report on the Fire History of the City of Rocks National Reserve.)

Erosion

Soil erosion is very common in the City of Rocks because of the nature of the decomposed granite soils (N. Jackson, W. Keck and B. Shilling). Brad Shilling, who has done a lot of work on erosion control for the Reserve, said the ground could “practically be eroded using an eye dropper”. Measures to check and control erosion have been completed by City of Rocks management including: the trails around the Twin Sisters where 3 foot gullies were forming (J. Jones), around the Bread Loaves where gabions were installed and willows planted (W. Keck, B. Shilling), and the old road around the back of Bath Rock was filled in where it had eroded out some 10 to 12 feet deep to where the road now meets the parking area (N. Jackson). Anywhere there is a foot trail, a livestock trail or a road, it will begin to erode away (N. Jackson). There is evidence of the old wagon roads throughout the Reserve and many areas where they are eroding into swales (N. Jackson, W. Keck). Ned Jackson speculated that the gully starting just north of Camp Rock was actually the old wagon road that has eroded away. Following the big fire in 2000, there was a massive erosion event that made water coming off the burned hillsides look like flowing lava (N. Jackson). That storm also resulted in a lot of head cutting in the drainages, particularly down Emigrant Canyon and near the old stage station (N. Jackson). There was a lot of culvert work completed in the 1990s in the Reserve to move the water off the roads (W. Keck).

Erosion is linked to the vegetation changes, particularly to the willows. Jim Lloyd said that when the willows were destroyed, the gullies formed. He and Stan Lloyd believed that farming across the willows (burning or cutting them out and plowing over them) and the general clearing of the land set up the area for a great deal of erosion. The Lloyd family property used to be flood irrigated using reservoirs where Circle Creek drains out of the City of Rocks. There was a big flood some time in the 1950s that broke through the reservoir and cut the gully out south of their old property. Jim Lloyd also remembered the ditch to the south of the road going into the Reserve. When it flooded, it spread gravel out by their property and that layer of gravel created a well draining surface with underground water storage and springs along that whole alluvial fan (S. Lloyd). Jim Lloyd also remembered there being a deep grove just beyond Camp Rock all of his life but, he said, there were no willows in it because there was not water in it all the time. Similarly, he remembered there being a gully near the Bread Loaves but did not recall the willows being there. (There are willows in both now. They have probably moved down the drainage from the plantings up at the Bread Loaves to the Camp Rock area.) Erosion and the subsequent lowering of the water table were also associated with the loss of aspen near Register Rock (J. Lloyd, S. Lloyd).

Land uses

The oral histories provide a great deal of information concerning land use and changes in land uses over time in the City of Rocks and surrounding area including: cutting meadow hay, timber and fuel wood use, and mining.

Many of the original areas used for cutting meadow hay still remain (G. Durfee, R. Bruesch, A. Bruesch, B. & M. Ward). Meadow hay was cut once a year and would get better and thicker with every cutting (R. Bruesch, G. Durfee). Grass species included in meadow hay were timothy, orchard grass, brome, blue grass, quack grass, and perennial rye (G. Durfee, P. Tracy, B. & M. Ward, J. Black, R. Bruesch). Sometimes the meadows were supplemented with a little extra seed or maybe augmented with some clover (R. Bruesch). Residents have battled with clearing the willows over the years. Richard Bruesch explained that there are two kinds of willows. One has a trunk and the other just has little shoots 1-2 inches in diameter. The small one is always cut and burned back (R. Bruesch).

The original families got their timber out of Almo Park for building their homes (G. Durfee, K. & J. Durfee, J. & D. Sheridan). A variety of fuel wood was used by the communities surrounding the City of Rocks. Many liked to use mahogany because it burned hot like coal (B. & M. Ward, J. Erickson, K. & J. Durfee, J. Black, J. & D. Sheridan, K & J. Lloyd). People also

said they used a lot of aspen (B. & M. Ward, J. Erickson, K. & J. Durfee, J. & D Sheridan, K. & J. Lloyd) some pinyon pine (J. Lloyd, B. Jones, B & N. Ward, K & J Lloyd) some juniper (J. Black, V. Archibald, K & J. Lloyd) and even lodge pole pine, limber pine and fir (R. Bruesch). Aspen was said to be the easiest to cut and made a good fire for cooking because it did not make much ash. The mahogany was the hottest and lasted the longest so it made a good night time wood. While the mahogany was good burning, the pinyon was good for starting fires (J. Lloyd) but it was less popular because it was so “pitchy” (A. Bruesch).

Dick Jones’s father hauled wood for his family, the school house and the church. He went all over and into the City of Rocks cutting both live and dead wood including aspen, pine mahogany and cedar. Jim Lloyd described two wood roads in the Reserve. One was just before Bath Rock and he said there are not any old trees left there anymore. The other was the old road around the Circle Creek basin (See Plate 14). After the war, and when electricity came to the valley, many residents stopped using as much fuel wood and many installed oil burning stoves (L. Jones, B. & N. Ward). Some residents got coal furnaces and bought their coal at Tracy’s store (B. & N. Ward). Finally, during the time when people were making bricks for their homes, there were kilns set up down in the fields behind Phyllis Tracy’s house and they cut and burned willows in the kilns (P. Tracy).

The City of Rocks has not experienced a great deal of mining (with the exception of all the digging for hidden gold around Treasure Rock!). One resource, however, that was mined for a time was mica. The Lloyd property, known as the “mica knolls”, was mostly used as pasture by Jim Lloyd’s father. Then, a gentleman from Utah named Vern White came out and set up a gasoline powered mill back behind the Bath Rock area. He mined mica out of his property that was rocky and had to be crushed (or milled). The mica on the mica knolls was more pure and came out in large sheets. During the winter of 1939-1940, Jim Lloyd set up a trailer house out on the mica knolls and pulled out close to 25 tons of mica. The mica was going to be taken by Vern White, ground up, and sold for use in insulation and cast stone for buildings. By the time the winter was over, Vern White had a new job with the Rural Electric Administration and he was no longer interested in the mica. Elbert Durfee, who was always an enterprising man, purchased the mica from the Lloyds, ground it up using his grain chopper, and used it to insulate his house (J. Lloyd and G. Durfee). There was also a very short period of time (around the late 1980s) when some oil well rigs were put in the City of Rocks in the Circle Creek basin area (J. Erickson, J. Lloyd).

Another common land use within and around the City of Rocks was pine nut harvesting.

Many people talked about the tradition of fall pine nut harvesting (P. Tracy) and that it, too, was a time that the Native Americans would come from Fort Hall, camp, collect pine nuts (B. & M. Ward, J. Black) and trade hides for their beaded deer skin gloves (G. Durfee, L. Jones, J. Erickson, B. & N. Ward, R. Bruesch, A. Bruesch). Grace Durfee said her family would collect close to 25 pounds without the cones and Buddy and Marion Ward remembered getting about 50 pounds in sacks with the cones still on them. Jim Lloyd said he was raised on pine nuts and they would sell them to earn a little money to buy a bicycle tire or something. Leona Jones said there were more pine nuts out by Yost. There are still pine nuts out there but not as many of the young people pick them (G. Durfee). Residents also gathered choke cherries in the City of Rocks around Treasure rock and in the creek past Emery Canyon (P. Tracy, J. Jones). There was edible lambsquarter (also called pigweed) around the area and watercress at Reid Springs (G. Durfee).

Animals

The participants all have many memories about animals. Some of those memories come from hunting or trapping experiences and stories. Larry Edward's Grandfather killed a bear in the City of Rocks. Cougars were often hunted (G. Durfee, A. Bruesch, R. Bruesch). Several of the earliest settlers in the City of Rocks and surrounding areas were trappers. Walter Mooso, a homesteader west of the Twin Sisters said he bought most of his traps from Mikesell who had homesteaded on the east side of the Twin Sisters. He and other early trappers caught coyotes, muskrats, badgers, skunks, mountain lions, lynx, bob cats and weasels (W. Mooso, B.T. Kimber). Venna Ward found an old bear trap when she was working on trails in the City of Rocks. A couple of game animals were planted unsuccessfully by the state including turkey and elk. People did not really want elk around because they would get into the haystacks (G. Durfee). The turkeys apparently did not survive the winters very well (B. & M. Ward and others).

Some of the memories come from animals that were a problem. There were bounties on several animals considered to be pests. There had been a bounty on squirrel tails from about 1912-1920 (G. Durfee). People could get a penny a squirrel tail and so some people would put out poison oats to kill them (J. Lloyd). Gophers and ground squirrels were a problem because they would get into the fields and plug up the swather (B. Jones). Some reported an increase in packrats, weasels and the Uintah ground squirrels (B. Shilling) especially around the campsites where they getting fat from being fed (J. Jones).

There used to also be a lot of magpies which were a problem because they were nest robbers. Jim Lloyd said they would get into the chickens and eat the eggs so his father would shoot them. Magpies, too, carried a bounty. In the early 1930s people took them to Tracy's store and Joe Tracy would count them (J. Erickson). You could get anywhere from 1 to 5 cents a head for the bird (L. Edwards, J. Black and J. Erickson) and 2 cents for an egg (J. Erickson). Packrats were also a problem and had to be burned out of the rocks around the Lloyd family ranch and other places nearby (J. Lloyd, V. Archibald, K. & J. Lloyd). Many people recalled having rabbit drives when the populations would get large (J. Erickson, J. Jones, S. Lloyd, K. & J. Durfee). There was also a bounty on mountain lions in the 1950s (L. Edwards, J. Black and J. Erickson).

Another troublesome animal was the porcupine. There used to be lot of porcupine and people worried about them because they were "unpleasant" (L. Jones) and they would get up into the orchards and strip bark from the trees (G. Durfee). Porcupine did not kill the trees by barking them unless they stripped it all the way around, but they were considered a threat to the trees and hunters were encouraged to shoot them (J. Lloyd). Porcupines were generally shot when they were encountered. No one ever reported seeing them in the pinyon trees. People said there does not seem to be as many porcupines now (A. Bruesch, and others).

Another animal that was troublesome and unpleasant was the rattlesnake. The area around the cove did not seem to have as many but they were frequently seen on the "Flint Hill" area. One interesting control over the rattlesnake population occurred when homesteaders in the City of Rocks were raising hogs. According to Jim and Stan Lloyd, Hull's hogs (at the Circle Creek ranch) and others like the Flower's helped keep down the population of rattlesnakes. The thick layer of fat under the hog skin reportedly keeps the snake poison from circulating in their bodies, so hogs were sort of "immune" to the bites. The hogs would stomp on the snakes and just "unzip" them out of their skins (J. Lloyd and S. Lloyd). Jim Lloyd's father taught him to always carry a stick for killing rattlesnakes (Hull's hogs apparently did not get them all!) and he had a jar full of rattles.

There were some animals that people remembered having around that are now gone. Many residents recall fishing in the Raft River and its tributaries as kids. Many report that the fish have disappeared from these streams (J. Sheridan, A. Bruesch, R. Bruesch, K. & J. Durfee and others). The fish used to be so plentiful that some were able to grab fish out of the water by hand (K. Durfee, A.J. Durfee Rice) or with buckets (W. Rice). Leona Jones's husband (Oscar) drove about 20 -25 head of wild horses from around the City of Rocks to Deweyville to earn the

money to buy their first house. Jim Sheridan also remembered rounding up wild horses west of the Twin Sisters and herding them into a “natural corral” where the kids would play at branding the colts. Delmar Vail’s Grandfather told him that the military would release stallions into the wild horse herds on the Jim Sage to improve the stock and then harvest close to 2,000 head from that area. There are no longer wild horses found in the City of Rocks.

Although there were still some listed as being in the City of Rocks, beaver were not a major species that people remembered seeing much. Alan Bruesch’s grandfather caught a beaver up stream from their place. Buddy and Marion Ward remembered there being beaver up in Almo Creek that were a problem because they were using up all the aspen. Leona Jones only recalled beaver out in Cotton Thomas basin area.

There were animals that people reported seeing more of in recent times. Several participants said there are a lot more deer now. Jay Black said it was exciting to see a deer when he was kid because there were so few of them and now there seem to be hundreds more. They also reported that the deer would come right down into their yards (J. Erickson, P. Tracy, B. & M. Ward, K. & J. Durrfee, J. Black, V. Ward, and N. Jackson). This is partially attributed to the drought and that it is so dry in the hills. Several people mentioned that they also used to not see any cougar and now they, too, are spotted in town and in people’s yards (J. & D. Sheridan, K & J. Durfee, J. Black, V. Ward). The Bruesch family takes the prize for having the strangest pets which have included both cougar and deer!

Birds get mixed reports of increases and decreases in their populations. Larry Edwards believes there are fewer birds, in general, than there used to be. Juanita Jones says there seem to be less bald eagles and owls. Others notice some bird populations on the rise like the bluebirds, meadow larks and starlings (K. & J. Durfee) and pinyon jays (W. Keck).

Other Changes

Many of the local people have stopped going into the City of Rocks because they say there are too many other people up there now. In the past, the City of Rocks was mostly used by local people (D. Vail). It was been a popular place for the locals to go for picnics, family reunions or just to play. From what people described in these histories, people have been climbing, rolling and moving rocks out there since as long as there have been people coming into this valley (See Plate 6). Local people have different names for the rocks than what have become common for the Reserve (J. Lloyd, S. Lloyd, and L. Edwards). There were a couple of special memories about what everybody called “Camp Rock”. The Ericksons celebrated their wedding (with a party called a shivery) out by Camp Rock with fried chicken, salads, and a camp

fire. Jim Lloyd said the area in front of Camp Rock on the road used to be closed in with a covered roof and that was where he had been told the stage would change horses. Also, around the back side of Camp Rock (away from the road) was the spot that John Flowers (one of the homesteaders) had closed in for his hog pen. The memories as well as the writing are beginning to fade and you cannot see the emigrants' inscriptions from the road anymore (V. Ward). There is now a whole generation of kids in the community that have only known the City of Rocks as a National Reserve (W. Keck).

Table 6: Animals Mentioned in Oral Histories

Mammals

Coyote
 Cougar
 Ground Squirrel
 Porcupine
 Jack Rabbit
 Snowshoe hare
 Gopher
 Elk (planted)
 Skunks
 Deer
 Beaver
 Moose (in hills behind Elba)
 Antelope (out by the old E.Y. Ranch)
 Badger
 Bear
 Bob Cats
 Raccoon
 Fox
 Marmots
 Chipmunks
 Bats
 Cottontail Rabbits

Fish

Trout

Reptiles and Amphibians

Green Leopard Toads
 Frogs
 "Blow Snakes" or King Snakes
 Rattle Snakes
 Water snakes
 Rubber Boa

Birds

Sage hen
 Pheasant
 Starling
 Bluebird
 Robin
 Meadowlark
 Canary
 Turkey (planted)
 Curlew
 Turkey Buzzard
 Chuckar
 Oriole
 Hummingbird
 Crow
 Bald Eagle
 Owl
 Sandhill Crane
 Duck
 Geese
 Golden Eagle
 Sparrow
 Sage grouse (Junction Valley)
 Cliff Swallow

Insects

Tics
 Grasshoppers

Other Aquatic

Shrimp (in pools on Bath Rock)

The management of the City of Rocks has also created changes. There is a lot more supervision of the livestock which used to be turned out in April and now do not go out until late May (D. Jones). In the 1970s, the City of Rocks became a “free for all” and there was a large influence from the drug culture, vandalism and so much garbage that many of the locals did not want to go in there anymore (V. Ward). For a while, the City of Rocks looked pretty bad from the human uses but it is said to look better now that it is more controlled (R. Bruesch, A. Bruesch). Among the employees of the Reserve, the new reservation system seems to be really changing the clientele at the City of Rocks. Camping used to be on a first come first serve basis. Now that people have to plan ahead, there are less of the last minute rock climbers and more family camping with kids and RVs (B. Shilling, J. Jones, V. Ward, W. Keck). The camp sites have been overflowing in past years (B. Shilling). The new campground east of Smokey Mountain is expected to help with the campground overcrowding (W. Keck). And the increased use in Castle Rocks will soon help to spread out some of the climbing day use (B. Shilling).

Other Topics of Interest

The history of some of the structures (buildings, roads, etc) within the Reserve was also revealed in these interviews. Jim Lloyd explained that William E. Tracy built the stone house and sold it to John Hull. John Hull enlarged the front windows and he put that new capstone in that had his initials but the Tracy’s built it. Job Adams lived in it for a while. The Shoemakers lived in it until Olive died in 1935. Jim Sparks lived in it until 1939 and then, the Nicholsons bought it. The stone house in Almo with the tree growing out of it has been a saloon (L. Jones), a store, and a barber shop (J. Lloyd) in the past.

Jim Lloyd said that the California Trail never went where the road is now which was built in 1935. The California Trail and the Salt Lake Alternate used to run parallel to each other for a while where they joined coming out of Emigrant Canyon (J. Lloyd, N. Dayley, also confirmed in the General Land Office Survey notes). The old road in the 1940s photo (See Plate 14) was a wood road that people used and the same one that he and Jim Sheridan used to go visit and tease the Shoemakers (J. Lloyd). The roads used to follow the section lines through the Circle Creek basin once people started homesteading and fencing their properties (J. Lloyd). It used to be hard to get a Model T up the road through Emery Canyon and people had to get out and push them up the hill there (J. Lloyd). Jim Lloyd remembered watching crews build the road over the pass by the Twin Sisters. Prior to that, the road came along the section lines and cut in front of the Mikesell’s place (See Plate 11).

The metal rods sticking out the rocks just past the “Y” in the road were put in by Jim Lloyd back in the 1940s using a hand drill. He had a trailer house up on the “Mica knolls” and Vern White and his wife were living up by where the mill was in the winter of 1939-1940. Jim Lloyd said he used the rods to construct antennae for better radio reception by running a wire from one rod to the next. He said one of the rods was part of an old Model T line and the other was probably an old buggy axel. The corral up near the Bread Loaves was once owned by Ted King and there is a picture of three men branding cattle in that corral that was used in a calendar (J. Lloyd, Bill and Phyllis Tracy, and Deann Durfee). The man on the horse is Ted King, Bill Tracy is sitting on the calf and the other man is Cyrus Bulhre (Bill Tracy, personal communication 2006) (This photo was provided in Appendix 5).

Discussion

Much of the information in these oral histories is congruent with what was recorded in the archival documents. The earliest people to settle in the City of Rocks and the surrounding communities seem to have experienced a land that was very different than it is today. There was reportedly more grass, more water, more snow and more harsh winters. Those earliest settlers, however, also experienced a land very similar to the one today. There were droughts that turned boggy areas to dust, impacted their livestock, their culinary water supplies, and the vegetation. Part of the difference between then and now is the technologies available to people for coping with the droughts. For example, the oral histories tell of increasing farming of alfalfa with the assistance of wells and center pivot sprinkler systems. During the drought in the 1920 and 1930s, the homesteaders who relied upon dry farming were “starved out” because they could not pay their taxes. At that time, people went the way of the water. If it was gone, so were they. Several moved to Burley following the Minidoka Water Project (W. Mooso).

The droughts took a toll on the communities, the livestock and the land – particularly the native grasses and forbs. Shrubs (like sagebrush) and trees (like juniper) can tolerate drought better than more shallowly rooted plants like grasses and other herbaceous species. The understory vegetation suffered under both the dry conditions and a level of livestock grazing that could not be sustained during a drought. The arrival of crested wheatgrass was said to have “saved that country”. It certainly must have made an improvement in the amount of feed available but it did not seem to have been enough to have held back the erosion from years of understory losses higher in the watershed (See also descriptions from Minidoka Forest in Chapter 1). It appears that a wetter period returned (See also Figure 3 in the Introduction) caused

some flooding, washed out reservoirs, and began cutting the riparian areas down. This, in turn, lowers the water table, drains the meadows and provides even more opportunity for sagebrush to flourish. Cultivation and herbicides may have also played a part in reducing the level of native herbaceous understory. As discussed previously, it can take several decades for the native vegetation to reoccupy a cleared site. Also, herbicides like 24D used to spray back the sagebrush are very hard on native forbs like arrowleaf balsam root (yellow dock) (Blaisdell and Mueggler 1956).

Finally, there seems to be several factors involved in the increasing woodland densities as well. Most residents do not recall there being a lot of fires during their lifetime. There certainly was some fire suppression occurring but there also seems to have been a lack of fire because of the lack of the fine fuels (grasses etc.) to carry fires. A lack of fire in conjunction with drought conditions that favor the woodlands, decreasing use as a fuel wood as people switched to oil, coal and electric heating, decreasing use of juniper posts for fencing in favor of metal rods, and decreasing removal of the seeds in fall pine nut harvesting all appear to be potential influences for the woodland expansion. In addition, no one recalled any major insect outbreaks that would have controlled the populations until very recently (See also BLM Condition Report 1986).

Clearly there were a number of overlapping changes in the soils, seed banks, precipitation levels, stocking rates and timing of use, fuel wood cutting, fence post cutting, land clearing, forage seeding, wildlife uses, agricultural developments and recreational activities that have all contributed to the changing vegetation over time in and around the City of Rocks. This history is important for understanding the range of variability on this landscape and what may be its potential. The next chapter will illustrate some of the changes discussed in this and the archive documents chapter using historic and repeated photos.

CHAPTER 4 - REPEAT PHOTOGRAPHY

Introduction

Repeat photography is the act of locating the site of a previous photograph, finding the original camera position, and creating a photograph of the same scene (Rogers et al. 1984). The method was first used to examine landscape changes in 1888 by Sebastian Finsterwalder to study glaciers (Rogers, et. al 1983, Turner et al. 2003). It was first used in the United States for comprehensive study of vegetation change in the early 1960s with the work of Phillips (1963) and Hastings and Turner (1965) (Turner et al. 2003). Since then, it has become an increasingly popular method for examining vegetation change across the western United States including the Northern Rockies (Gruel 1983), Arizona (Bahre 1991, Webb 1996), Colorado (Veblen and Lorenz 1990, McGinnies et al. 1991), Utah (Rogers 1982, Kay 2003) and South Dakota (Grafe and Horsted 2002).

The popularity of the method may come from the fact that it is a relatively simple and elegant way of demonstrating change to a variety of audiences. Further, photographs are believed to be unbiased and accurately represent historic conditions. Unfortunately, photographs can be misrepresentative for a number of reasons (Rogers et al. 1984). For example, simple artistic intent can alter what is photographed or where a photograph is taken and, therefore, they do not represent the full landscape (Rogers, 1984). In other words, historic photographs often only represent a very small portion of the total area of interest (Bahre and Shelton 1993). In addition, the viewer may believe that the photo represents a “pristine” condition when, in fact, most of the earliest photos were taken at least a decade into European American settlement and land use (Bahre and Shelton 1993). When these potential shortfalls are taken into consideration, historic photos offer a very useful method for examining vegetation and other landscape changes. Furthermore, the biases can be minimized by using photographs from more than one individual (Rogers 1984), and by using them in combination with other forms of evidence – archival or biological (Swetnam et al. 1999).

Methods

Historic photos were collected from the City of Rocks National Reserve, Cassia County Historical Society, Idaho State Historical Society, Utah State Historical Society and the National Archives and Records Administration photographic collections, the USDA Forest Service Region 4 Office and the Bureau of Land Management Burley District Office as well as from private individuals. The effort yielded a total of 114 historic photos that were provided digitally

to the City of Rocks National Reserve (see Appendix IV). Five of the photos were taken in Castle Rock State Park.

With the original photographs in hand, a search was initiated to locate the original camera locations and positions (Rogers 1980). A majority of the photos were taken from road (or old roads) within the Reserve. This, in addition to unique and recognizable rock formations, made relocation fairly easy for many of the shots. However, some were taken from what is now private land and permission had to be obtained from private land owners prior to searching for the location. The City of Rocks seems to have always inspired rock climbing and several photographs were taken from on top of the rock formations. In that case, Brad Shilling, Climbing Ranger for the City of Rocks National Reserve, kindly assisted in repeating those shots. Other repeats, unless otherwise noted, were taken by me.

It is desirable, but not always possible, to replicate the time of year and of day in repeat photography (Rogers 1984). When possible, the author attempted to duplicate the correct time of day and lighting for the photos. However, under the time frame for this project and with the number of photos there were to be repeated, this was not always possible. The photos were repeated in the August and September of 2005. Three camera types were used in an attempt to replicate the correct focal length from this wide variety of lenses used in the historic photos including: a 35mm Olympus with a single lens reflex 52 mm lens, a 35mm Olympus “point and shoot” model with a 38-80 mm zoom, 3.3 megapixel and a Nikon digital camera with a 38-152 mm zoom. Getting an exact match can be difficult in the field. Rogers (1984) recommended using a Polaroid camera which produces an instant print to determine if the framing is correct. Digital cameras now provide similar assistance in the field and do not have problems with light leaks or improperly loaded film. The vast majority of the repeats, therefore, were taken with the Nikon digital camera. Non-digital photos were scanned into a digital format using a Canon CanoScan LiDE 60 scanner. The closest pairs were then selected and, in some cases, cropped digitally to create the best match possible (Veblen and Lorenz 1990). Color photos were converted to grayscale digitally for ease of comparison between paired photos.

Results

The earliest known photographs in the City of Rocks National Reserve were taken by Timothy O’Sullivan in 1868 as part of the King Survey of the 40th parallel for the United States Geological Survey. O’Sullivan created these photos using what is called a “wet plate” photographic process (Grafe and Horsted 2002). He had a large box camera that exposed a

chemically coated 9 x 12 inch glass plate which had to be developed immediately in a dark tent or wagon and then stored carefully (King Survey Records 1868, Grafe and Horsted 2002). These glass plates were shipped back to the USGS offices in Washington D.C. over the course of the expedition (Records of the King Survey 1868). The photographs are now housed in the National Archives and Records Administration. This collection included four “stereographs” or “stereoviews”. Stereoviews are images created using two identical lenses that record the view from slightly different angles on the same glass plate so that when they are printed, mounted on cards and viewed through a stereoscope they appear three dimensional (Grafe and Horsted 2002). One of the stereoviews was badly damaged (See Plate 4) so it was possible to print only three of the stereoviews to size and mount them on cards for viewing with a replica of a Holmes stereoscope (provided with this report). These stereoviews were also used in the repeated photo sets by cropping one side of the image. The quality and detail available from these photographs is amazing because of the size of the negative, the ability of the photographer and the chance to wash the plate and re-expose if the image was not acceptable.

These 1868 photographs are interesting not only because they are the first known images of the City of Rocks but also because they represent a snap shot in time between two very important eras for the Reserve. These photos are taken at the end of the California Trail era and the mass movement west by wagons and the beginning of permanent settlement in the City of Rocks and surrounding area. By 1860, the California trail had seen some 200,000 families make their way west (Unruh 1978). Although the exact numbers of livestock that traveled over the trail are unknown, in 1850 some 7,500 mules, 31,000 oxen, 23,999 horses, 5,000 cows and 9,000 California-bound wagons are known to have passed Ft. Laramie (Little 1994). One year after these photos were taken, James Q. Shirley summered cattle in the area and ushered in permanent use of the area for livestock grazing. One year after these photos were taken the transcontinental railroad was completed and a new era of westward transportation was born. Twenty years later, in 1888, George Lunsford patented the first homestead in the Reserve (Homestead Records). Clearly, a lot happened in the Reserve before and after these 1868 photos. They are by no means a representation of a “pristine” land if such a thing even exists. They do, however, reveal some interesting changes and information about the landscape at that time including changes in species diversity, historic fires and impacts of fire suppression.

Of the 114 photos collected, 62 were repeated and were provided with this report (See Appendix 4). The repeated photo sets include 59 from within the City of Rocks National Reserve and 3 from within Castle Rock State Park. Since many of the photo sets demonstrate

similar changes through out the Reserve, a representative sample of 25 repeat photos were printed in the following plates. Each photo set includes information about where the photo was obtained, a date if it was provided or an idea of when the photo was taken, a description of the camera location and general cardinal direction, and a general description of what the photo contains and how it has changed in the recent repeat. All the images were retaken by me with the Nikon digital camera unless otherwise noted.

The following 25 plates are organized chronologically to assist in following the landscape over time. Several general types of change can be observed through the decades. First, there are the many obvious structural changes in roads, buildings, power lines or telephone poles and fencing. Second, there is a general increase in the density and expansion down slope of the pinyon and juniper woodlands. In many cases, the increase is observable as an historic fire scar across the landscape is reoccupied and filled in by woodlands. Third, a general increase in grasses can be seen in the photos. Some are native grasses and some are remnants from seeding of the introduced crested wheat grass. Crested wheat grass was introduced into the Reserve around the mid 1940s (Olin Ward, personal communication 2004). The lack of feed (grasses) in the photos through the 1940s illustrates why the residents of the area who grazed livestock found crested wheat grass to be so desirable. Fourth, sagebrush cover changed depending upon the land use history at the site. For example, on some areas within private land, the sagebrush cover has been reduced through treatments since the older photo was taken. At other times, the camera angle is almost difficult to repeat because of the increased height and density of the sagebrush. Finally, there are other changes such as a general increase in conifers within aspen stands and a decrease in visible riparian vegetation because of incision of drainages.

It is important to note that many factors influence vegetation change and they all are occurring simultaneously throughout time. Therefore, the causes are difficult to tease apart and rarely is there a single cause for vegetation change. Factors influencing vegetation dynamics can include: climate, soils, herbivory, livestock grazing, land use such as dry land farming or herbicide treatments, recreation, erosion, fire and lack of fire, insects and parasites, road building and other disturbances. Several of the repeat photographs do not represent the aspen and riparian vegetation well because they were photographed during fall color and the yellows do not stand out as well when they are converted to black and white images. When there could be misinterpretation, this issue is noted within the Plate's text. The information provided with each photo is from notes and memory and more information may be available (i.e. species

identification) once the changes in the vegetation can be “ground truthed” and examined using the biological evidence.



Plate 1(a) Timothy O'Sullivan, National Archives and Records Administration, 1868
The original photo was taken looking north toward the "Twin Sisters". The vegetation in the foreground includes arrowleaf balsamroot, rabbit brush, grass (probably bluebunch wheatgrass), antelope bitterbrush and some sagebrush. Note the anthill in the center foreground.



Plate 1(b) Lesley Morris, 2005
About 130 years later, species diversity in the foreground is limited to sagebrush and crested wheat grass. Pinyon and juniper have occupied the granite apron.



Plate 2(a) Timothy O'Sullivan, National Archives and Records Administration, 1868
This photo was taken looking north just a little to the left of camera position in Plate 1(a). This photo is one half of a stereoscopic view which was damaged in the left corner. This perspective shows a standing dead shrub in the foreground that was probably burned and more sagebrush than Plate 1(a).



Plate 2(b) Lesley Morris, 2005
About 130 years later, the vegetation at this site is sagebrush and crested wheat grass with pinyon and juniper filling in on the granite apron.



Plate 3(a) Timothy O’Sullivan, National Archives and Records Administration, 1868
The original photo was taken looking northwest from what is now the Box Top Trail.



Plate 3(b) Lesley Morris, 2005
This repeat about 130 years later shows the increase in conifers in both the foreground and the background slopes.



Plate 4(a) Timothy O'Sullivan, National Archives and Records Administration, 1868
The original photo was damaged in the left corner where the glass negative had begun to peel. It was taken looking northwest from near the top of Box Top Trail. The distant slopes in upper right corner show signs of past fire.



Plate 4(b) Lesley Morris, 2005
Damage prevented a better match in the foreground for this photo but the ridgeline is very similar. About 130 years later, the fire scars are no longer visible on distant slopes in upper right hand corner. In addition, the conifers have occupied the valley bottom and are very dense.



Plate 5(a) Utah State Historical Society, no date

Original photo is taken looking west from on top of Camp Rock. Though no date is available for the photo, it is likely early 1900s because a part of the California Trial (visible in the foreground) still appears to be the only real road, it is on the south side of Camp Rock and there is no evidence of homesteading activity. The smaller trails to the left are sheep trails.



Plate 5(b) Brad Shilling, Climbing Ranger, City of Rocks National Reserve, 2005

As seen nearly 100 years later, none of the trails are visible. This area around Camp Rock was put into crested wheat by at least the 1960s (See Plate 23). Sagebrush has re-occupied the site and is now nearly 4 feet tall in some areas. The gully, which runs through the top right hand portion of the photo, does not appear to be as deep as in earlier photo. However, the tall sagebrush make it difficult to see how deep it is in the current picture.



Plate 6(a) Cassia County Historical Society, no date
Original is taken from on top of Treasure Rock looking east. It is believed to be taken in the early 1900s based on clothing, other photos of this party in a white top buggy and no evidence of Homesteading.



Plate 6(b) Brad Shilling, Climbing Ranger, City of Rocks National Reserve, 2005
Pinyon-juniper woodland has completely filled in the fire scar that was visible on the north facing slope of the Smokey Mountain in the original picture.



Plate 7(a) Cassia County Historical Society, no date

Original is also taken on top of Treasure Rock looking east. These gentlemen are part of the same group pictured in Plate 6 and it is believed to be from the early 1900s for the same reasons listed there. The fire scars on Smoky Mountain in distance are very clear in this photo. Note that the road goes around the south side of Camp Rock.



Plate 7(b) Brad Shilling, Climbing Ranger, City of Rocks National Reserve, 2005

Pinyon-juniper woodland has completely filled in the fire scars on the Smoky Mountains and has started to move into the valley floor in the lower right hand corner south of Camp Rock. The line to the right of the road in the corner of photo is the deep gully that now runs to Camp Rock (See Plate 5).



Plate 8(a) Utah State Historical Society, 1918

Original photo is from the Emery Canyon road looking east back to the Bread Loaves. This photograph was taken about a decade after this area was put into the Forest Reserves. Presumably, it was made a Reserve to protect the watershed from overgrazing. The image is strikingly clear for its time. The land appears to be dominated by sagebrush.



Plate 8(b) Lesley Morris, 2005

Nearly 100 years later, the area appears very similar. However, there are more grasses visible in the foreground.

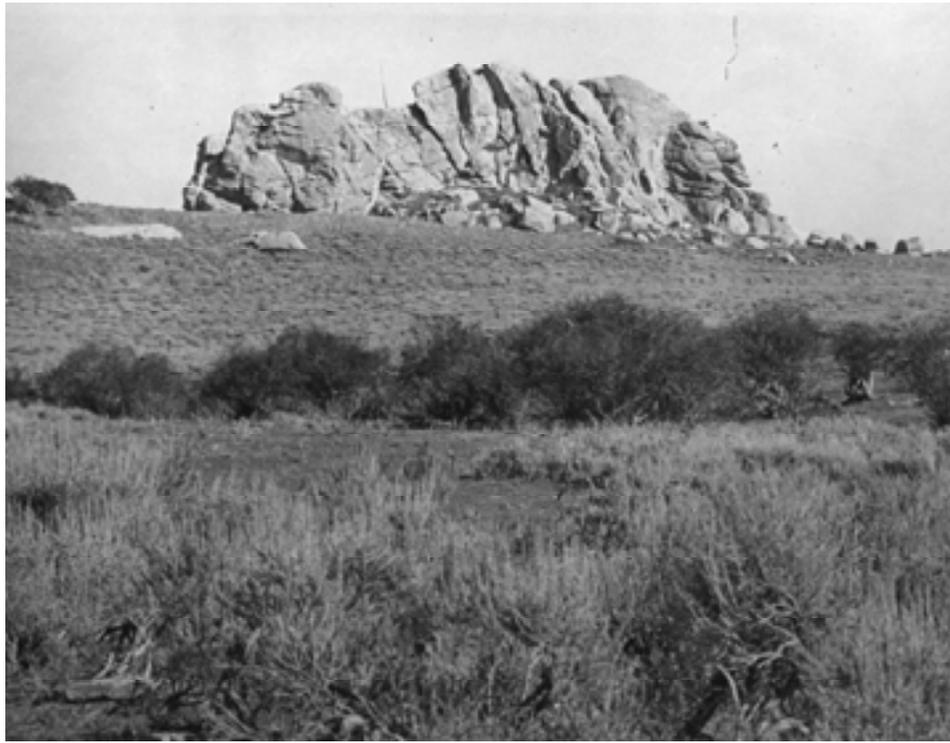


Plate 9(a) Utah State Historical Society, 1918

This photo was taken from the Emery Canyon Road looking west at a rock formation now known as “Go West” in the far northern portion of the Reserve. This photo, taken about a decade after this area was put into the Forest Reserves, shows signs of heavy livestock use such as the bare ground just past the sagebrush in front, very little grass and coppicing around the Mountain mahogany in the center right of the photo.



Plate 9(b) Lesley Morris, 2005

Nearly a century later, there are more grass species and less sagebrush in the foreground. It is unclear what happened to the Mountain mahogany.



Plate 10(a) Idaho State Historical Society, 1923

The original photo was taken from the road (visible in left hand corner of the photo) looking northeast toward the Twin Sisters. The foreground to the distance is mostly sagebrush with no recognizable grass species present. Many young junipers are seen in the valley.



Plate 10(b) Lesley Morris, 2005

About 80 years later, fire burned a portion of the foreground at this site. The current vegetation along the roadside is largely invasive species such as tumble mustard, curlycup gumweed and cheatgrass. The Reserve also reseeded this area following the fire in 2000. Pinyon and juniper have filled in on the granite apron of the Twin Sisters in the distance and the hillsides north of Pinnacle Pass in the upper right hand corner.

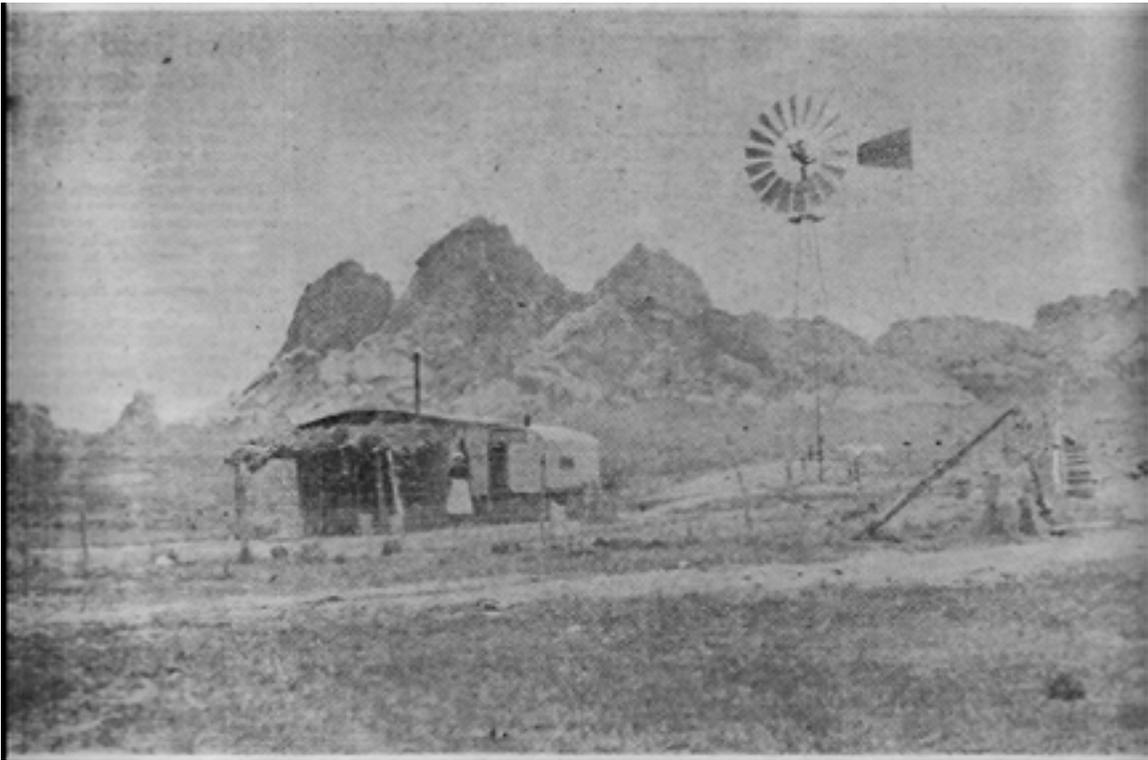


Plate 11(a) South Idaho Press, 1955, no date published with the photo

This is the best reproduction of this photo that could be obtained from the South Idaho Press Archives. Although there is not a direct repeat of this photo, it goes with this set. The Mikesell's homesteaded this land by the Twin Sisters in 1910 and lived here until 1920 (South Idaho Press, 1955). Clearly, the photo is prior to the one in Plate 11(b) from 1930 since the windmill and the house are still intact. Therefore, it is believed that the photo is probably taken in the early 1910s. The California Trail ran across their property in front of the house. It can be seen as the light streak in the foreground of the image. Their sheep camp is to the right of the house. Mrs. Mikesell described their land as having sagebrush "like tall trees with blue grass growing among it" (South Idaho Press, 1955). The area in the foreground must have been cleared as this description seems to fit later photos better.



Plate 11(b) Utah State Historical Society, 1930

This photo is taken looking west from just off the road on what was the Mikesell's homestead. The building in this picture, according to Jim Lloyd (see Oral History Section), is a shed and not the Mikesell's home. Remnants of the old windmill and corral are visible on the right side of the photo.



Plate 11(c) Lesley Morris, 2005

Seventy five years after the photo in Plate (b), all of the structures are gone and the California Trail is no longer visible. The sagebrush is not quite as dense as it appears in the 1930s photo. There are also a few more visible grasses (mostly crested wheatgrass).



Plate 12(a) Utah State Historical Society, 1930

This photo was taken looking northeast from the western side of the Twin Sisters on private property. The sagebrush is very dense throughout the entire valley.



Plate 12(b) Lesley Morris, 2005

Seventy five years later the sagebrush is much less dense. The sagebrush has been sprayed to thin it and the area was seeded with crested wheat (Olin Ward, pers. comm., 2004).



Plate 13(a) Utah State Historical Society, 1930

Original photo is taken from what is now the Nicholson's property looking west. Notice that the ruts of the two-track road are still visible in the foreground. The vegetation in the foreground is difficult to discern but looks to be weedy annual species such as cheat grass and Russian thistle .



Plate 13(b) Lesley Morris, 2005

The site 75 years later is dense sagebrush and crested wheat grass in the foreground. The area has been treated to thin sagebrush several times according to property owner. There is some loss of the woody riparian vegetation running through the center of the photo. The apparent decrease is due to a combination of factors. First, the repeat photo was taken in the fall and the yellow leaves did not stand out as well as the green in the original when it was converted to black and white. Second, the vegetation is lower in the landscape where the riparian area has incised. Likewise, what appears to be a loss in aspen on the hillside in right corner is due to the fall color differences in black and white.



Plate 14(a) Idaho State Historical Society, 1940

This photo is taken looking west into the Circle Creek basin from the Almo road into the City of Rocks National Reserve. The building is a shed or a barn on the Circle Creek ranch but the house is not visible from this angle. The sagebrush in the foreground is quite dense and there are no recognizable grasses in the understory.



Plate 14(b) Lesley Morris, 2005

Sixty five years later, the Circle Creek ranch building is gone but two new structures have been added to the scene – a fence and telephone/power poles. More grasses are visible in the foreground and the road has been reclaimed by vegetation. Only the road cut scar by the large juniper remains. Pinyon and juniper now block the view to the rocks on the right.



Plate 15(a) Idaho State Historical Society, 1940

This photo is taken looking north from the Emery Canyon Road to the Bread Loaves. At the time, the road was mostly just a two-track. The drainage to the left of the road is barely visible. The vegetation in the foreground is unrecognizable.



Plate 15(b) Lesley Morris, 2005

Sixty five years later, the road and the vegetation have changed a great deal. Emery Canyon Road is now bladed and maintained but erosion has been a large problem for the Reserve in this area. Several erosion projects, included planting these willows, were initiated in the 1990s.



Plate 16(a) City of Rocks National Reserve, mid 1990s

This file photo from the City of Rocks is very similar to the ones in Plate 15. It shows how much the road has cut and eroded before the willows were established. Also, it is more useful for comparison to Plate 15 for the increases in conifers in the background which is also blocked by the willows.



Plate 16(b) Lesley Morris, 2005 (Same photo as Plate 15b)



Plate 17(a) Idaho State Historical Society, 1940

This photo was taken looking east from the Emery Canyon Road near the turnout at the entrance to what was USDA Forest Service land prior to the creation of the City of Rocks Reserve. Although a portion of the valley is in shadow, it offers a good view of Circle Creek Basin.



Plate 17(b) Lesley Morris, 2005

Sixty five years later, the increase in woody vegetation is apparent on the slopes in the background as well as in the foreground. Pinyon and juniper have nearly covered the old fire scar still visible in the 1940 photo on the north side of Smokey Mountain in upper right hand corner (See also Plate 6 & 7).



Plate 18(a) Idaho State Historical Society, 1940

The original photo is taken looking south through Parking Lot Rocks. The vegetation is mostly sagebrush in the foreground with some juniper and aspen against the rocks in the right of the photo.



Plate 18(b) Lesley Morris, 2005 (Olympus)

Sixty five years later, repeating this photo is difficult due to the thick brush and trees. A very large juniper now blocks the southern view to the Smokey Mountain. The aspen and conifer against the rock at the right have grown much larger. This and other photos collected from this portion of the Reserve demonstrate the lack of fire in the area for many years.



Plate 19(a) Photo Provided by Arlo Lloyd, “Scenic Idaho” Magazine, 1950

The original photo is taken looking south from the Emery Canyon Road toward Bath Rock. Even in the 1950s this road was still basically a two track. Aspen are the dominant tree seen on the left and right hand side of the road with sagebrush dominating the background.



Plate 19(b) Lesley Morris, 2005

Fifty five years later, Emery Canyon Road is wider, bladed and maintained. The large aspen on the right in the previous photo is gone. Juniper has grown into the aspen stands on both sides of the road and in the background.



Plate 20(a) Photo Courtesy of the Bruesch Family, 1950s

This photo was taken from on top of Bath Rock looking southeast toward Smokey Mountain. Fire scars are still visible along the north slopes of Smokey Mountain in the distance on the left.



Plate 20(b) Brad Shilling, 2005 (Olympus)

Fifty five years later, the fire scars have filled in the slope on the far left of the image. They have also moved down slope and increased density on the east slope of the Smokey Mountain in upper right corner. Juniper is now visible in the right lower corner of the photo and the drainage (clearly visible along the road in the original) is shadowed by the tall sagebrush. Note that tree encircled by road on the lower left portion of the 1950s photo is still present.



Plate 21(a) USFS photo on file at City of Rocks National Reserve, 1958

This photo was taken from the Pinnacle Pass on the California Trail looking north east toward Smokey Mountain. Unlike Plate 20, the woodland on the south and southeastern facing slopes of Smokey Mountain is already quite dense.



Plate 21(b) Lesley Morris, 2005 (Olympus)

Fifty five years later, the woodland in the distance is still dense. Although the view of the western slope is now blocked by the pinyon and juniper, behind them, the woodland has moved down slope. Evidence of the 2000 fire is visible in the right foreground of the picture.



Plate 22(a) Idaho State Historical Society, 1963

This photo was taken from nearly the same position as Plate 17 near the turnout at the boundary of what was USDA Forest Service land prior to creation of the City of Rocks National Reserve. The old fire scar on the north slope of Smokey Mountain is still visible in the 1960s. Also, the signs of agricultural development are evident in the Circle Creek basin. These are likely areas where the sagebrush was cleared for crested wheat seedings.



Plate 22(b) Lesley Morris, 2005

About forty years later, the old fire scar has nearly disappeared as have the signs of agriculture in the valley. The vegetation along the riparian corridor is not as prominent as it appears in the 1960s. This is likely due to both the time of year of the repeat photo (fall color does not stand out as well when converted to black and white) and the incision of the creek bed over time.



Plate 23(a) USDA Forest Service photo, on file at City of Rocks National Reserve, 1967
Original photo is taken from in the road coming into Circle Creek Basin looking southwest. The fields of crested wheat grass are clearly visible in the left side of the photo. Cattle are grazing in the first field to the left of the road.



Plate 23(b) Lesley Morris, 2005
Nearly 40 years later, the crested wheat seedlings have been re-occupied by sagebrush. The seeded area is still visible by the marked lack of pinyon or juniper. Where the ground was not plowed for the seeding, there is an increase in density of the woodland. This is also visible in Plate 20.



Plate 24(a) Cassia County Historical Society, no date

This photo was taken looking northeast near what is now campsite #10. Similar photos of this re-enactment celebration from the South Idaho Press in 1971 help to date it as the early 1970s.



Plate 24(b) Lesley Morris, 2005

Nearly 35 years later the sagebrush, antelope bitterbrush and rabbit brush have increased in density while there is a visible decrease in the grasses. Campground use is more regulated than in the 1970s and new bathroom facilities have been added. The growth of conifers in the center of the photo and in the distant left in front of Bath Rock is evident. There is some decrease in the aspen stands on the slope in the left corner of the photo. However, some of that difference is due to the lack of color contrast with fall color in this repeat photo.

REFERENCES CITED

- Anderson, M.K. 2005. Tending the wild: Native American knowledge and the management of California's natural resources. University of California Press, Berkeley, CA.
- Allen, C.D. and D.D. Breshears. 1998. Drought-induced shift of a forest—woodland ecotone: rapid landscape response to climate variation. *Proceedings of the National Academy of Sciences of the United States of America* 95(25): 14839-14842.
- Antevs, E. 1938. Rainfall and tree growth in the Great Basin. Carnegie Institution of Washington, Publication No. 469, American Geographical Society Special Publication No. 21.
- Bahre, C.J. and M.L. Shelton 1993. Historic vegetation change, mesquite increases, and climate in southeastern Arizona. *Journal of Biogeography* 20: 489-504.
- Batten, N. Case, M. Collette, J. Cram, B. Hill, H. Hoffnagle, E. Mullens, N., Rodhouse, T., Steele, J., Vincent, J., Wolken, P. and M. Wyse 2005. Baseline Survey of Quaking Aspen (*Populus tremuloides*) in City of Rocks National Reserve. Produced for City of Rocks National Reserve through the OMSI Botany Research Team.
- Blaisdell, J.P. and W.F. Mueggler 1956. Effect of 2,4-D on forbs and shrubs associated with big sagebrush. *Journal of Range Management*, 9:38-40.
- Brown, R. 2004. Historic inscriptions on western emigrant trails. Oregon-California Trails Association.
- Bureau of Land Management [BLM] Allotment Files. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
Smokey Mountain Grazing Summary, BLM 1990.
- Bureau of Land Management [BLM] Range Surveys 1952. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Junction Adjudication File 1955. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Woodland Inventory 1958. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Burley District Report 1961. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Memo 1965. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).

- Bureau of Land Management Christmas Tree Management Plan [BLM-CTMP] 1981. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Report of Meeting 1983. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Condition Report 1986. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Bureau of Land Management [BLM] Press Release 1986. On file at the Bureau of Land Management Burley District Office. (See Appendix 2).
- Boag, P.G. 1993. Overlanders and the Snake River region: A case study of popular landscape perception in the early West. *Pacific Northwest Quarterly*: 122-125.
- Bolton, H., Jr., Smith, J.L. and S.O. Link 1993. Soil microbial biomass and activity of a disturbed and undisturbed shrub-steppe ecosystem. *Soil Biology and Biochemistry* 25(5): 545-552.
- Burkhardt, J.W. and E.W. Tisdale 1976. Causes of juniper invasion in southwestern Idaho. *Ecology* 57: 472-484.
- Bracken, A. F. 1935. Extent and condition of the range lands for Utah. Pages 37-42 In: Utah Agricultural Experimental Station. *Agricultural Adjustment Survey for Utah*. Special Collections, Merrill Library, Utah State University, Logan, UT.
- Chance, D.H. 1989. The Tubaduka and the Kamuduka Shoshoni of the City of Rocks and surrounding country. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office Seattle, WA.
- Chance, D. H. and J.V. Chance. 1990. The archaeological reconnaissance of the City of Rocks Reserve. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office, Seattle, WA.
- 1992. Archaeology at the City of Rocks: The investigations of 1991. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office, Seattle, WA.
- 1993. Riddles of a stagecoach station and other questions at the City of Rocks. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office, Seattle, WA.
- Crumley, C.L. (Ed.). 1994. *Historical ecology: Cultural knowledge and changing landscapes*. School of American Research Press, Santa Fe, NM.

- Daugherty, R.E. 1988. Legislative land cost estimate for City of Rocks National Reserve Cassia county, Idaho. Prepared for National Park Service Pacific Northwest Region, Seattle, WA.
- Durfee, K. no date. Cowboys of the early cattle days of Idaho. Unpublished manuscript. On file at the City of Rocks National Reserve.
- Egan, D. and E.A. Howell (Eds.) 2001. The historical ecology handbook: A restorationist's guide to reference ecosystems. Island Press, Washington, D.C..
- Faragher, J.M. 2000. Women and Men on the Overland Trail. Second Edition. Yale Nota Bene, New Haven, CT.
- Galatowitsch, S.M. 1990. Using the original land survey notes to reconstruct pre-settlement landscapes in the American West. *Great Basin Naturalist* 50(2): 181-191.
- Goodman, G. 2005. Forage productivity of rangeland along the Santa Fe Trail in 1846. *Rangelands* 27(1): 37-40.
- Grafe, E. and P.Horsted 2002. Exploring with Custer: The 1874 Black Hills Expedition. Golden Valley Press, Custer, SD.
- Grazing District Map 1939. On file at the Bureau of Land Management Burley District Office (See Appendix 2).
- Gruell, G.E. 1983. Fire and vegetative trends in the northern rockies: Interpretation from 1871-1982 photographs. USDA Intermountain Forest and Range Experiment Station, General Technical Report INT-158, Ogden, UT.
- 1985. Fire on the early western landscape: An annotated record of wildland fires 1776-1900. *Northwest Science* 59(2): 97-107.
- Haines, A. L. 1972. An Historical Report on the City of Rocks in Southern Idaho. Unpublished Manuscript, on file at the City of Rocks National Reserve.
- Harstad, P.T. 1966. Constructing the Lander Trail. Report Prepared for USDA Forest Service Region 4, on file at USFS Intermountain Region Office (R4-1680-95-0043-3), Ogden, UT
- Historical Research Associates [HRA] 1996. Historic Resources Study: City of Rocks National Reserve southcentral Idaho. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office Seattle, Washington.
- Hull, A.C. 1973. Regrassing southern Idaho Range Lands. University of Idaho College of Agriculture Extension Division, Extension Bulletin No. 146.

- Hull, A.C. and G.J. Klomp 1974. Yield of crested wheatgrass under four densities of big sagebrush in southern Idaho. USDA Agricultural Research Station Technical Bulletin No. 1483.
- Hunt, T.H. 1989. Silent City of Rocks. *Overland Journal* 7(4) 13-23.
- Jackson, N.R. 1995. Statement for management, City of Rocks National Reserve. Prepared for National Park Service Pacific West Field Area.
- Jackson, W.T. 1952. Wagon roads west: A study of federal road surveys and construction in the trans-Mississippi west, 1846-1869. University of California Press, Berkeley, CA.
- John, T. 1995. Vascular plants of the City of Rocks: An annotated checklist. Prepared for the National Parks Service. On file at the City of Rocks National Reserve.
- Kay, C.E. and C.A. White 2001. Reintroduction of bison into the Rocky Mountain parks of Canada: Historical and archaeological evidence. Pages 143-151 In: *Crossing Boundaries in Park Management, Proceedings of the 11th Conference on Research and Resource Management in Parks and on Public Lands*, Harmon, D. (Ed). The George Wright Society.
- Kay, C.E. 2003a. Lewis and Clark, aboriginal overkill, and the myth of once abundant wildlife. Pages 103-110 In: *Symposium Proceedings from A Confluence of Cultures: Native Americans and the Expedition of Lewis and Clark*. University of Montana Printing and Graphic Services.
- 2003b. Long-Term vegetation change on Utah's Fishlake National Forest: A study in repeat photography. USDA Forest Service Intermountain Region 4 and the Fishlake National Forest.
- Keck, W. 2005. Superintendent of City of Rocks National Reserve, personal communication.
- Lander, F.W. 1861 Maps and reports of the Fort Kearney, South Pass, and Honey Lake wagon Road: Letter from the acting Secretary of the Interior transmitting reports and maps (by F.W. Lander) of the Fort Kearney, South Pass, and Honey Lake Wagon Road. United States 36th Congress, 2d session, House Executive Document No 64.
- Lang, W.L. and L. Mercier 1991. Testing for Reliability in Oral History. Pages 103-118 In: *Interpreting local culture and history*. Rikoon, J.S. and J. Austin (Eds.) University of Idaho Press, Moscow, ID.
- Lipshitz, N. and G. Biger 2001. Past Distribution of Aleppo pine (*Pinus halepensis*) in the Mountains of Israel (Palestine). *The Holocene* 11(4): 427-436.

- Little, W.J. 1994. A historical overview of livestock use in the area of City of Rocks National Reserve from introduction to 1907. Unpublished report for the National Park Service, copy on file at the City of Rocks National Reserve.
- MacDonald, W. 1911. Dry-Farming: Its principles and practice. The Century Co., New York, NY.
- Madsen, B.D. 1980. The Northern Shoshoni. The Caxton Printers, Ltd., Caldwell, ID.
- Malta CCC Report 1941. Cotterel Mt. Post Cutting Project. On file at the National Archives and Records Administration Pacific Alaska Regional Office, Seattle, WA. (See Appendix 2).
- Mason, L. 1963. Using historical records to determine climax vegetation. *Journal of Soil and Water Conservation* Sept.–Oct.: 190-194.
- McGinnies, W.J., Shants, H.L., and W.G. McGinnies 1991. Changes in vegetation and land use in Eastern Colorado: A photographic study, 1904 to 1986. USDA Agriculture, Agricultural Research Service, ARS-85.
- Millar, C.I. and W.B. Woolfenden 1999. The role of climate change in interpreting historical variability. *Ecological Applications* 9(4): 1207-1216.
- Miller, R.F., Svejcar, T.J. and N.E. West 1994. Implications of Livestock Grazing in the Intermountain Sagebrush Region: Plant Composition, Pages 101-146 In: *Ecological Implications of Livestock Herbivory in the West*. Vavra, M., Laycock, W.A. and R.D. Pieper (Eds.) Society for Range Management Publications, Denver, CO.
- Minidoka National Forest Report 1909. Report for Forest. On file at the City of Rocks National Reserve. (See Appendix 2).
- Minidoka National Forest Report [MNF Report] 1929. Individual Grazing Allotment Plan. On file at the National Archives and Records Administration Pacific Alaska Region, Seattle, WA. (See Appendix 2).
- Minidoka National Forest Personnel 1941. History of the Minidoka National Forest [MNF History]. USDA Forest Service Intermountain Region, Sawtooth National Forest. On file at the City of Rocks National Reserve.
- Minidoka National Forest 1949 [MNF Report]. Albion Range District Management Plan. On File at the National Archives and Records Administration Pacific Alaska Region, Seattle, WA. (See Appendix 2).
- Moore, C.A. and W.W. McCaughey 1997. Snow accumulation under various forest stand densities at Tenderfoot Creek Experimental Forest, Montana, USA. Paper presented at 66th Annual Western Snow Conference, May 5-6, Banff, Alberta.

Platte, P.L. and N. Slater 1852. Traveler's Guide to California. On file at the Merrill Mattes Library, Independence, MO (Watkins-MS-Slater) (See Appendix 3).

Piemeisel, R.L. 1938 Changes in weedy plant cover on cleared sagebrush land and their probable causes. USDA Technical Bulletin No. 654.

Public Law 100-696. 1988. Arizona-Idaho Conservation Act of 1988.

Records of the King Survey, 1867-81.

Letters sent to the Chief of Army Engineers, Mar. 28, 1867-Jan. 18, 1879; vol. 1, National Archives Microfilm Publication M622, roll 3, Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KS-11-2-59; "Sphynx Rocks", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KS-11-2-60; "City of Rocks", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KW-167; "City of Rocks, ID", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KW-189; "City of Rocks, ID", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KW-190; "City of Rocks, ID", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Photograph no. 77-KW-194; "City of Rocks, ID", 1868; Timothy O'Sullivan; Records of the U.S. Geological Survey, Record Group 57; National Archives at College Park, College Park, MD.

Records of the Office of the Secretary of the Interior Relating to Wagon Roads, 1857-1887. Records of the Office of the Secretary of the Interior, Record Group 48; National Archives at College Park, College Park, MD.

Reid, J.P. 1997. Punishing the elephant: malfeasance and organized criminality on the overland trail. *Montana* 47(1): 2-21.

- Roberts, N. 1998. *The Holocene: An environmental history*. Blackwell Publishers, Malden, MA.
- Rogers, G.F., Malde, H.E. and R.M. Turner 1984. *Bibliography of repeat photography for evaluating landscape change*. University of Utah Press, Salt Lake City, UT.
- Rogers, G.F. 1980. *Photographic documentation of vegetation change*. Unpublished Dissertation, University of Utah, Salt Lake City, UT.
- Rogers, G.F. 1982. *Then & Now: A photographic history of vegetation change in the central Great Basin desert*. University of Utah Press, Salt Lake City, UT.
- Rubal, T. 2004. Internal Review Board Administrator, Utah State University, personal communication.
- Russell, Emily W.B. 1997. *People and the land through time: Linking ecology and history*. Yale University Press, New Haven, CT.
- Sanders, K.D., Bunting, S.C. and R.G Wright 1996. *Grazing management plan: City of Rocks National Reserve*. Prepared for the Pacific Northwest Region of National Park Service, on file at the City of Rocks National Reserve.
- Sprugel, D.G. 1991. Disturbance, equilibrium, and environmental variability: What is 'natural' vegetation in a changing environment? *Biological Conservation* 58: 1-18.
- Stoddart, L.A. 1941. The Palouse grassland association in northern Utah. *Ecology* 22: 158-163.
- Swetnam, T.W., Allen, C.D. and J.L. Betancourt 1999. Applied historical ecology: Using the past to manage for the future. *Ecological Applications* 9(4): 1189-1206.
- Tharp, J. 2006. Ecologist, Bureau of Land Management Burley District Office, personal communication.
- Tisdale, E.W. and M. Hironaka 1981. *The sagebrush-grass region: A review of the ecological literature*. USDA Forest, Wildlife and Range Experiment Station, University of Idaho, Bulletin No. 33.
- Turner, R.M., Webb, R.H., Bower, J.E. and J.R. Hastings 2003. *The changing mile revisited: An ecological study of vegetation change with time in the lower mile of an arid and semiarid region*. The University of Arizona Press, Tuscon, AZ.
- United States Department of the Interior, National Park System (USDI-NPS). 1994. *City of Rocks National Reserve comprehensive management plan, development concept plan and environmental impact statement*.

- Unruh, J. 1979. The plains across: The overland emigrants and the trans-Mississippi west, 1840-1860. The University of Illinois Press, Chicago, IL.
- Vale, T.R. 1975. Pre-settlement vegetation in the sagebrush-grass area of the Intermountain West. *Journal of Range Management* 28 (1): 32-36.
- Veblen, T.T. and D.C. Lorenz. 1991. The Colorado front range: A century of ecological change. University of Utah Press, Salt Lake City, UT.
- Webb, R.H. 1996. Grand Canyon a century of change: Rephotography of the 1889-1890 Stanton Expedition. The University of Arizona Press, Tuscon, AZ.
- Wentworth, E. N. 1948. America's sheep trails: History and personalities. Iowa State College Press, Ames, IA.
- West, N.E. 1989. Spatial Pattern-Functional Interactions in Shrub-Dominated Plant Communities. Pages 283-305 In: *The Biology and Utilization of Shrubs*. McKell, C.M. (Ed.) Academic Press, Inc.
- Western Regional Climate Center (WRCC) 2006. Climate of Idaho. Accessed on line at <http://www.wrcc.dri.edu>
- Wells, M. 1990. History of the City of Rocks. Prepared for National Park Service Pacific West Field Area Columbia-Cascade System Support Office Seattle, WA.
- Widtsoe, J.A. 1911. Dry-Farming: a system of agriculture for countries under low rainfall. The MacMillan Company, New York, NY.
- Wilkins, T. 1988. Clarence King: A biography. University of New Mexico Press, Albuquerque, NM.
- Wilson, G.M. 2005. Landcover classification of the City of Rocks National Reserve using ASTER satellite imagery. Produced through the National Park Service Upper Columbia Basin Network Inventory and Monitoring Program.
- Wolf, G. 1987. "Idaho Senators Want Area Protected, City of Rocks Study Prompts Action" Pocatello-Chubbuk, Idaho, Thursday, June 25, 1987. *Idaho State Journal* Section, p. 8.
- Young, J.A. and B.A. Sparks 2002. *Cattle in the cold Desert*, expanded edition. University of Nevada Press, Reno, NV.
- Young, J.A., P.C. Martinelli, Eckert, R.E., and R.A. Evans. 1999. Halogeton: A history of mid-20th century range conservation in the Intermountain Area. USDA Agricultural Research Service Miscellaneous Publication No. 1553.

APPENDIX 1

List of Common Plant Names and Possible Scientific Names

Nomenclature follows Tom John (1995)

Common Name	Scientific Name
Arrowleaf balsamroot /yellow dock	<i>Balsamorhiza sagittata</i>
Aspen	<i>Populus tremuloides</i>
Bitterbrush	<i>Purshia tridentata</i>
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>
Bulbous Blue Grass	<i>Poa bulbosa</i>
Bur Buttercup	<i>Ceratocephalus testiculatus</i>
Burdock	<i>Arctium minus</i>
Canada thistle	<i>Cirsium arvense</i>
Cheat grass	<i>Bromus tectorum</i>
Chokecherry	<i>Prunus vir</i>
Crested wheatgrass	<i>Agropyron desertorum</i>
Curlycup gumweed/ornicky weed	<i>Grindelia squarrosa</i>
Death camas	<i>Zigadenus paniculatus</i> <i>Zigadenus venenosus</i>
Dyers woad	<i>Isatis tinctoria</i>
Fir	<i>Abies lasiocarpa</i> <i>Pseudotsuga menziesii</i>
Flixweed	<i>Descurainea sophia</i>
Halogeton	<i>Halogeton glomeratus</i>
Johnson grass (crabgrass)	
Juniper/cedar	<i>Juniperus osteosperma</i> <i>Juniperus scopulorum</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Lambsquarter	<i>Chenopodium album</i>
Larkspur	<i>Delphinium andersonii</i> <i>Delphinium depauperatum</i> <i>Delphinium nuttallianum</i> <i>Delphinium occidentale</i> <i>Pinus flexilis</i>
Limber pine	<i>Pinus contorta</i>
Lodgepole pine	
Morning glory ("bind weed")	<i>Convolvulus arvensis</i>
Mountain mahogany	<i>Cercocarpus ledifolius</i>
Orchard grass	<i>Dactylis glomerata</i>
Perennial ryegrass	<i>Lolium perenne</i>
Pinyon pine	<i>Pinus monophylla</i>
Poison hemlock	<i>Conium maculatum</i>
Purple mustard	<i>Chorispora tenella</i>
Quackgrass	<i>Elytrigia repens</i>
Rabbitbrush	<i>Chrysothamnus viscidiflorus</i>
Russian Thistle	<i>Salsola iberica</i>

Common Name**Scientific Name**

Sagebrush

Artemisia tridentata subsp. *tridentata**Artemisia tridentata* subsp. *vaseyana**Artemisia nova**Artemisia ludoviciana* var. *ludoviciana**Artemisia ludoviciana* var. *latiloba**Artemisia ludoviciana* var. *incompta**Artemisia arbuscula*

Serviceberry

*Amelanchier alnifolia**Amelanchier utahensis*

Timothy

Phleum pratense

Tumble mustard

Sysymbrium altissimum

Watercress

Nasturium officinale

Willow

*Salix boothii**Salix drummondiana**Salix exigua**Salix geyeriana**Salix lasiandra**Salix lutea**Salix scouleriana*

Wild iris (Flag lily)

Iris missouriensis

APPENDIX 2

Digital Copy Available at the City of Rocks National Reserves

APPENDIX 3

Digital Copy Available at the City of Rocks National Reserves

APPENDIX 4

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APPENDIX 5

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