

LANDSCAPE IMPRINTS OF HAYING TECHNOLOGY IN EASTERN IDAHO AND
WESTERN MONTANA

by

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Abstract

Hayscapes, or haying landscapes, are distinctive cultural landscapes that evolve through time as a result of technological changes in response to economic realities. Since settlement began in the western United States, hay-making has gone through a number of mechanical revolutions that have given rise to an assortment of different methods employed in the process of gathering and storing hay. For this research, the changes in haying technology and resulting cultural landscapes are divided into four eras based on the haying methods of the time in western Montana and eastern Idaho. Common haying technology used in the study area at one time or another includes rudimentary devices, hay derricks, Beaverslides, overshots, swinging arm stackers, small, rectangular balers, tractors with front loader extensions, loaf stackers, round balers, large, rectangular balers, and forage harvesters (choppers). Farmers and ranchers create different hayscapes based on the technology used. There are different reasons for using different haying technologies, such as the type and size of agricultural operation, economics, and personal preference.

Landscapes are documents, and by “reading” the haying landscape, we are able to acknowledge the story of the transition of life and ways of the past to present-day living of the people. Insights are discovered regarding past and present technologies and aspects of their social and economic systems. This study examines the different past and present haying landscapes of western Montana and eastern Idaho to better understand reasons and ways in which human activities have imprinted the landscape and given rise to distinct, and aesthetically pleasing, patterns on the earth’s surface.

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CHAPTER 1 - Introduction

Landscapes created from haying are diverse and often picturesque cultural imprints that give character to this economic activity and the places in which it occurs. As such, haying and the resulting cultural landscapes are soundly geographical in nature. Haying is done with a purpose and creates functional, as well as aesthetically pleasing, landscapes. J.B. Jackson believed that “the human landscape is *not* a work of art,” but rather “it is the temporary product of much sweat and hardship and earnest thought” (1997, 343). Even if the haying landscape is not a work of art, there *is* an art to haying. Whether viewed as an art or not, there is also a story worth telling behind the creation of haying landscapes, or *hayscapes*, in the American West.

For the most part, geographers have bypassed the examination of haying landscapes and the processes of their creation. Hayscapes, however, are dynamic landscapes that reveal information about our culture and ourselves. They are distinctive cultural imprints that evolve through time as a result of technological changes made in response to economic realities. Since the dawn of European settlement in the western United States, hay-making has been affected by a number of mechanical innovations that have given rise to an assortment of different methods employed in the process of gathering and storing hay. The changes in technology have drastically altered ranching and farming methods and, as a result, the cultural landscape of the American West (the West).

Studying the cultural geographic issues of the United States can be a challenge “because of its very monolithic sameness” (Wagner 1963, 17). Although some diversity exists from place to place, agricultural practices and their resulting landscapes are quite homogenous throughout much of the country. In terms of contemporary haying landscapes, the ‘homogeneity’ generally consists of bales in some form, either square or round. Before hay bales dotted the landscapes,

however, there were other dominant ways of putting up hay that created distinct hayscapes in different locations. Cultural characteristics, particularly those of economic, technological, or social nature, explain these developments and their resulting changes that uniquely imprint themselves on the landscape.

Exploring the creation and meaning of cultural landscapes is an enlightening task. Every cultural landscape tells a story of the people who created it, that includes clues to why they did things a certain way and how it was accomplished. The tools and techniques used by the people answer the “how,” and it is the techniques used that Philip Wagner (1963) called one of the most vital relationships between man and land. By focusing on the haying techniques farmers and ranchers of the American West used to produce functional landscapes, conclusions also arise concerning the people who created the landscapes and why they chose certain haying methods, which in turn created distinct haying landscapes.

J.B. Jackson (1984, 68) wrote that “not all ruins mean sudden disaster.” Rather, as Jackson continues, “many represent a long series of decisions, choices between alternatives that we have no inkling of.” This is especially true for haying relics. Since haying first began in the West to the present time, farmers and ranchers have had choices in the way they put up hay. They choose certain methods for various reasons. Jackson concludes the paragraph by writing that “all landscapes sooner or later come to an end; that we know. What we do not always know is how or why.” The haying landscapes of the West have changed. A diversity of archaic and present haying technologies are, however, still visible on the landscape. With an assortment of haying technologies still present on the landscape, a “reader” of the landscape is better able to come to conclusions regarding how and the reasons why the landscape has evolved. When relics begin to disappear, it is more difficult to “read” the landscape. Although relic haying

technologies still occupy the landscape in the West, many have disappeared and others are rapidly vanishing. Haying relics disappear at an accelerating rate as more people move into the region. In parts of Europe, few relics from centuries ago occupy the landscape today to indicate the ways of the past (Antrop 2005). Time, therefore, is running short for the study of our vanishing folk heritage.

Agricultural development has impacted the lives of farmers and ranchers as well as having dramatically altered the landscape. Haying landscapes are often taken for granted, sometimes not even noticed. There is much to learn, however, about the West, its people, and their lives, through the study of these cultural landscapes. This study examines the different past and present haying techniques and resulting cultural landscapes of the northern part of the U.S. Rocky Mountain West. In doing so, it seeks to develop a better understanding of ways in which human activities have imprinted the landscape and given rise to distinct patterns on the earth's surface.

Haying

Haying has been an important agricultural activity for centuries. Its primary goal is to provide feed for livestock through the winter months when sufficient forage is not available. Hay is produced during the summer months and stored until it is needed during the winter season. Haying has accompanied livestock raising since at least the time of the Roman Empire (Asson 2003). Ranchers and farmers have come to depend on hay for the survival of their livestock, particularly where the winters are long and harsh. Inhabitants of the intermountain area of the western United States came to understand just how necessary hay was in the survival and production of livestock after the winters of 1886-1887 and 1889-1890 when over 100,000 head of cattle starved to death (McCormick, Young, and Burkhardt 1979; Young 1983). Charles

Russell, the “Cowboy Artist,” began his painting career after recognition of the famous “Waiting for a Chinook” that depicted a starving steer being circled by wolves. Russell used the sketch to illustrate the conditions of a Montana cattle ranch to people in the eastern part of the country after the blizzard of 1886. Many ranchers could no longer survive in the area and went out of business (Young 1983). Those who stayed, and others who moved in, changed the ways of raising livestock in the West. Grass was no longer sufficiently plentiful for ranchers to engage in free range grazing (Virginia 1973), and consequently the open-range era came to an end. Ranchers started to put fences up, and by 1890 the open-range era, commonly called the “cattle kingdom,” had vanished and ranching had begun (Starrs 1998).

Hay production, or haying, is a multi-step process that involves the growing, cutting, drying, processing, and storage of various types of edible biomass. Through time and space, the methods have changed subtly and significantly. Whatever the storage technique used, however, the basic steps remain very similar. In western Montana and eastern Idaho, hay crops are produced from grasses, such as timothy, Kentucky bluegrass, and smooth brome, as well as from legumes, such as alfalfa and clover. Irrigation is required to grow hay crops in much of the West (Young and Clements 2003). Some moist mountain meadows, however, are capable of producing hay crops without irrigation. The hay crop is cut upon maturity, left out until dry, raked into long, narrow piles commonly called windrows, and then gathered and stored. Although the gathered or stored hay is most evident on the landscape, each step in the haying process produces a unique imprint upon the land. Some parts of the haying landscape, such as the drying of the hay, are more ephemeral, or shorter-lived, than other aspects. The form in which the hay is stored is particularly evident on the landscape, and a part of the creation of place differences.

Methods used to gather hay differ considerably, based on acquired cultural habits and the group's or individual's adaptations to the environmental conditions in a given locale. Options today include a loose hay gathering process, baled hay, or chopped hay. Whether loose, baled, or chopped several techniques are possible. Today, the most recognized and utilized method of gathering hay in the United States is in a compressed bale, which can take the form of various sizes and shapes. Other haying techniques, however, are still used for a variety of reasons. The most common justification for using a certain haying method today, as well as in the past, is economic conditions. Various social and cultural systems also impact technology and therefore influence haying practices used by ranchers and farmers. In many instances in which modern techniques (such as baling) are used, relics of past haying techniques, such as slide stackers and various types of hay derricks, are still visible on the landscape. These relics reveal the past haying methods in places where they are evident.

Relevance in Geography Today

What is geography? What do geographers study? A simple definition of geography is “What is where, why there, and why care?” in regard to Earth's varied physical and human features and conditions (Gritzner 2002). This describes all the basic elements of the discipline; it recognizes geography as a methodology, and it also covers all geographic subjects, themes, and traditions. By adhering to this definition, geographers can study anything on Earth's surface that varies spatially. This definition is very broad, yet simple. Others have broken the discipline of Geography into several sub-disciplines, or different branches or areas of study. Cultural geography, one branch, includes diverse content and approaches, as do other general sub-disciplines. One area of interest within cultural geography is the study of landscape and the variables responsible for landscape change (Norton 1989). The study of the human impact on

landscapes fits within the “Man-Land” Tradition (Pattison 1964). Landscape has long been an important consideration for geographers; within cultural geography the focus has been on the interpretation of visible characteristics of the cultural landscape (Muir 1998).

Many geographers from the ‘Berkeley Tradition’ established during Carl O. Sauer’s era adhered to the belief that landscape is a central theme to geography (e.g., Sauer 1925), and consequently much of their research focused on landscape analysis. Studying cultural landscapes, however, was not a new theme to Geography. Even before the paradigm of cultural landscape studies in American geography, German geographers around the end of the 19th Century, such as Otto Schlüter and Friedrich Ratzel, advocated the analyses of landscape evolution (Norton 2000). Both Schlüter and Ratzel emphasized how and why landscapes change through time. For several generations, geographers have studied and understood cultural landscapes. It is not a passing fad in geography; rather, it is an area of study that has a firm foundation and a long genealogy.

Although the emphasis in landscape studies within cultural geography today has shifted, it does not undermine the importance of this study. Over and over for the past century, geographers have recognized the importance of studies that incorporate technological developments and their impacts on the landscape. In the first half of the 20th Century, Sauer made a plea for studies that showed the development and modification of different aspects of husbandry, or farming (1941). Haying, of course, is one form of husbandry, and this study examines the development and modifications of haying in the U.S. West.

Eric Sloane, a 20th Century artist, philosopher, environmentalist, and historian, advocated for more than mere observation of relics on the landscape; rather, he urged a deeper understanding of the people who used the remnants of earlier technologies and their way of life

(1955). It is not enough to merely describe the haying relics on the landscape. We also must seek to understand the people who used the labor intensive methods of the past and the social bonding that occurred from their usage.

Philip Wagner, a student of Sauer's, stated the importance of the relationship between humans, their tools and techniques, and the landscape changes resulting from technological and economic forces (1963). Haying technology has changed significantly as the economic systems of the West have undergone the transition from a folk, bartering culture to a contemporary commercial culture. This resulted in a change of scale in production, which, in turn contributed to landscape change.

In 1966, J.B. Jackson published *An Engineered Environment* that recognized the significance of technology in the transformation of the agricultural landscape. He stated that "mechanization of farm work is the most conspicuous hallmark of the new rural landscape" (228). Haying landscapes have become increasingly mechanized, from the tractors pulling the mowers to even larger tractors pulling hay balers. Because of the mechanization of the haying process, the landscape has changed (Baker 1983).

Peirce Lewis, a respected geographer who has written extensively about the American cultural landscape, stated, "What we still lack, however, is systematic accessible information about the history of the tools and building materials that literally *made* the ordinary American landscape" (1983, 256). This study examines the various types of haying technology and methods that have produced distinctive cultural landscapes in areas of the American West from the earliest period of European occupation to the present. Haying techniques do have an impact on the landscape, from the presence of the technique itself to the way the hay is gathered and stored. The hayscapes of the West, which are part of the ordinary American landscape, are a

result of the tools farmers and ranchers used. An entire anthology concerns itself with the relationship between technology and landscape (Nye 1999). The editor states in the introduction that “every landscape implies the technologies that produced it” (Nye 1999, 15), and technology, in the form of tools and techniques, is an expression of culture. Landscapes are thus tangible expressions of the technology and culture that produced them.

Although material cultural landscape studies may not be the prominent area of inquiry in American geography today, they will always have a place in the discipline because there is always a landscape in need of explanation, and landscapes continuing to evolve based on changing human activities and structures. There will also always be people, in academe or elsewhere, who are curious about certain landscapes. Peirce Lewis said it well when he wrote, “For as long as history has been recorded, people have wondered about man-made patterns on the surface of the earth – the patterns that together compose the human landscape” (1983, 1). Haying landscapes are one aspect of the human landscape, and this study examines the patterns and meanings behind this diverse and rather aesthetically pleasing human imprint on Earth’s surface. Studying hayscapes of the West represents one way to explore changes in culture and the landscape through space and time.

Study Area

People migrated to the American West during different time periods and for various reasons. Explorers, scientists, fur trappers, and miners all ventured into the West with little or no intention to settle permanently. In the mid to latter part of the 19th Century, however, individuals and families began to settle western Montana and eastern Idaho with the intention of permanency. A majority of these people engaged in farming or ranching (Malone and Etulain 1989). With mining areas nearby, they found an eager market for livestock products including

meat, hides, and tallow (Guelke and Hornbeck 2001). Some of the miners even later turned to ranching for a living. This study is concerned with those settlers who engaged in ranching or farming, and their creation of distinct haying landscapes.

Haying landscapes are common throughout much of the United States. In western Montana and eastern Idaho, where it is economically productive, much of the land, is used for some type of ranching or farming endeavor. Paul Starrs (2003) claimed that ranches define the West, and a necessary part of ranching is putting up hay. Haying related activities make up a significant part of the landscape, and variations on the hayscape are common countryside scenes. Compared to Europe and the eastern United States, haying in the West is a rather recent activity as settlement did not occur in many areas until the latter half of the 19th Century.

Not only are haying landscapes common in the American West, they are also unique. When European-American ranchers and farmers settled in the West, they encountered a new and sometimes harsh environment that made agriculture difficult (Guelke and Hornbeck 2001). As Wallace Stegner wrote, “Aridity changes the agriculture of the West, turns a farmer’s values upside down” (1998, 100). Modifications were necessary in order to engage successfully in western agriculture. Haying techniques used elsewhere, such as the humid East, were not effective in the West; changes were required for many aspects of ranching and farming, including haying.

Depending on the cultural group, time of settlement, and specific physical environment in which they settled, each group found a different solution to make the unfamiliar landscapes productive (Geulke and Hornbeck 2001). Settlers had different environmental responses, many of which were innovative (Jordan et al. 1997). Among the many innovations that occurred in the American West were two different methods of haying. The Beaverslide hay stacker and the

Mormon derrick hay stacker were both developed in and are unique to the region. Since these folk haying techniques originated, creating distinct haying landscapes in the West, introductions of several other haying techniques have added to the complexity of western haying landscapes.

In the area between Great Falls, Montana and Pocatello, Idaho all principal haying methods ever used in the West still appear on the landscape (Figure 1). This swath is representative of haying in the Rocky Mountain West, which is comprised of Montana, Wyoming, Colorado, Utah, Idaho, and Nevada (Stegner 1998). In the study area, older methods of putting up hay are still sometimes employed. This is another benefit of the study area: parts of the past are still, in a sense, “alive.” With a rather large study area, this thesis represents a macro, rather than micro, research endeavor. The goal is to examine the “big picture” of haying in the West. There are advantages and disadvantages to every type of research, but as others have noted (e.g., Norton 1983; Fang and Liu 2008), the study of the evolution of cultural landscapes is acceptable at different scales, and even benefits from various scales of approach. By conducting field research between these Great Falls and Pocatello, recognition of the entire development of haying landscapes in the Rocky Mountain West is possible.

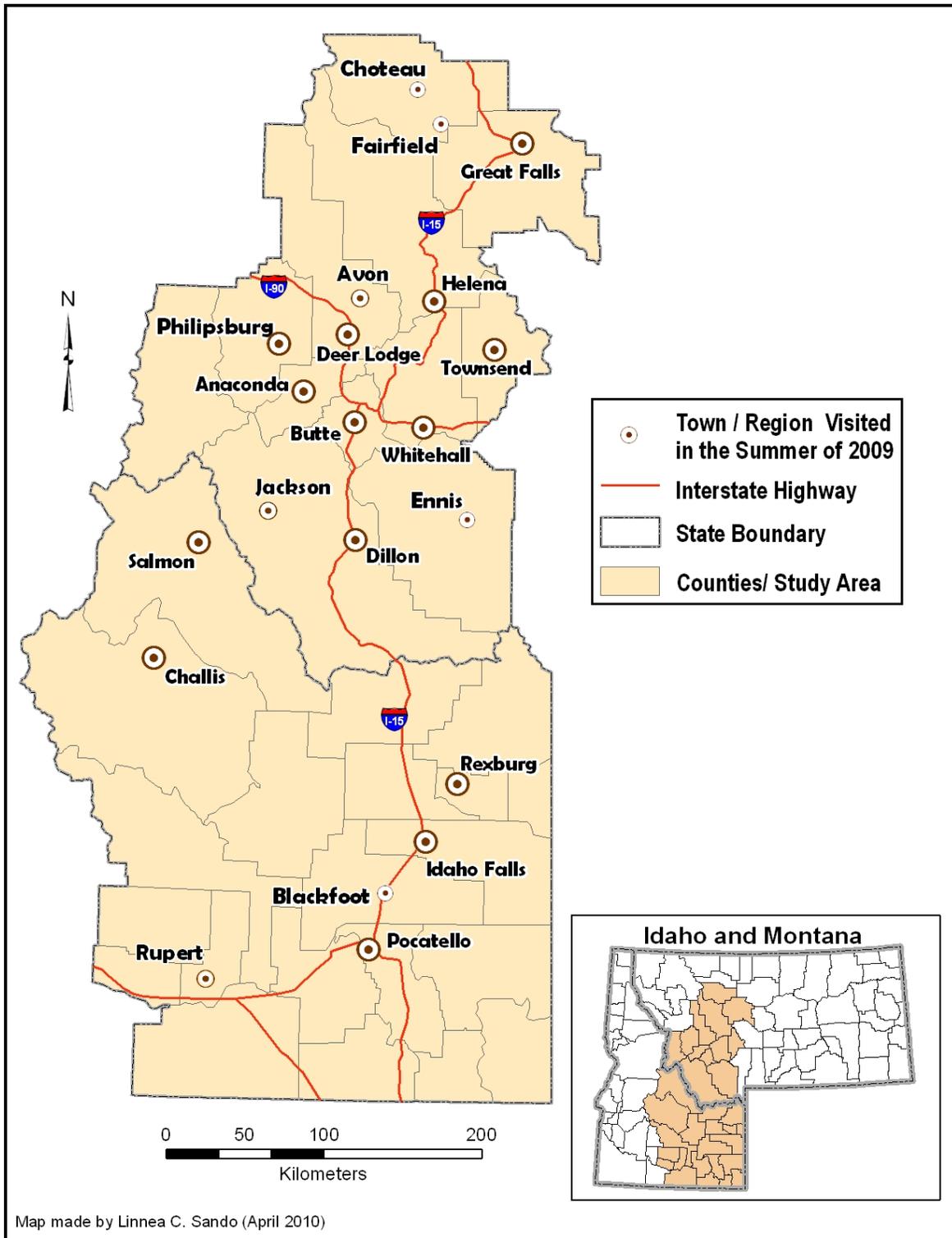


Figure 1. Study Area. Fieldwork was conducted during the summer of 2009.

It could be said that “hay” is part of western Montana’s and eastern Idaho’s identity. Not only are hay fields a significant part of the western landscape, but there are other landscape features that indicate the abundance and importance of hay to the region. For example, a new housing development on the outskirts of Helena, Montana, is named Hayfield Estates (Figure 2). Residents in the development need only to look outside their windows to see hayfields. Since 1990, Utica, Montana has held its annual Labor Day weekend “What the Hay” contest where local farmers, ranchers, and anybody else interested design hay sculptures. Spectators cast votes for the most creative entry. Southwestern Montana, particularly the Big Hole Valley, is widely known as the “Land of 10,000 Haystacks” (Berthold 1973) . A highway pull-off in the famed valley displays a miniature Beaverslide indicating the historical importance of the hay stacker and the ranching livelihood to the region. Ranchers and farmers all over Montana and Idaho use old haying equipment for yard decorations. Farmers in Idaho have not used hay derricks since the early 1970s, yet there are a number of relics on homesteads still taking up space. One common reason given for not tearing them down to make more space available is the stacker’s grand appearance on the landscape. Derricks were known by some as “Giants in the Field” (Asson 2003). Another frequently given reason is the fond memories of the era and of the haying process itself as there was an important social aspect to it. A museum in Rupert, Idaho displays a Mormon hay derrick showing that it was a part of the region’s identity (Figure 3). One family interviewed near Rexburg, Idaho had a painting of a hay derrick hanging in their living room. Positive memories of the past are evident on the cultural landscape as well as in the home. The value of hay in western Montana and eastern Idaho is evident in many forms.



Figure 2. New housing development sign. July 2009, Helena, Montana. Photo: Linnea C. Sando.



Figure 3. Hay derrick outside of museum near Rupert, Idaho. June 2009. Photo: Linnea C. Sando.

Although parts of the study area have similarities in terms of the presence of hayscapes, much variability exists throughout western Montana and eastern Idaho, particularly in terms of the physical environment. Since ranchers and farmers began to settle in the West, they have adapted to the environment in varied ways. Groups of people, as well as individuals, chose, and

continue to choose, to operate different types of farms and ranches based on their knowledge and experience, perceived economic needs, resource perceptions, and available technology. This results in different agricultural activities, and consequently, diverse cultural landscapes.

Ranchers in western Montana believed the physical environment was best suited for range livestock and meadow-grass hay based on their perceptions of such environmental factors as the physical landforms, soils, vegetation, and climate. Parts of Idaho, like the Lemhi Valley, are similar to western Montana, but other parts of the physical landscape, such as the eastern and southern half of Idaho, are quite different. The relatively flat Snake River Plain occupies much of southern Idaho. Rather than use the fertile soils in the plain for livestock grazing, early Euro-American settlers and later generations, believed the land, when irrigated, was better suited for the growing of crops, such as potatoes, sugar beets, and alfalfa hay alongside the raising of livestock.

Early Euro-American settlers in Idaho operated small dairy operations. In the 1980s, however, larger dairy operations – primarily from California – began to move into Idaho. The Snake River Plain region appealed to large dairy operators because of the less expensive land, relatively initial lax regulations, nearness of quality feed, and (later) the proximity of markets, such as whey, cheese, and milk processing plants (Stuebner 2002). With a reliable infrastructure system, livestock, milk, and feed are easily transported. Because of the diverse economic activities of the agricultural operations, the hayscapes of southern and eastern Idaho have taken on a much different appearance than those found in western Montana.

Organization

The haying landscapes of the West have evolved and changed through time as a result of technological changes introduced primarily in response to economic realities. These

developments in haying technology and their introduction to western Montana and eastern Idaho fit into four eras based upon primary haying methods of the time (Figure 4). This haying time frame was developed based on information collected from interviews, the archives, and a review of the literature on haying. It is important to note, however, that these eras fit more on a developmental continuum rather than being completely discrete divisions. Gradual transitions exist between all of the eras.

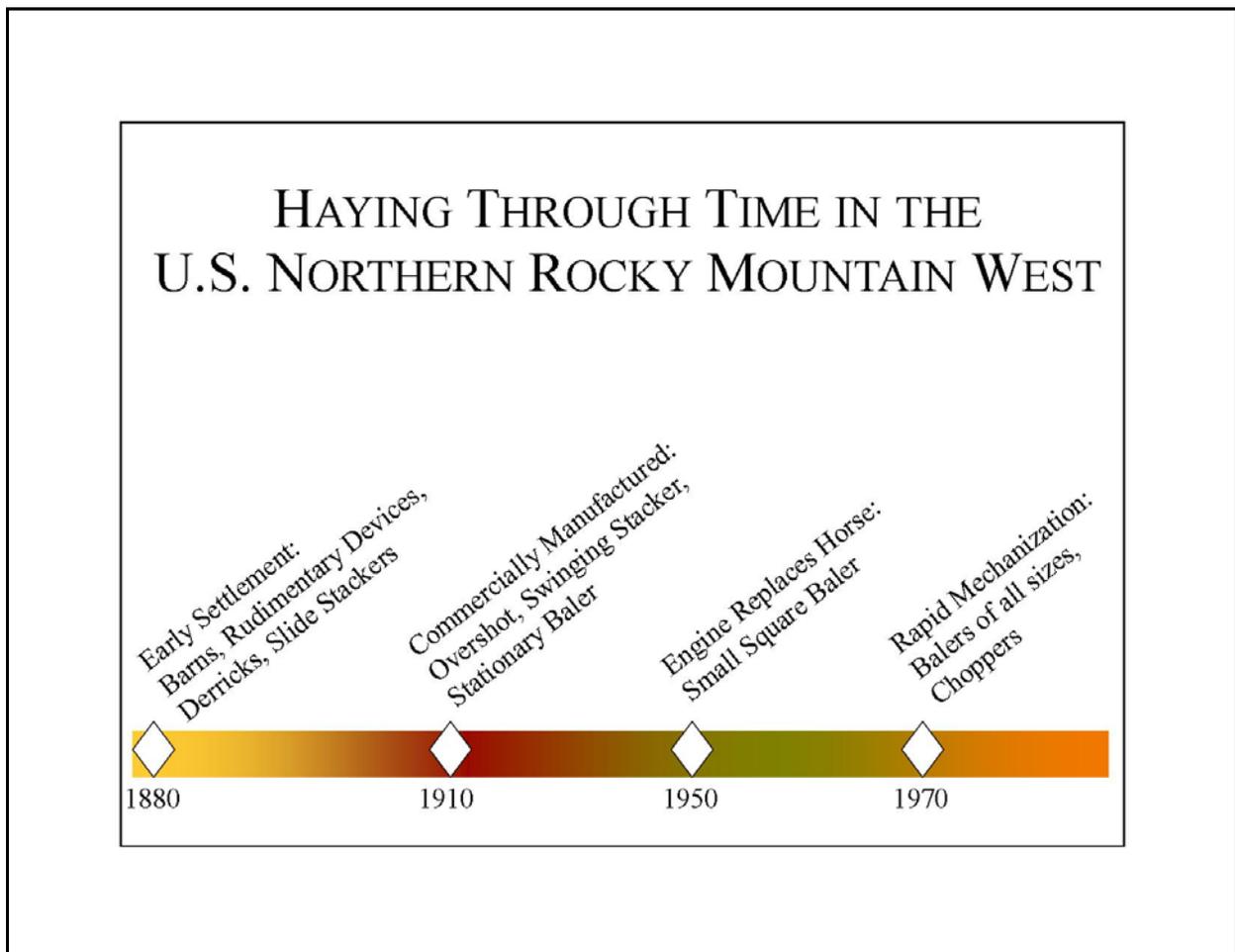


Figure 4. Four eras and their approximate beginnings of haying technology in the West.

The first era, extending approximately from 1880 to 1910, is based on the arrival and innovation of the first Euro-American settlers who engaged in ranching and farming. During this

era, a surge of people migrated to the West to engage in agriculture (Starrs 1998), and the prosperity achieved by many of these families was immense (Malone and Etulain 1989). Hayscapes began to appear and be a more significant part of the western landscape.

The second era (1910-1950) is characterized by the introduction of commercially manufactured hay stackers in the West. During this era, particularly in the latter years, the economics of ranching and farming began to change. Ranchers and farmers began to experience the transition from a semi-subsistence economy with minimal commercial involvement to a more contemporary and highly competitive cash economy.

Beginning in the third era, changes in agriculture accelerated. Farmers and ranchers began to decrease their reliance on traditional methods of agriculture (Malone and Etulain 1989). From 1950-1970, new agricultural technologies became available and were inexpensive enough for farmers and ranchers to purchase and use. A movement that would continue to grow was underway that included farmers and ranchers moving from small operations to large-scale operations. Agricultural landscapes, including hayscapes, began to change at increasingly fast rates as new technology appeared that was compatible with the larger-scaled farming and ranching operations.

The fourth era (1970-present) continues to experience change in western agriculture. It is based primarily on the rapid mechanization of haying technology and a dramatic increase in the scale of operation that has in turn greatly changed the haying landscapes of the West.

The haying techniques mentioned in each era are not all-inclusive; rather, they were dominant in their eras. A relatively small number of ranchers and farmers used haying methods that were not especially common; therefore, they did not have a drastic impact on the haying landscape.

Organizing field findings into eras is useful as it shows the developmental context and recognizes “the long-term and cumulative nature of technological change” (Doolittle 1990). Within each time period the introduction of certain haying technologies occurred and resulted in a significant impact on the haying landscapes in the West. Changes in technology produce landscape changes, and when the cultural landscape changes, it implies that something much deeper is at work than was initially suspected. Landscape changes as a result of technology indicate a significant change in our cultural attitude and social structure (Wagner 1963). The examination of haying technological changes, when divided into eras, offers insight into these changes and why they occurred in the American West.

CHAPTER 2 - Literature Review

This thesis fits within the realm of cultural landscape studies, specifically rural landscapes. The cultural landscape is an artifact produced by humans that is constantly evolving. It is a gradual and cumulative process that not only reflects local evolution, but also influences and changes as a result of migration, diffusion, and commerce (Wagner and Mikesell 1962). Cultural landscapes are the visible imprint of collective decisions and actions made by humans as representatives of their respective cultures. As such, they are tangible manifestations of human values, beliefs, technology, economic systems, and interactions with the natural environment. Such decisions and activities are recorded upon the landscape as if their imprint were a document waiting to be read. Peirce Lewis wrote, “Our human landscape is our unwitting autobiography, reflecting our tastes, our values, our aspirations, and even our fears, in tangible, visible form,” (1979, 12). Insights regarding past and present technology, skills and techniques, resource use and perception, and other aspects of social and economic systems are discovered through an analysis of the landscape. For these values, both past and present, to be revealed, one needs to learn how to “read the landscape” and tell the story behind the landscape as if it were a book (Lewis 1979, 12).

Cultural Landscape Approaches

There are numerous approaches to studying cultural landscapes, each with a different focus and goal. Several individuals interested in landscape studies have written books that summarize various methods (e.g. Norton 1989; Muir 1999; Wylie 2007). Richard Schein (1997) reviewed dominant themes in cultural landscape studies in North America since Sauer’s “Morphology of Landscape.” He summarized approaches ranging from: cultural landscapes as

autobiographies; as part of everyday life; rural, urban, and suburban landscapes; landscapes viewed as symbolic; social aspects of landscapes, such as gender issues, class divisions, and politics; and debates within cultural geography over the “proper” way to approach a landscape (1997). This thesis fits best within cultural landscape approaches focusing on the landscape as autobiography and as a part of everyday, rural life. I have approached it, as Sauer outlined in his seminal piece “Morphology of Landscape,” from an historical perspective.

Historical Approach

The first, most widely accepted approach to cultural landscape studies in the United States follows the example Carl Sauer (1925) laid out in “Morphology of Landscape” (Muir 1999). In this influential piece, he claims the cultural landscape is the product of people’s imprint on Earth’s surface; it is history and geography made visible. Climate, land surface and tectonic activity, soils, drainage, substrate materials, sea and coast, and vegetation determine the natural, or physical, landscape. People, or culture groups, then shape and mold the natural landscape to produce the cultural landscape. They modify the landscape based on their cultural traits, particularly technology. Those who followed Sauer’s method are generally said to adhere to the “Berkeley Tradition.”

A significant factor in the Berkeley tradition of cultural geography, which this study follows, is that all cultural geography must be treated historically (Gritzner 1966). Therefore, studying the landscape of haying based on the techniques used and the modifications that have occurred through time requires an historical approach. Carl Ortwin Sauer believed that in studying the cultural landscape, it is essential that contemporary conditions represent only a point on a temporal line, and that to comprehend it, the beginning must be reconstructed (1941). Later, Charles Gritzner again emphasized the importance of the historical approach saying that it is

“imperative in determining the successions of culture that have taken place within a given area. Since the landscape-shaping forces are constantly at work, the cultural landscape is not static, but is continuously changing through time” (9, 1966). Although the hay baler has become the primary haying technique in the United States today, producing landscapes dotted with bales, one can go back in time and reconstruct the haying landscapes of the past to gain a better understanding of contemporary hayscapes. More than half a century ago, Eric Sloane wrote an entire book on the vanishing landscape of the United States. In the opening pages, he stresses the importance of knowing the past in order to look forward intelligently (1955). No matter what approach is taken in studying landscapes, an understanding of landscape origins and formations seems necessary (Muir 1999).

There has been a great deal of interest in the emphasis on space and time in cultural geography throughout the 20th Century. Not all landscape studies, however, adhere to this emphasis. Landscape studies that do put an emphasis on time and space tend to have an evolutionary objective. The landscape is viewed as experiencing continuous development, with acknowledgement of both the preceding landscapes and of the ongoing processes prompting current landscape changes (Norton 1989). Landscape history, an approach closely tied with historical geography, also highlights the evolutionary concept; it is concerned with the evolution of landscapes and their expressions with the goal of explaining why landscapes have certain patterns and relict features (Muir 1999).

Landscape as Text and Autobiography

Peirce Lewis saw landscapes as documents, or more specifically, a cultural autobiography of sorts that humans have etched and continue to etch into the earth's surface creating distinct landscapes and stories (1993). Similar to Lewis's approach of cultural

landscapes as documents, the notion of landscape as palimpsest has become more popular in the latter part of the 20th Century. Whether individuals choose to think of cultural landscapes as autobiographies or as text written on parchment, they are documents none the less that indicate our past and present values, goals, and social tendencies. These “documents” allow an awareness of cultural growth and change, past and present modes of life and work, agricultural methods, and land uses; they are, in a sense, an ever expanding archive (Scazzosi 2004).

When spectators view landscapes as types of documents, the implication is that we should be able to read them. Until someone knows how to read the landscape, however, cultural values and social tendencies are not readily revealed. When someone does learn how to read and understand the landscape these disorganized elements start to come together and reveal more than initially perceived.

The landscape of haying, when read more deeply, does indeed tell of the region’s cultural institutions, such as social tendencies and economic trends. There is a significant social aspect to handling hay with many of the hay stackers in the early eras. For example, the use of the Beaverslide involved a large crew consisting of family, friends, neighbors, and traveling work crews. For the few weeks it took to put up the hay, all of these people worked together. Men, women, and children all had their specific jobs, whether it was in the field, kitchen, or elsewhere. The majority of today’s haying landscapes reveal that the social aspect and the economics of farming and ranching have changed. No longer do farmers and ranchers require haying crews of 25 people; rather, one person operates large, mechanized machinery during the haying process. On first glimpse, the landscape of haying does not directly reveal the changing infrastructure of the lives people led in the past or present. With an understanding of the haying methods, however, economic and social conditions are evident.

Rural Landscape

Although recent American cultural landscape studies tend to focus on the urban landscape, the rural landscape also has been the focus of attention by many geographers. J.B. Jackson was not educated as a geographer, but much of his work is highly geographic in nature and widely accepted by most cultural geographers. In the first issue of his *Landscape* magazine, Jackson noted that cities are only a part of the growing and shifting American landscapes and that beyond the city limits, “a whole new country waits to be discovered” (1951, 5). Urban landscapes are not the only landscapes with complex and dynamic relationships and patterns; rural landscapes also have variety and ever-changing features.

The majority of land in the United States is considered rural, especially in the West. Vast amounts of rural landscapes lack the infrastructure found in cities, but there are still facets to study as is evident from different rural geographic studies. John Fraser Hart has spent decades studying various aspects of the rural landscape. In his book, *The Look of the Land* (1975), he discussed various elements of the rural cultural landscape, such as farm buildings, fields, farm structures, and agricultural regions in the United States. Such elements found in rural areas can reveal much about the economy of the area. For example, the division of land is very different in western Montana compared to eastern Idaho because the economy is different. They are both agricultural regions, but their activities differ. Western Montana is ranch land where the focus is on the raising of livestock. In eastern Idaho, farmers grow a variety of cash crops and raise smaller numbers of livestock; there is greater overall agricultural diversity than in western Montana. An observant traveler who understands the “look of the land” can learn much about the activities in a region.

J.B. Jackson, who spent a great deal of time in the countryside evaluating the landscape, conducted other rural studies. Many of the rural landscape topics he addressed emphasized in

some aspect the changing status and ways of the American farmer through discussions of past landscapes and why they have changed. The methods and economics of western ranching and farming have changed, and haying landscapes document the changing ways of ranchers and farmers.

An anthology, *Changing Rural Landscapes*, was put together in the late 1970s addressing the various changes occurring in the rural landscape (Zube and Zube 1977). Themes in the volume include cultural forces that bring about change in the landscape, particularly technological forces; spatial organization and relationships among landscape features; the value of community experienced among those living in rural areas; and how individuals value different landscapes based on perception and experience. The study of landscape imprints of haying technology fits well with the first theme. Haying landscapes differ based on the technology used to create them, and since the turn of the 20th Century, haying technology has undergone a number of changes as the economics of ranching and farming evolved. Changing (hay) technology makes possible a change in scale of production, which, in turn contributes to landscape change.

Even though rural landscapes seem to lack the infrastructure found in urban landscapes, researchers have uncovered a variety of issues worth studying. The focus of rural landscape studies has changed. Whereas much of the emphasis used to be on describing, analyzing, and explaining different tangible features on the landscape, today, there is more emphasis placed on land use and scale changes. As with all geographic studies, there are different approaches and emphases, none of which is superior to others.

Cultural Landscape Evaluations

No matter the approach used, to effectively conduct any cultural landscape study, one must know how to “read” or interpret the landscape; a number of geographers have done this in the past. Interpreting the cultural landscape is more complex than just “seeing” the landscape; therefore, research associated with the steps involved in this process were referenced to properly study and interpret the haying landscape.

Edward Relph claimed “that ordinary places and landscapes are far more complex than anything encountered in an econometric model or a physicist’s laboratory” (1984, 212). There is a tendency to view the landscape and make over-simplified explanations of what is there and why. To prevent this from happening, there is a process, or structure, to reading the landscape that consists of a combination of steps. Various geographers have developed different methods or approaches of interpreting the landscape. Relph has used the idea of seeing, thinking, and describing the landscape (Relph 1984). With his model, seeing a landscape involves direct observation, rather than reading about it in published works by other individuals. Thinking is the attempt to make sense of what the viewer sees in his or her own mind, not other people’s interpretations. Describing a scene involves putting together what was seen and interpreted and trying to make sense of it all.

Peirce Lewis developed seven axioms for guidance in reading America’s cultural landscape: the axiom of landscape as clue to culture, the axiom of cultural unity and landscape equality, the axiom of common things, the historic axiom, the geographic or ecologic axiom, the axiom of environmental control, the axiom of landscape obscurity (1979). Each axiom contributes an essential idea to understanding the cultural landscape. Many of the examples used reflect material cultural traits that are visible on the landscape. Lewis, however, also promotes going beyond just seeing something, but truly understanding it, particularly from a historical

perspective. To fully understand a landscape there is a process of looking, reading, and thinking about the landscape in question. Both geographers' ways of interpreting the landscape involve a process, and the steps within these procedures are interrelated and repeated as often as necessary to uncover the meaning of the landscape.

Similar to Relph and Lewis's approach, John Fraser Hart (1998) stressed the importance of a process to learn about and understand the landscape. The steps in his process are to live in it, look at it, think about it, explore it, ask questions about it, contemplate it some more, and speculate or hypothesize about it. Fieldwork is essential in learning about and comprehending the cultural landscape. Hart, Lewis, and Relph are only a few geographers among many others who offer advice to reading the landscape by offering clues about the kind of things to look for and think about.

Cultural Landscape Applications

Although there is very little research concerning the haying landscape, there have been a number of works written on various other cultural traits and their landscape manifestations that aid in the framework for this study. Several geographers during the 20th Century examined tangible objects on the landscape, and focused on the distributions, origins, patterns, and relationships of the phenomena. Carl Sauer in the early to mid-1900s was the catalyst for such studies in American cultural geography. Many of his students continued Sauer's tradition with success studying material culture in the American landscape (Lewis 1983). One of his students, Fred Kniffen, spent years studying folk architecture and distinguishing culturogeographic regions based on the type of architecture on the landscape (1990). The Berkeley school of thought continued in later generations, and Kniffen's student, Charles Gritzner researched the material culture of Hispano gristmills on the landscape of New Mexico (Gritzner 1969, 1974,

1990). A recent published work, also in line with the Berkeley Tradition, analyzed the distributions, patterns, associations, and interactions of displaying the national flag and its impact on the American cultural landscape (Pavlović 2008).

Traditional cultural geographers tend to focus on rural, rather than urban, landscapes. Much of the time, rural landscape studies examine material objects of the agricultural landscape. Together and individually, John Fraser Hart and Cotton Mather wrote several geographic works discussing different agricultural topics (e.g., Hart 1975; Hart and Mather 1954; Hart and Mather 1961; Mather 1950; Mather and Hart 1956). In one such paper, they examined fences on the landscape and addressed the different types of fences, where they occur, and their function (Mather and Hart 1954).

J.B. Jackson contributed numerous, wide-ranging works on landscape research including several on agricultural topics. *A Vision of New Fields* (1984) analyzed the cultural landscape of irrigated fields throughout the High Plains. Not only did Jackson offer a vivid description of the irrigated landscape, he also discussed how irrigation has evolved from irrigation ditches to the current use of center pivot methods. His explanation of the evolution of irrigation in the High Plains took a cultural approach, which provides insight into how the landscape came to be, as well as shows the reflection of culture in the landscape.

Tom McKnight also examined the landscape manifestations of center pivot irrigation (1979). His study of the cultural landscape shows how the development of new technology changes the landscape. He considered the history of center pivot, how it operates, its advantages and disadvantages, how users adapt to its use, implications of switching to this system, and the future of irrigation in American agriculture (McKnight 1979). Rather than haying technologies,

Terry Jordan chose a different prominent landscape feature to study – the windmill (1963). He studied windmills in Texas, paying close attention to the economic significance of the object.

Some cultural geographers study tangible features of the cultural landscape. These material objects, many of which are archaic, offer a window to the past. Because of this, the traditional agricultural landscapes are able to teach us much about the cultural heritage of its occupants (Jordan-Bychkov 2006). All changes in agricultural technology and techniques, whether fence structures, windmills, irrigation, or haying, transform the rural landscape. It is imperative to explain, not just describe, the reasons for the changes and developments to grasp the transformation that has occurred, and continues to occur, within our culture.

Landscape Change

That landscapes change is indisputable. They do, however, change at different rates and degrees. Haying landscapes, for example, change with the seasons as well as through time. Some refer to these types of landscapes as ephemeral, or short-lived, landscapes, while others argue for a distinction between ‘ephemeral landscapes’ and ‘seasonal landscapes’ (Palang et al. 2005). Jones (2007) characterizes seasonal landscapes as recurring and rhythmical phenomena on a regular basis; they are altered during certain times of the year by seasonal activities. Although this study emphasizes the gathering and storing aspect of the haying landscapes, there are a number of components that comprise the hayscapes. They include: the growing of the grass or legumes; the cutting (Figure 5), raking into windrows (Figure 6), and initial gathering and compression of the dried hay (Figure 7); and the final storage (Figure 8). Each of these facets of the haying landscapes is only visible temporarily, but each one of them is still a significant component of the entirety of all hayscapes. There is a cycle, or a rhythm to all parts of the haying landscape. Because of the rhythmical aspect of hayscapes, they fit more

appropriately with the labeling of “seasonal” landscapes. Both seasonal landscapes and ephemeral landscapes, however, are short-lived, temporary landscapes.



Figure 5. Cutting of the grass in a hayfield. July 2009, Jackson, Montana. Photo: Linnea C. Sando.



Figure 6. Hay drying in temporary windrows. July 2009, Helena, Montana. Photo: Linnea C. Sando.



Figure 7. Automatic hay baler gathered dried hay and compressed into bales that now lay scattered across the field. July 2009, Canyon Creek, Montana. Photo: Linnea C. Sando.



Figure 8. Final storage of hay bales along edge of a field. August 2009, Fairfield, Montana. Photo: Linnea C. Sando.

Landscapes are always changing and evolving. Sometimes individuals or groups deem these changes to be improvements, whereas at other times they consider them to be detrimental (Antrop 1998). There are some societies and individuals who resist landscape change as a result of human actions. They instead aim to preserve past landscapes and advocate for the establishment of cultural heritage sites to maintain a part of the past. Journals, essays, and books concerned with restoring and preserving landscapes and historical structures abound (e.g., *Journal of Cultural Heritage; Landscape and Urban Planning; Preservation*).

The Grant-Kohrs Ranch near Deer Lodge, Montana is an example of a haying landscape that is preserved. It is listed as a National Historic Site with the goal of providing awareness and understanding of the frontier cattle era, preservation of the ranch site, and an appreciation of the

era for present and future generations (National Park Service 1987). All the former buildings are still intact, and every summer, they put up the hay on the ranch using horses and the Beaverslide.

Some small-scale ranchers and farmers use older haying technologies such as the overshot or various slide stackers in order to remember the past. Websites (e.g., www.draftanimalpower.com) provide forums for people to discuss past techniques and how to build them. There is interest among many individuals, organizations, and businesses concerning the preservation of the past.

Haying Techniques

Largely overlooked in academic research is the process of haying as a landscape feature. This is not to say that there has been no prior research regarding haying processes. A handful of geographers have studied haying in terms of specific techniques used and their distributions (e.g., Francaviglia 1978; Alwin 1982). Also recorded are several personal and historical accounts of past haying techniques (e.g., Asson 2003; Hoffbeck 2000; Yale 1991).

John Alwin (1982), with the assistance of other geographers, studied the origin, distribution, and possible future of the Beaverslide hay stacker. The Beaverslide hay stacker and its history are also intriguing to non-academic writers. The story of the Beaverslide is interesting to readers from varied backgrounds. Verlyn Klinkenborg, a non-fiction author, wrote *Making Hay* (2003), which follows the story of family farms and ranches in southwestern Montana, as well as other parts of the country, where the colossal stacker was commonly used for putting up hay.

A few individuals from various backgrounds have studied the origin, evolution, and distribution of the Mormon hay derrick. Austin E. Fife and James M. Fife were the first to study the geographic distribution and development of the Mormon hay derricks in the Great Basin and

Upper Snake River Valley (1948). Folklorists and historians also examined the hay derricks of the West, concentrating primarily on their significance and function (e.g., Georges and Jones 1995; Simmonds 1991). Decades after Fife and Fife first published their results, cultural geographers took notice of the significance of the Mormon hay derricks and their origins. Richard V. Francaviglia thoroughly examined the ways Mormons have shaped the landscape; their use of hay derricks is one such way. Using a traditional cultural geography approach, Francaviglia examined the origin and diffusion of the western hay derrick (1978). Other cultural geographers incorporated Mormon hay derricks into studies that have concentrated on larger issues, such as the Intermountain West (Jordan et al. 1997) and the settlement landscape of North America (Noble 1984).

Although prior research exists concerning specific haying techniques and their distributions, a comprehensive study examining the development of haying techniques and the resulting imprint on the landscape has not yet been undertaken. By incorporating the work of previous geographers studying haying techniques with my field work, this study will add another dimension to the cultural landscape studies of haying. Rather than focusing solely on one technique and its origin and diffusion, studying the development of haying from the beginning allows examination of the story of regional hayscapes up to this point.

CHAPTER 3 - Methods

Landscapes are continually changing as cultural materials are removed, altered, left to deteriorate, or added. Some haying techniques used in the past do not reside on the landscape today; using Lewis's metaphor of the cultural landscape as a book, there are "large parts of the document missing" (1993, 116). For this reason, it is necessary to combine different methods of obtaining information to assure an accurate and consistent outcome. This study incorporated the literature on haying by other researchers, archival research, interviews, and personal observation and interpretation.

Archives

The beginning of the haying story is not always easily recognizable on the landscape; even more recent elements of the story are sometimes disguised. Fragments of the haying story are there, but later generations built over other portions, making it extremely difficult to read. For this reason, it was necessary to use archives to fill in the missing parts of the story.

Archives contain wide-ranging forms and types of data, such as statistical information, images, newspapers, and reports (Harris 2001). For this study, the primary types of archival data used included images, newspaper items, and government reports. A great deal of the archival data was available online. I used images from the past that were obtained online from the Library of Congress (LOC), Farm Security Administration (FSA), and an online database titled *Hay in Art* to compare past places and their activities with the present. Collections of photographs, such as those available through the databases mentioned, contain important information, such as the environmental setting, resources used by people, and various other ways of life in an earlier time that are not clearly noticeable on the landscape today (Stoddard 1982).

Historical photographs past provide the most graphic evidence of past land use practices and ways of life, which in turn lead the viewer to ask questions concerning how life and landscapes have changed. They are a visual record of what was present during a certain time period (Russel 1997).

The Montana Historical Society located in Helena houses a number of newspaper and magazine clippings concerning haying. The majority of these clippings are associated with the Beaverslide hay stacker because its origins are in Montana. Archived newspaper articles allowed me to recheck the information I obtained from interviews, as much of the information was the same. Five newspaper and magazine articles dating from 1955 to 2007 were found in the Montana Historical Society's archives. The several articles printed show the local interest in Montana's haying past.

In the early part of the 20th Century, the U.S. Department of Agriculture issued several bulletins concerning different aspects of haying. Today, many of these bulletins are available online through *Google Books*. Topics published in the bulletins include the most effective haying equipment and practices depending on the area and type of farm, labor saving practices in haymaking, and the gathering and storing of different types of hay. These bulletins indicate when different commercially manufactured haying technologies became available. They also provide information on the approximate costs of each technology. This is noteworthy because if the haying technologies are more expensive, smaller ranches and farms generally would not have purchased the equipment. Even if ranches and farms were doing financially well, high costs might deter them from purchasing new technologies when current hay stackers were doing the job effectively. The high cost of certain haying equipment, then, exerted a significant effect upon their presence on hayscapes within the study area.

Archival research is an important part of this study as it provides a glimpse of past hayscapes through images, print media, and government publications. Essential to this thesis, however, was extensive fieldwork in Montana and Idaho that included landscape observation and interviews with local residents.

Observation

Several individuals have referred to geography as the science of observation, or exploration and discovery, of the earth (Sauer 1956; Parsons 1977). This involves seeing and thinking about what is in the landscape and recognizing patterns and forms. Sauer (1956) labeled this attention to form and pattern the “morphologic eye.” Indeed, for this study it was necessary to engage in many days of field observation and interviews throughout the study area. I explored areas within western Montana and eastern Idaho multiple times during the summer of 2009 searching for any indication of haying landscapes. As I found out, it is beneficial to return repeatedly to an area with an open mind in order to grow more familiar with the landscape. When I visit a region, a town, or a field for the first time, my senses are sometimes overwhelmed. If I can return to an area, I am able to more clearly see and understand my surroundings. James Parsons (1977) noted that as familiarity with an area grows, phenomena and relationships previously missed become apparent. Meaningful phenomena that I bypassed the first time in certain areas, such as relic haying technologies camouflaged by trees, were apparent the next time I visited. In some cases, haying relics were hardly noticeable because of their condition. Revisiting areas also allowed for fresh reflections concerning the patterns on the landscape.

Part of observation in fieldwork entails recording discerned phenomena and events. The recording devices used for this study included detailed field notes, sketches, and photographs of

different aspects of the haying landscape, such as haying machinery or equipment. The sketches helped in remembering details of an area that were difficult to capture on camera, such as spatial relations of landscape features. Drawings also helped in recalling the processes of certain aspects of haying, such as the differences in how the hay is gathered from the windrows depending on the haying method used. The photographs did not always capture such detail. Photographs did, however, allow a re-examination of the haying landscapes without returning to the field (Stoddard 1982). Visual images also contribute a great deal to the telling of the story.

Not only did I observe relics or patterns on the landscape, but I was fortunate enough to be able to experience the haying landscapes and their creation. I watched as farmers and ranchers put up hay using the Beaverslide, loaf stacker, tractor with front loader extension, round balers, and large and small rectangular balers. Watching farmers and ranchers create distinct haying landscapes helped me understand not only the process better, but it also gave me an even deeper appreciation for the work these people put into creating functional landscapes.

Growing up on a farm, I have been observing the creation of South Dakota hayscapes my entire life. I remember stories my Grandpa and Dad told of haying with the horses, while my Grandma told stories of cooking meals for the workers. I have ridden in tractors as the hay was cut, raked, and baled. I am familiar with the musty, but pleasing aroma, the scratchy, delicate texture, and even the dusty taste as the hay is gathered and stored for a later time. Familiarity with the process of haying was incredibly valuable as I explored western hayscapes. I understood the terminology ranchers and farmers used when they described different aspects of haying. Most importantly I believe, I also understood their way of life.

Interviews

Interviews were an important part of this study. I felt it was necessary to talk with local residents and hear their explanations for their chosen haying methods. I wanted to hear from them about the advantages, disadvantages, and justifications concerning the various ways of putting up hay today and in the past. People make choices based on different rationales, and the result of the choices they make may be seen on the landscape. The result of their choices is different haying landscapes. Visiting with the people who have imparted their signature on the landscape gives a clearer understanding to why and how different hayscapes were created.

During field work in Montana and Idaho, I initially chose people to interview based on any older, or distinct, haying technique evident on their land. Upon noticing an unusual technique, I drove up to the farm or ranch yard and visit with whomever was available. Several times I would talk to an individual, and he or she would refer me to a neighbor who had more information and stories. Through word of mouth, or the “snowball” technique, I was able to connect with other area residents, many of whom have witnessed the changing of haying technologies.

I was able to talk with a demographically wide range of people – men, women, young, and old. Throughout the Summer and Fall of 2009, I talked with 25-30 individuals. Sometimes the interviews took place with one to four people present, but most of the time, I talked with the interviewees one on one. Interviews took place in the mornings and afternoons, and they lasted from ten minutes to a few hours. If they were not currently ranching or farming, they were in some way active with the agricultural industry. For example, I talked with a couple of agricultural implement dealers in Idaho.

Those interviewed readily talked about various aspects of haying and ranch life, such as how it has changed, advantages and disadvantages of different technologies, and why they use

the methods they do, without probing. Interviews conducted were more conversational than structured questioning in format. At times, however, questions were necessary as guides to obtain some needed information about the haying landscapes.

Stoddard (1982) classified interviews into four groups: the unstructured interview, the free story, the structured interview, and the structured interview with aids. When talking with farmers, ranchers, and others knowledgeable about western haymaking, I used unstructured interviews and free stories, both of which are more casual conversational approaches. Unstructured interviews are conversational-type interactions. Both the interviewer and the interviewee talk back and forth. It is not uncommon during an unstructured interview for the conversation to at times deviate from the primary topic. For example, when I talked with individuals about haying, many times other issues came up, such as various aspects of general ranch life. Free stories are a modified version of the unstructured interview. Rather than the interactions being conversational, the interviewer allows the interviewee to wander around various aspects of the topic as they tell their stories. Before my interviews began, I thought the casual method of interviewing would be most beneficial in obtaining information about the past and present haying landscapes as it would allow the interviewees to feel more at ease. Casual approaches also allow for the formation of a bond between the interviewer and interviewees because interviewees relay other anecdotes besides those directly related to the thesis topic. The free stories and unstructured interviews method is the approach used by scholars within the “Berkeley Tradition” (Gritzner 2009).

The free stories approach I used is very similar to the “oral history” approach, which is the verbal memory of events from a person’s lifetime (Riley and Harvey 2007). Listening to the oral history of different individuals allows for a less mechanistic approach, and similar to the

Berkeley Tradition, it allows the interviewees to wander more from the specific topic which can lead to new information that would not have been gained if following a strictly structured or questionnaire type of interview. Riley and Harvey, advocates of the oral history approach, also encourage interviews to take place ‘in the field’ and near artifacts and/or photographs (2007). This allows for the landscape, artifacts, and photographs to guide the discussion and stir up memories. When interviewing people, photographs were used on occasion, but more significant was the location. Most interviews took place in a hay field or in the barnyard. This allowed the interviewees to point to different fields and to demonstrate the process of putting up hay a particular way. Interviews that took place in the home, however, also had advantages. On different occasions when I was visiting with individuals in his or her home, they went to their files and took out relevant photographs, newspaper clippings, or journal entries from family members. This allowed for visual proof of the stories they told, as well as a clearer understanding of ranching and farming related activities that they were describing to me.

Much of the time, unstructured interviews, free stories, and the oral history method involve more listening than talking by the interviewer. Hart (1998) noted that he found value in talking, but mostly listening, to the inhabitants of the landscape in question, which was useful for his agricultural research. Similarly, Doolittle (2001) stressed the importance of “going to the field and watching and listening to farmers” to learn about the landscape and the way it was created.

There were practical reasons to conduct interviews for this research, but there were also more subjective intentions in talking with local residents. Individuals consulted provided me with inspiration. They were kind and helpful and willing to take time out of their day to visit with me. Because of this, I have more of a connection with the research and the people involved.

As Jackson (1997) noted, the human landscape is the product of much work. The people I talked with work incredibly hard to produce functional haying landscapes, which in turn spectators, such as myself, are able to enjoy the aesthetics of their hayscapes in the comfort of air conditioned vehicles.

Incorporating multiple techniques allows for a more holistic discussion of a topic. Each of the methods was necessary in this research. Studies conducted by earlier researches were influential and helpful as I began my research. They were also valuable for comparisons of my findings with earlier findings. Archival research allowed for an objective window into the past. Observation was necessary in order to come to conclusions about the patterns of hayscapes, such as where certain haying landscapes appear, how they have been transformed, and why. Information gathered from interviews assisted in putting everything together and making sense of it. If any one method was excluded, important material would have been left out.

CHAPTER 4 - Era of Western Haying Innovation: 1880-1910

The initial settlers of western Montana and eastern Idaho were culturally diverse. Many migrated from the eastern United States, and some families consulted during field work came directly from European countries such as Sweden, Denmark, and Scotland. With the diversity of people settling the American West, all with their own bag of cultural traits, the cultural landscapes, including hayscapes, of the West took on a variety of appearances as each group had different adaptive strategies.

Barns

In the eastern United States where there is more humidity, hay was generally stored in a barn's hayloft. When Euro-Americans moved to the western territories to settle and farm or ranch, they built a barn with a haymow and hayloft as that was the method of storing hay back home; the hay was pitched into a wagon or cart and hauled to the barn where a sling was attached to the haymow. They soon realized, however, that for several reasons, haying in the West was much different than haying in the East. First, the West is much drier than the humid East. Whereas it was necessary in the East to store hay in the hayloft or some type of cover, the West received much less precipitation, so it was more time efficient to store the hay outside. Secondly, the purpose of the hay was also different in the West than in the East. In much of the East, hay was used more as supplemental feed, but in the West, hay was necessary to feed the livestock through the harsh winters.

Ranchers realized that the more hay they could put up, the better off they would be. Most haylofts were unable to store as much hay as was needed (Jordan et al. 1997). The presence of the barn with a haymow and hayloft on the landscape in the West is a sign of the early European-

American settlers' initial response. Although barns are not a haying technology, they are a landscape feature related to hay storage.

Nearly all of the barns with haymows, or haylofts, still part of the landscape in the West today are old and falling apart (Figures 9 and 10). Earlier settlers built them over a hundred years ago for the purpose of storing hay and keeping small numbers of livestock (Noble 1984). Ranchers soon realized more effective adaptations were necessary for putting up the amount of hay needed. Although ranchers and farmers continued to build barns, it was for a different function that included storage of animals, machinery, and other miscellaneous items on the homestead rather than the storage of hay.



Figure 9. Old barn with haymow and hayloft. June 2009, southeastern Idaho. Photo: Linnea C. Sando.



Figure 10. Derelict barn near Avon, Montana, with haymow and hayloft. August 2009. Photo: Linnea C. Sando.

After the building of barns, two different unique responses to the environment occurred at approximately the same time but at different places and by different cultural groups. Although the technology differed in form and function, one similarity did exist between the two techniques; both methods piled the hay outside in large loose stacks. In southwestern Montana, ranchers found that a slide stacker worked most effectively for large quantities of meadow hay, while those in Idaho employed a derrick-style hay stacker with a pivoting arm or boom mounted on a sturdy base to stack dried alfalfa (Jordan et al. 1997).

Hay Derrick

Hay derricks of the West are known by several different names, the most common being the Mormon hay derrick and the Wilson/Boom hay derrick. Whichever name is used, the derrick

style hay stacker, associated only with alfalfa crops, is of Mormon origin (Francaviglia 1978). They are locally made folk implements that never received a patent. From the beginning, the derricks underwent a number of transformations producing several sub-types (Fife and Fife 1948). Emerging from a simple device that consisted of a stationary vertical pole, cables, pulleys, and guy wires, hay derricks eventually evolved into mobile devices with a long diagonal boom supported by a rectangular base (Fife and Fife 1948; Jordan et al. 1997). It is these later subtypes that are still visible on the landscape in parts of eastern Idaho, particularly between Rexburg and Idaho Falls. Because Mormon settlement in Idaho came after that in Utah, the earlier devices were probably not used as much in Idaho. Francaviglia observed that hay derricks outside Utah, which is the center of Mormonism, tend to be more complex. Using Francaviglia's (1978) classification, the two most commonly seen hay derricks on the Idaho landscape during field observations include the see-saw (Figure 11) and the chain/hung boom (Figure 12).



Figure 11. See-saw hay derrick near Rexburg, Idaho. August 2009. Photo: Linnea C. Sando.



Figure 12. Chain/Hung Boom hay derrick near Idaho Falls, Idaho. August 2009. Photo: Linnea C. Sando.

The evolution of various hay derrick styles accompanied the expansion of farms. Simpler derricks were used in the earlier days when there was less production of alfalfa, and the crop was stored in stacks in the barnyard (where the feeding of livestock was more manageable). As cattle raising grew and alfalfa acreage expanded, simple, stationary hay derricks were not efficient. Rather, mobile derricks that created several larger hay stacks along the perimeter of the field proved more useful (Fife and Fife 1948; Georges et al. 1995).

Hay stacks sometimes went by different names. Farmers called the amount of hay put up within the range of a hay derrick's arm a butt, bent, or sometimes a section (Fife and Fife 1948). A hay stack consisted of one to several butts, bents, or sections.

Haying with hay derricks during the first era took approximately a 5-10 person crew, depending on the size of the farm. Each person had a specific duty in the overall haying process. Someone was in charge of cutting the hay, others gathered the hay from the windrows by pitching it onto a wagon and bringing it closer to the stacks (Figure 13), and then there were those who worked with the derrick itself and smoothed the loose stack (Figure 14).



Figure 13. Workers pitching hay onto a wagon that is then brought to the stacker. September 1940, Cornish, Utah. Photographer: Russell Lee. Source: Farm Security Administration.



Figure 14. Operator of hay derrick and man smoothing out hay on top of the stack. August 1940, Box Elder County, Utah. Photographer: Russell Lee. Source: Farm Security Administration.

The Mormon hay derricks were successful hay stackers by many standards. They were inexpensive, homemade or locally made, and stacked the hay in large enough piles to reduce spoilage. The success of the derricks continued for several decades even into the era of the engine and small square bales. Their function, however, changed slightly. Rather than stacking loose hay in piles, farmers used hay derricks to elevate and stack small, rectangular bales; because of the device's range, high stacks of 25 or more bales could be made. Most of the time,

while enough family members were available to help, farmers continued to use the hay derrick to stack bales. As family size decreased, or young family members opted to leave the farm, farmers switched to haying techniques that were more suitable for their circumstances. This involved technology that could be operated by only one person.

Landscape Imprint

Hay derricks were versatile devices, and their landscape imprint has changed with time. When they were first developed, farmers used them to pile hay loosely in stacks (Figure 15). During later eras, when automatic hay balers gathered cured hay from the fields, derricks continued to be used in the stacking process; instead of stacking loose hay, however, derricks were used to stack the hay bales.



Figure 15. Hay derrick being used to loosely stack hay. 1940, Box Elder County, Utah. Photographer: Russell Lee. Source: Farm Security Administration.

The size of the hay stacks created with derricks differed depending on the design of the hay stacker. The earlier versions of hay derricks did not have booms as long as those of later versions (Jordan et al. 1997). As modifications occurred, hay derricks employed much longer booms. With longer booms, higher haystacks were created. Even with later subtypes, hay derricks were still homemade implements; therefore, there were various haystack forms and sizes. Generally, however, haystacks were not higher than 30 feet.

Once the arm of the derrick had deposited hay within its range, workers moved the stacker over slightly to begin a new stack directly adjacent to the former. Each “stack” is called a bench; an entire haystack could consist of multiple benches (Reynoldson 1929). A greater number of benches meant longer, and probably fewer, haystacks on the landscape.

In general, hay derricks were not as mobile as some of the earlier hay stacking devices. This impacted the landscape imprint. With stackers such as the Beaverslide, overshot, and swinging stacker, it was not uncommon for haystacks to be scattered about fields; the stacker was brought to the hay fields. It was difficult to maneuver heavy hay derricks around the fields. Therefore, workers pitched the hay onto a wagon and brought the hay to the stacker. Large stacks of hay moderately close together were more common than dispersed haystacks with the derricks. Later subtypes of hay derricks, however, were more mobile.

The Beaverslide

In western Montana a different environmental response occurred. Ranchers needed a hay stacking device that was mobile and could quickly stack the large amounts of gathered meadow hay. The form of Montana hay stackers differed from the Mormon derricks; Montanans employed a slide stacker that had an inclined plane that elevated the hay to the top of the stack

(Alwin 1982; Jordan et al. 1997). Just as the hay derrick went through an evolutionary process with a number of variations, the slide stacker did as well. It started out as a crude device consisting of “simple wooden inclines on which net loads of hay were pulled up and back over the stack so that the stack was built back from the ramp” (Young 1983, 319-320). This device proved troublesome, prompting western ranchers to start modifying it.

The next variation, called the “ram” stacker or plunger push slider, consisted of a fan shaped incline where hay was pushed up by a horse-driven plunger (Asson 2003). Although this device left much room for improvement, it did spread throughout many of the valleys of the central Rocky Mountains (Jordan et al. 1997). A stacker of this variety still occupies the landscape near Salmon, ID (Figure 16). The disadvantages of the “ram” stacker included its short incline which resulted in low haystacks as well as its inability to stack large amounts of hay quickly.



Figure 16. Ram stacker near Salmon, Idaho. June 2009. Photo: Linnea C. Sando.

Following the “ram” stacker, in 1907-1908 two ranchers in Beaverhead County, Montana devised the Beaverslide hay stacker that created large stacks of hay quickly (Alwin 1982). Originally named the Beaverhead County Slide Stacker, it was later shortened to simply Beaverslide. The first Beaverslides were constructed with lodgepole pine timber, and some current Beaverslides are still made with this timber (Figure 17). The Beaverslides mimic the “ram” stacker with the concept of the incline, but two 50 foot long poles support the Beaverslide’s incline in order to create taller haystacks. Rather than a plunger, the Beaverslide consists of a large toothed basket that raises the hay to the top of the incline with the use of cables and pulleys powered by horses (Figure 18), or later in the century by engines (Figure 19).

The placement of the hay on the stack is determined by the position of the hay on the basket as well as the speed at which the basket is brought to the top of the incline and dumped.



Figure 17. Beaverslide made of timber near Avon, Montana. June 2009. Photo: Linnea C. Sando.



Figure 18. Horse power used to operate Beaverslide, demonstrated at Grant-Kohrs Ranch National Historic Site, Deer Lodge, Montana. Source: National Park Service homepage.



Figure 19. Truck providing power to lift the Beaverslide's toothed basket. The truck is connected to the basket with cables. It provides power to pull the cables and raise the loaded basket to the top. July 2009, Jackson, Montana. Photo: Linnea C. Sando.

Similar to the Mormon derricks, a couple of people remained on the top of the stacked hay to even it out and shape the top in such a way that it sheds the occasional moisture (Figure 20). Once the hay can no longer be stacked higher, the Beaverslide is pulled forward and another stack is started adjacent to the first (Figure 21). Ranchers call each individual stack a “butt.” Depending on how much hay a field produces, the size of the stack or the number of “butts,” created by the Beaverslide differs. After all the hay is stacked in a field, workers transport the Beaverslide to the next field. Skids placed on the bottom of the Beaverslide (Figure 22) enable it to easily move from one field to the next even in wetter fields. Because of its efficiency, ease of mobility, and low cost, the Beaverslide hay stacker diffused rapidly in areas where light, meadow grass was put up for hay (Jordan et al. 1997).



Figure 20. Worker leveling top of haystack. July 2009, Jackson, Montana. Photo: Linnea C. Sando.



Figure 21 . A second “butt” being added to the haystack. July 2009, Jackson, Montana. Photo: Linnea C. Sando.



Figure 22. Skids on bottom of Beaverslide allow for an easier transport to the next hay field. July 2009, Jackson, Montana. Photo: Linnea C. Sando.

There were long periods of stability in the design of the Beaverslide punctuated by relatively minor adjustments to the technology. The first alteration was in the 1920s, with the development of an option for an extension onto the top of the (slide) incline. This addition allowed the creation of more balanced haystacks because the hay could be thrown further back onto the pile. Ranchers continued to use the Beaverslide in the following eras. With each period of time, or era, in the region's haying history, ranchers and blacksmiths made further modifications to the Beaverslide. The most significant alteration occurred during the third era (the 1950s), when wings were attached to the sides of the Beaverslide that helped shape and hold the haystacks (Figure 23). Although it was common for the wings to be attached to the Beaverslide, that was not always the case. Sometimes they were built separately from the slide and manually moved to accompany the haystacker. Also built, but never attached, was a backstop that assisted in keeping the stack even and in place (Figure 24). Even into the fourth era (the 1970s), improvements continued on the Beaverslide. For example, during this era, construction of the Beaverslides switched from primarily timber to metal (Alwin 1982).



Figure 23. Wings attached to the Beaverslide allow for more even haystacks. July 2009, Jackson, Montana. Photo: Linnea C. Sando.



Figure 24. Backstop to keep haystack in place. July 2009, Jackson, Montana. Photo: Linnea C. Sando.

Landscape Imprint

The Beaverslide hay stacker creates distinct hayscapes. The stacker itself is part of the landscape, but there are other, more abundant, features of the haying landscape as well. The primary landscape features resulting from the Beaverslide hay stacker are the stacks themselves (Figure 25). Haystacks up to thirty feet tall are created with the Beaverslide (Figure 26). Several days after the stacks are created, they settle, making them slightly lower in elevation than when they were first put up. Ranchers sometimes kept the haystacks placed throughout the hayfields, or other times they used haywagons to bring the stacks closer to the farmyard for storage. If the stacks are in fields where livestock winter, fences are put up around the stacks to keep the livestock out (Figure 27). When Beaverslides were first used, the fences were mobile wooden panels that could be shaped according to the perimeter of the stacks. The wood panels

accompany the Beaverslide and are usually left by the stack and put up when needed. Ranches throughout the West still use the wood panels to protect their haystacks; electric and metal fences, however, are common as well.



Figure 25. Haystacks near Avon, Montana created using a Beaverslide hay stacker. June 2009. Photo: Linnea C. Sando.



Figure 26. New, high haystack made with a Beaverslide stacker. July 2009, Jackson Montana. Photo: Linnea C. Sando.



Figure 27. Haystack near Avon, Montana surrounded by wooden panels, ready for setting up when needed. August, 2009. Photo: Linnea C. Sando.

Rudimentary Devices

Although Beaverslides and hay derricks were the greatest innovations in haying in the West during the first era, there were other methods used. In some instances, farmers and ranchers used “rudimentary” methods prior to the development of the Beaverslides and hay derricks, while other times they were used in lieu of the larger hay stackers. On smaller ranches and farms, particularly in Montana, it was not usually efficient to use Beaverslides; they were most useful for large quantities of hay. The location of the hay fields also had an impact on the decision to obtain or reject the Beaverslide hay stacker. Beaverslides work best in large, open hay meadows. Ranchers and farmers with smaller, rougher fields opted out of the large, cumbersome stacker.

One common option in the beginning was to use simple devices to gather and stack the hay, such as pitchforks, slings or nets placed on the bottom of hayracks or wagons, and long poles with ropes and pulleys. Hay was stacked onto wagons with a pitchfork and carried up to the barnyard or other place of storage. There were different ways of stacking the hay for winter storage once workers gathered it from the field. One way was to stack it by hand with pitchforks (Figure 28) and shape it in a way that would shed the water. Other times, farmers and ranchers used long poles with rope attached. The rope was hooked onto the nets that had been placed on the bed of the wagons or racks. The loaded net was raised with a system of simple pulleys over a haystack and dropped on the top (Beck 1971). Men or children on top of the haystack would then arrange the hay so it would shed precipitation. Many times, it was these farmers and ranchers who embraced the haying technology of the second era.



Figure 28. Farmers using simple pitchforks to transport and stack hay. April 1942, Beaverhead County, Montana. Source: Farm Security Administration.

Landscape Imprint

Farmers and ranchers using rudimentary devices such as pitchforks created ephemeral hayscapes consisting of smaller, low piles of loose hay. They did not use technology capable of elevating the hay up high as did the Beaverslide and hay derricks. Because the stacks were smaller in height, more of their hay was susceptible to spoilage. Stackers learned how to place the hay to best shed any precipitation.

If using long poles, rope, and pulleys, ranchers and farmers were able to create stacks as high as the poles. This was a simple, inexpensive method of putting up hay, and it was capable of creating higher stacks than using only pitchforks.

Transition into Second Era

The transition between the first and second era was gradual. Technologies classified in the second era were being produced in the first era. They were not, however, dominant in the first era. Western farmers and ranchers in the study region did not adopt commercially manufactured hay stackers as quickly, mainly because hay stackers produced in the first era were quite effective.

The landscape imprints of the first and second eras were similar in that the most commonly used hay stackers created hayscapes of large, loosely stacked hay. There are subtle differences in the shapes and sizes of the haystacks. The first era hay stackers were generally more capable of producing larger stacks, although much depended on the construction and variety of each individual hay stacker.

Rather than the first era of western hayscapes being completely replaced by a new era of haying technologies, and therefore new hayscapes, western haying landscapes received an extension. Most of the initial hayscapes remained, and new hayscapes were added as different technologies were included in the choices individual farmers and ranchers had in hay stackers. During the second era, farmers and ranchers had a variety of hay stackers from which to choose. There were a number of factors that influenced their decision about what hay stacker to use. According to an Agricultural Bulletin in 1923, the factors affecting the decision included: location of the ranch, method of irrigation, climate, number and age of children, type and amount of hired labor, use and type of hay, up-front cost of machinery, and most importantly, personal preference of the farmer or rancher (Corkins 1923). With such a variety of hay stackers from which hay growers could choose, variations in the western hayscapes underwent expansion.

CHAPTER 5 - Commercially Manufactured Period: 1910-1950

After the Beaverslides and Mormon derricks were well-established in much of western Montana and eastern Idaho, the introduction of new, commercially manufactured haystackers began. The swinging arm stacker, the overshot, and (to a much lesser degree) the stationary baler became options for ranchers and farmers in the West. Many ranchers and farmers, however, bypassed these new stackers and kept their older equipment. There were several reasons for this decision.

First, the Mormon hay derricks in Idaho and the Beaverslides in Montana were both very effective. The swinging arm stackers and the overshots did not offer any great improvements for those already using the former devices. Ranchers and farmers are generally conservative, and they tend to rely on traditional techniques until new ones prove better (Stilgoe 1982); the new techniques introduced during this era did not offer any significant enhancements. Second, because the new stackers were commercially produced, they were more expensive to purchase. Derricks and Beaverslides were either homemade, or were locally built, thereby making them much less expensive. The 1920s and 1930s were an economically difficult time, so investing in new technology, especially when the existing haying methods were still effective, was not commonplace. A third reason many chose not to switch was the inability of the commercially manufactured hay stackers to support the weight of large quantities of hay put up by westerners (Young 1983). A 1927 Farmer's Bulletin acknowledges this disadvantage of the patented hay stackers (Reynoldson 1927).

Although many farmers and ranchers chose to bypass the new hay stackers, a number of others did purchase and use them as is evident by the relics on the western landscape. For some,

depending on the ranch or farm operation and its location, there were benefits to the commercially produced hay stackers that their current hay stacker did not possess.

Many times there is a lag between when individuals patent their objects and when they actually become useful. There are different reasons for the interval between the conception of a technology and the applied use. The concepts of diffusion and isolation play a role in when a technology becomes available and widely adopted to a region.

Isolation played a role in the slower adoption of new haying technologies. In the past, the study area was fairly isolated from the rest of the United States. The largest urban center was Salt Lake City. Even though Salt Lake City was a major urban center in the West, it was part of the Mormon Region (Meinig 1972). The Mormons were already progressive in terms of agricultural technology. Until a more efficient technology, the automatic hay baler, came along in the 1950s, farmers using the Mormon derricks, generally persisted in using their derricks to stack hay.

In Montana during the 1920s through the 1940s, Helena and Butte were the major cities because of mining and ranching activities nearby (Meinig 1972). They were, however, much smaller compared to the major western nuclei cities of Salt Lake City, Denver, Santa Fe, Portland, San Francisco, and Los Angeles. Because of Montana's relative isolation to the rest of the United States, the region was less influenced by commercial activities, including new hay stacking devices.

The hay stackers classified in the Commercially Manufactured Period were patented years before farmers and ranchers began using them in the West. For example, John Deere Company was manufacturing overshots and swinging stackers at the turn of the 20th Century (Asson 2003). The swinging arm hay stacker and the overshoot were being produced during both

the first and second era, but they were used in the West after the establishment of homemade hay stacking devices. Overshots and swinging arm hay stackers were used on the Great Plains at an earlier date and in greater numbers than they were in the West. Although the swinging arm stacker and overshoot may be considered “primitive” in terms of construction and function, because they are commercially produced, they are in a different era. They started to gain popularity in certain parts of the West after Beaverslides and Mormon hay derricks were fairly well-established in many of the valleys.

Swinging Arm Stacker

The swinging arm stacker is similar in appearance to some of the later variations of the Mormon derrick (Figure 29). A triangular base supports a pole with a basket on one end and a wooden box on the other end to hold boulders to counterweight the loaded hay basket. The loaded hay basket is elevated and swung sideways, then the hay is dropped on any part of the stack desired (Noble 1984).



**Figure 29. Swinging arm hay stacker near Deer Lodge, Montana. August 2009.
Photo: Linnea C. Sando.**

Swinging arm stackers had certain advantages. The primary advantage was that the hay could be placed at almost any point on the stack (Reynoldson 1927). Hay was laid onto the toothed basket that was on the end of the arm and swung to the desired place above the haystack. Another advantage was only having to lift the hay as high as the stack itself (Rogers 1983). Other stackers required the same amount of energy and movement whether the stack was small or large.

Swinging stackers, which came in several forms and sizes, were very complex in construction as well as in their operation. Much of its success depended upon the person operating it. With a capable operator, the swinging stacker was incredibly valuable. In the control of a poor operator, it was considered one of the most disappointing hay stackers

(Reynoldson 1927). Because of its complexity in form and operation, swinging arm stackers were not used as much as other stackers introduced in the previous era or the second era.

Obsolete swinging stackers are still visible on the landscape in parts of western Montana, as well as northeastern Idaho, but few ranchers remember anybody using them. When horses were used for haying, one ranch near Deer Lodge, Montana used a swinging arm stacker in conjunction with a Beaverslide (Figure 30).



Figure 30. Swinging arm stacker, apparently used in conjunction with a Beaverslide, at this ranch near Deer Lodge, Montana. August 2009. Photo: Linnea C. Sando.

Landscape Imprint

The swinging arm hay stacker created stacks of loose hay that were smaller than the stacks created by the Beaverslides and the Mormon hay derricks (Figure 31). The average height of the stacks was approximately 20 feet; some stacks, however, reached about 26 feet high (Corkins 1923).



Figure 31. Swinging arm stacker creating haystacks on the landscape. 1940, Ouray County, Colorado. Source: Farm Security Administration.

Overshot Hay Stacker

The overshot hay stacker was most common across the Great Plains (Jordan et al. 1997). In western Montana and eastern Idaho, overshots were not as common. Some ranchers in Montana and Idaho did, however, use the overshots and found them to be very effective hay stacking devices. Relics, some hardly noticeable, dot the western landscape (Figure 32). Although it is more common for crumbled overshots to still occupy the landscape, there was one “newer” overshot sitting in a field near Whitehall, Montana (Figure 33). Functioning much like a catapult, the overshot’s main advantage was its ability to produce stacks of various sizes (Noble 1984). The overshot hay stacker was more widely used in smaller hay meadows. It was a mobile device that could easily move from stack to stack in smaller, rougher fields. Because

they were capable of producing various stack sizes, it was not a problem if fields varied in hay production.



Figure 32. Remains of an overshot near Dillon, Montana. June 2009. Photo: Linnea C. Sando.



Figure 33. "Newer" overshoot hay stacker sitting in a field south of Whitehall, Montana. August 2009. Photo: Linnea C. Sando.

A disadvantage of the overshots, as was the case with the swinging stackers, was its complexity in design. Beaverslides and hay derricks were easier to copy and build at home, but there were very few homemade overshots. Agricultural implement dealers sold most overshots. Farmers and ranchers closer to dealers were probably more likely to use overshots and other production made haystackers.

Landscape Imprint

As with the Beaverslide, hay derricks of various designs, and the swinging arm stacker, overshots created haying landscapes of loose hay stacks. The range at which hay could be stacked with the overshoot was less than the range of Mormon hay derricks and Beaverslides; this affected the height of the haystacks, and therefore the landscape imprint. The average height of

haystacks created with manufactured overshots was 20 feet; with some overshots, however, stacks were as high as 26 feet (Corkins 1923).

Stationary Baler

There is little evidence to suggest that stationary balers were used much in the study area. They were much more expensive to purchase and to use than the previous era's hay stackers, as well as most costly than the swinging arm stackers and the overshots. The rate at which the stationary baler created bales was much slower than the rate at which other hay stackers put up loose hay. Most of the time, the stationary baler was operated by a custom crew who would go from farm to farm baling hay (Virginia 1973). The majority of farmers and ranchers fed their hay to their livestock rather than transporting the hay. Those who did transport their hay, found the stationary baler to be more effective than other devices that stacked it loosely (Corkins 1923). Although stationary balers were not commonly used in western Montana and eastern Idaho, it is an important stepping stone into the next era when the automatic baler became more common.

Landscape Imprint

The stationary baler was the first haying technology to compress hay into bales, thus creating a distinctly different hayscape. Rather than large stacks of loose hay, with the stationary baler, haying landscapes consisted of stacks of baled hay. The majority of farmers and ranchers using a stationary baler, however, sold their hay to far away markets. Therefore, stacks of baled hay were seldom seen in the study area during the first half of the 20th Century.

End of Two Eras

The first half of the 20th Century experienced many changes in technology, including those related to the putting up of hay (Virginia 1973). The economics of ranching and farming

began to change in the mid to late 1900s. Mechanization was increasingly important, and agricultural implement dealers found valuable markets in the West. Instead of ranchers and farmers constructing their own hay stackers, they could now buy them from local dealers. In the latter years of the second era, ranchers and farmers began to transition from a semi-subsistence economy with minimal commercial involvement to a more contemporary and competitive cash economy. Farm and ranch units declined in number, but they grew larger in acreage and became more highly capitalized, mechanized, and reliant on modern technology (Malone and Etulain 1989). As time went on, this transition of economy and scale occurred even more rapidly.

Several similarities exist between haying in the first era and the second. The landscape imprint was comparable, with both eras using haying technology that created loose hay stacks. The social aspects were also similar. Haying crews of six to twenty-five individuals were necessary during the first two eras whether using the Beaverslide, hay derricks, overshots, or swinging arm stacker. Haying was an arduous process requiring a great deal of man and horse power, as well as many long hours. Because it was a labor intensive task requiring the help of family members, neighbors, and/or traveling work crews, there was a greater social aspect to haying in the 19th and first half of the 20th Centuries in the American West.

Stacking hay with the Beaverslide generally required more individuals to help than the other haying technologies. This is in part because ranchers using the Beaverslide were putting up larger quantities of hay, thus requiring more labor. When ranchers relied on horses for power during the haying process, large crews of approximately 25 people were needed. Families were larger during this era, but outside help was still usually needed. Sometimes neighbors were recruited to help, but many times, traveling work crews assisted ranchers during the few weeks it took to put up hay. Members of the work crews were as one interviewee put it, “drinking men.”

Most of them came from nearby towns. Sometimes, however, the men comprising the crew were train-riding hobos recruited by ranchers looking for anybody with a strong back who was willing to work (Young and Clements 2003).

With some operations, particularly those who used the Beaverslide, stories abound of parties in the bunkhouses where the haying crew stayed. For haying crews consisting of friends and family it was a time to catch up on happenings.

With large crews conducting labor intensive work, hearty meals were a must for the workers; for those still using the Beaverslide, large meals are still necessary. Typically, cooks prepared three meals a day. In order to make the most efficient use of time, the cooks, either hire-ons or the wives, brought the noon meal out to the fields (Figure 34). It is much easier for a few people to bring the food out rather than an entire crew to come in.



Figure 34. The noon meal is brought out to the field by the cooks. July 2009, Jackson, Montana. Photo: Linnea C. Sando.

As the next era in haying technology began, engine powered equipment was becoming more widely available and at a price that many farmers and ranchers were willing to pay. Although haying crews were still necessary, the number of people needed started to decline. Horses were replaced with motorized power, thereby speeding up the haying process. Many changes occurred in haying technology and the resulting hayscapes of the study area between 1880 and 1950. As the motorized equipment became widely available, changes in haying methods began to undergo rapid change, bringing in a new era.

CHAPTER 6 - Moving Forward; Engine In, Horse Out: 1950-1970

Technological changes in all sectors of agriculture began to increase at a faster pace beginning around 1950 (Brassley 1999). These technological changes, in turn, brought about many other changes in the agricultural landscapes. It was in the 1940s and 1950s that the tractor started to slowly take the place of horse power on ranches and farms in the West (Baker 1983). In most regions of the United States, farmers used tractors before the 1950s, but the numbers were relatively few. The function of tractors was also different and less variable. In the first half of the 20th Century, many times tractors were used as a source of stationary power; horses were still used in the fields, especially for haying. When tractors were used in the field in early years, it was usually for tasks other than haying, such as plowing (Safford 1983). After World War II, the number of farmers and ranchers using tractors began to increase, as did the uses of tractors. 1953 marks the year when the number of tractors exceeded the number of horses and mules on farms throughout the United States (Rasmussen 1975).

As with most innovations, there was a lag between the initial introduction of the technology and when it became widely adopted. Rural residents tend to be more hesitant in accepting change than urban dwellers (Kuntz & Gunderson 2002; Gritzner 2007). While some farmers and ranchers readily embraced tractors over teams of horses as their source of power, others were reluctant to make the transition. Several factors influenced their hesitance to adopt the new technology. First, because the cutting and storing of hay is a delicate operation, farmers felt more comfortable directing horses rather than tractors. Horses were guided with physical means such as harnesses and reins, but it was the words and their own intelligence and training that made farmers and ranchers more comfortable with the animals; individuals worked *with* the horses rather than mechanically operating the power, as was done with tractors. A second factor

having bearing on the decision was that horses did not trample as much hay as did tractors (Rogers 1983). Finally, the cost of purchase, fuel, and maintenance was an important factor. Many farmers and ranchers were reluctant to purchase tractors if their horses were still healthy and their operation was running smoothly.

Also introduced to the West in the early 1950s was the automatic hay baler. Instead of gathering and stacking the hay loosely, tractors pulled the hay baler that compressed the hay into small, rectangular (approximately 14 x 18 x 36 inches) bales that were light enough for workers to pick up by hand. During this time, however, the usage of the Mormon derricks did not stop; rather, it continued to assist in the stacking of hay, now baled instead of loose. The “Jackson Fork” attached to the end of the derrick pierced 4 or 5 bales. The arm swung around, and somebody on the stack arranged the bales. Stacks were sometimes 25 bales high (Figure 35), but the height of the stack depended on the amount of storage, number of bales, and range of the derrick. Use of the Mormon derricks did not dwindle significantly until the early 1970s when effective hay wagons with hydraulic ramps became more widely available and used. The hay wagons equipped with hydraulic ramps made the process of stacking hay bales much quicker; it also reduced the number of workers needed to stack.

The study region in eastern Idaho contains Latter-day Saint (“Mormon”) settlements. Although traditional in some respects, since the beginning of their settlement in the West, Mormons have had more modern attitudes – or tendencies to find and use efficient methods – in farming, as is evident in their early use of irrigation, as well as their method of handling hay (May 1992). When the automatic baler became available, farmers in Idaho were quick to adopt the new technology.



Figure 35. Hay derrick being used to stack hay bales. Source: Francaviglia 1978, p. 919.

Haying technologies, however, were not always adopted quickly by all farmers and ranchers. While progressive farmers in eastern Idaho accepted the new haying technology, many ranchers in western Montana continued to use the Beaverslides. To many, the Beaverslide still stacked the large quantities of meadow hay more efficiently than did a small baler. Instead of using horses or mules as power to gather and stack the hay, tractors or trucks became common (see Figure 19). Families began to switch to the baler when an adequate sized crew became harder to find. During this era, the out-migration of rural youngsters accelerated, resulting in the need for labor-saving machinery like the automated baler. Farming operations also began to

increase in size. As a result, baled hay became increasingly widespread, thereby altering the haying landscapes throughout the study region (Figure 36).



Figure 36. Small hay bales became more abundant on the landscape during the third era. July 2009, Helena, Montana. Photo: Linnea C. Sando.

Montana is generally thought to have large ranches, characterized by cattle raising, whereas Idaho is considered more farming territory where the growing of cash crops is mixed with some livestock raising. Generally speaking, farms in eastern Idaho are smaller than ranches in Montana. Because these farms tend to have fewer livestock, less hay is required for the winter months. It made more sense for farmers in Idaho to switch to the automatic baler that produced small bales. If large ranches in Montana were to use a small, square baler it would take them much longer to get the hay put up than if they used their existing and still functional

Beaverslides. Not all ranches in Montana were large, however, and some did use the new, automated haying technology. For these farmers, the baler made the gathering and stacking of hay much easier. The equipment was a bit more expensive, but it required less work, making it worth it for some ranchers (Safford 1983).

In the second half of the 20th Century, the scale of operation began to change for ranchers and farmers. Rather than operating small, semi-folk operations, farmers and ranchers began to increase their scale and commercial orientation of their operation. The technology used in the third era was necessary to keep up and run efficient, larger operations. Jackson (1997, 231) noted that “the larger the farm the more economic justification for mechanization; this is the best – indeed, the only – way of saving time and labor.” Farmers and ranchers needed to switch to more efficient equipment. As time progressed, it would become even more necessary to employ newer, more mechanized haying technologies.

Third Era Landscape Imprint

Beginning around 1950, hayscapes in the West took on a variety of appearances. No longer were stacks of loose hay dominating the haying landscape. Small, rectangular bales started to appear in fields where they were quickly transported to storage areas. Storage areas varied according to individual preference. Sometimes the bales were placed in stacks somewhere in the field (Figure 37), while other times they were brought to a type of building storage, such as pole barns or lean-tos.



Figure 37. Small bales stacked along the edge of a hay field. July 2009, near Helena, Montana. Photo: Linnea C. Sando.

The Beaverslide hay stacker was still in wide use in part of Montana during the third era. Instead of using horse power, however, ranchers switched to engine powered ways of stacking hay. The number of horses on farms and ranches started to decrease because they were no longer needed as a source of power. Depending on the size of operation, ranches and farms housed as a few as five horses, to as many as sixty or more horses. Instead of seeing herds of working, muscular horses on the landscape, tractors started to take their place; it did not take as many tractors as horses to complete the work that needed to be done. Engine powered tractors decreased the time and labor spent in completing tasks. With the use of the engine for power instead of horses, the time to put up haystacks decreased significantly for farmers and ranchers.

CHAPTER 7 - Era of Rapid Mechanization: 1970-Present

Mechanization started to increase even more rapidly in the 1970s, significantly altering the haying landscapes. The scale of operation is much larger in the fourth era compared to all previous eras. Rather than a couple dozen head of cattle for milking, farmers began running dairy operations of 1,000 head or more. With larger operations and less available labor, efficient equipment was needed for individual or small numbers of workers to put up all of the hay for the increased numbers of livestock. Large tractors, rather than teams of horses, began pulling expensive, factory produced haying machines.

The most common haying machine produced during this era is the large baler that compresses hay into either round bales (Figure 38) or large rectangular bales (Figure 39). Also produced during this era, particularly the 1970s and 1980s, was the loaf stacker. This stacker gathers the hay, usually grass and meadow hay (although alfalfa hay also works), and then piles it loosely into “bread loaf” stacks (Figure 40). The bread loaf stacker never gained wide acceptance largely because the hay was stacked loosely and many preferred the ease of moving bales.



Figure 38. Large round bales produced with an automatic baler. June 2009, southern Idaho. Photo: Linnea C. Sando.



Figure 39. Large, square bales produced from a fourth era hay baler. June 2009, southern Idaho. Photo: Linnea C. Sando.



Figure 40. "Bread loaf" hay stacks created by using an automatic loaf stacker pulled by a tractor. June 2009, Challis, Idaho. Photo: Linnea C. Sando.

Chopped hay is another option for storing hay introduced during the fourth era in Montana and Idaho. The concept of chopped hay has been around for the past century. It is only in the last few decades, however, that it has become more common in the West. Chopped hay is

gathered from the windrows when it is still moist, whereas baled hay needs to be cured, or dried, first. In much of the U.S. West (other than the coastal West) where there is not as much moisture, it is generally not a problem to wait for the hay to dry. In moister regions where it is not uncommon for it to rain every few days, waiting for the hay to cure can result in spoilage. Chopped hay has not gained as much popularity in the drier American West as it has in the wetter United Kingdom where it is the dominant method of storage (Brassley 1999). It was not until large dairy operations and beef cattle feedlots came into Idaho and Montana during the 1980s that moist chopped hay started to become more commonly seen on the landscape.

When the alfalfa, or sometimes the alfalfa-grass mix, is still lying out in the field in windrows, a chopper, sometimes called a forage harvester, is pulled over the moist forage. This machine chops the hay and blows it into a wagon or truck. The chopped hay is then brought to the farmyard where it is stored in long, white plastic bags (Figure 41). Occasionally, chopped hay was stored in vertical silos, but most of the time this method was cost inefficient. Large silos are not a widespread landscape feature associated with dairy operations in the West. By the time large dairy operations began to appear in the West, manufacturers and farmers had concluded that silos were not an effective way to store hay silage; rather, storing chopped hay in white plastic bags proved to be cheaper and more efficient.



Figure 41. Chopped hay stored in the farmyard area in white plastic bags. June 2009, Townsend, Montana. Photo: Linnea C. Sando.

With the increase of haying mechanization, ranchers and farmers no longer need large work crews. Western ranching and farming continue to become more of an independent occupation resulting in major changes in many aspects of the rural landscape. Mechanization of farm and ranch work is the most noticeable imprint of a new rural landscape (Jackson 1997).

The way hay is stored has changed in the last decades. A number of storage patterns emerge with this transition. Instead of storing hay in large, tall, loose stacks, baled hay is almost always stored in rows of various lengths and form (Figure 42). Although these bales are sometimes stacked two to three rows high, they are still more horizontally orientated than vertically. Chopped hay is not stored in upright silos anymore; rather, it is placed in long ground pits (Figure 43). Jackson noticed a tendency to eliminate vertical configuration in favor of more horizontal forms throughout rural and urban spaces (1984). The transition from vertical to

horizontal is evident in hayscapes as well. Everywhere we are transforming the American landscape with the technology and techniques we use to build it.



Figure 42. Long horizontal rows of baled hay. June 2009, near Augusta, Montana. Photo: Linnea C. Sando.



Figure 43. Chopped hay stored in long, low rows on the ground. June 2009, near Blackfoot, Idaho. Photo: Linnea C. Sando.

Today's Hayscapes

William Wyckoff observed that Montana is a “western American landscape that remains poised between yesterday and tomorrow” (Wyckoff 2006, 3). Some hayscapes of the West have changed little in the last fifty years, whereas others are quite modern and employ technology on the forefront of agricultural mechanization (Figure 44). Today, ranchers and farmers have a variety of haying methods from which to choose. Most contemporary methods involve some

type of baler, whether it produces small, rectangular bales, large rectangular bales, or round bales. A number of ranchers, however, continue to handle hay using older methods. Some ranchers in Montana continue to use the Beaverslides, while others use technology from the 1970s, such as the loaf stackers that produce loose stacks of hay shaped like a loaf of bread. Where large dairy farms or feedlots exist, some of the hay is chopped and stored on the ground wrapped in long, white, plastic coverings.



Figure 44. Two different hayscapes using technology from different eras adjacent to one another. August 2009, Avon, Montana. Photo: Linnea C. Sando.

Still other ranchers in Montana continue to stack hay loosely, but instead of using a Beaverslide, they use more recent innovations. One such device is a tractor with a grapple fork attached to an extension on the front that grasps the hay and lays it in a stack, very similar to the

ones produced by Beaverslides. Every rancher and farmer can justify his or her chosen haying method, each of which has its own advantages and disadvantages depending upon a host of related variables. The primary reasons for using a particular haying method includes cost, convenience, available labor, quality of hay, stance (traditionalist), size and type of ranch or farm, and personal preference. Sometimes the reasons are heavily intermingled.

The Enduring Beaverslide

The Beaverslide hay stacker is the most enduring haying method in the western United States thus far. For one hundred years ranchers have used the hay stacker to create a distinct hayscape. Most of the people who use the Beaverslide today come from a family that has used it. There are several advantages to using the Beaverslide, which is why it has held on for so long even with the advent of newer haying technologies. The Beaverslide is the fastest way to put up grass hay. With engine powered buck rakes bringing the dried hay in, and a truck providing power to lift the toothed basket on the slide, it can take as little as eleven minutes to complete one “butt,” or one slide full. One “butt” contains the equivalent of approximately twelve large, round two-ton hay bales.

Loose hay stacks like the ones the Beaverslide produces keep the hay fresher for longer periods of time than do hay bales. Depending on the shape and size of the stack, the hay is good for at least two to three years. Some Montana ranchers were confident the hay could be used five to six years after initially stacked. Hay bales can begin to mold after only one year, depending upon their exposure to moisture.

Haystacks created from Beaverslides are immense in size, which has both advantages and disadvantages. The primary advantage includes a large amount of hay storage in a relatively small space compared to numerous bales stacked in rows. A major disadvantage of having a

large quantity of hay stored in one location is the risk of fire. With large, loose stacks of hay, if a stack is struck by lightning and catches fire, it spreads rapidly. For this reason, some ranchers choose to insure their hay.

The process of using a Beaverslide involves special equipment, such as the Beaverslide itself and buck-rakes. The equipment used has both advantages and disadvantages to the process, much of them economic in nature. Economic considerations are a dominant driving factor in choices people make. A 1927 U.S. Department of Agriculture Bulletin states that “every rancher wants to put up his hay at the lowest possible cost” (1). For those still using the Beaverslide, the cost to switch to balers can reach hundreds of thousands of dollars because of the need to purchase new equipment. If all the equipment is working, putting up hay with a Beaverslide is less expensive. The Beaverslide is a very durable hay stacker. If it is constructed with metal, it can last ranchers nearly a lifetime. Those constructed with timber are functional for approximately ten to fifteen years. The buck-rakes are the most disadvantageous in terms of equipment. Buck-rakes are not commercially made anymore. Many times, they are homemade devices. Older trucks are taken apart and a toothed basket is attached to the front. Replacement parts can be hard to find when needed. An experienced mechanic is essential when using Beaverslides and buck-rakes.

Another disadvantage to the Beaverslide is that it is very labor intensive. Depending on the size of the operation, a crew from as little as six people to as many as 25 people is needed. Families still using the Beaverslide sometimes find it difficult to come across enough capable workers. If members of the hay crew are inexperienced, it can slow the process. There is, and always has been, a hierarchy to the jobs involved in the haying process. The youngest and most inexperienced begin with the scatter rakes, gathering hay missed by the others (Figure 45). More

intermediate jobs include mowing the grass or alfalfa, raking the cut hay into windrows, and then operating the buck-rakes (Figure 46). One of the most experienced crew members is in charge of dumping the hay; he/she runs the truck or tractor. With such a labor intensive haying process, and with certain jobs requiring a great deal of experience, most everybody needs to be present. When emergencies arise that may inhibit people from working, such as a health related issues or accidents, it is difficult to find replacements.



Figure 45. Girl assisting in the haying process by pulling a scatter rake. July 2009, Jackson, Montana. Photo: Linnea C. Sando.



Figure 46. Buck rake bringing hay closer to the Beaverslide to be stacked. July 2009, Jackson, Montana. Photo: Linnea C. Sando.

Depending on the location of the stack, feeding the livestock is either very efficient or extremely time consuming. For example, if the stack is in a “water meadow,” or lower pasture, a fence is put up around the stack to keep the cattle from eating it; a tractor with a grapple fork extension just grabs the hay and scatters it on the ground for the livestock to eat. If the stack is located far away from the wintering livestock, it can take a long time to distribute feed. Hay is brought to the livestock on a hay wagon that can be tedious and time consuming, especially when snow covers the ground.

Nearly everyone who uses the Beaverslide to put up hay has a slightly different approach to the task, the result being a variety of different hayscapes. Some ranchers put the hay up in stacks and leave them in the fields at the exact location they were created. This results in fields of scattered haystacks (Figure 47). Other ranchers will load the stacks onto hay wagons and

bring them closer to where they feed the cattle in the winter. The haystacks are placed side by side (Figure 48).



Figure 47. Smaller haystacks created with a Beaverslide scattered throughout the field. July 2009, Avon, Montana. Photo: Linnea C. Sando.



Figure 48. Haystacks stored along perimeter of field. Ranchers using Beaverslides sometimes move their stacks closer together to resemble a hayscape such as this. 1940, Cornish, Utah. Photographer: Russell Lee. Source: Farm Security Administration.

Balers

The automatic baler in all sizes has drastically transformed hayscapes. Balers offered an entirely new way of storing hay when they were introduced; rather than hay being stored loosely, it is compressed and “packaged.”

Fewer workers are needed when baling hay, which is one of the most significant benefits of using balers to put up hay. Changes in labor supply have always heavily impacted the use of agricultural technology (Young 1983). Although there are different reasons for switching to a baler for putting up hay, many farmers and ranchers in the study area have converted to newer techniques, such as the baler, because fewer workers are required. The percentage of individuals employed in agriculture has decreased significantly in the last century, to a present-day total of less than one percent (CIA World Factbook). Families are smaller which means that there are not as many children available to work on the ranch or farm. Haying is arduous work, and without traveling work crews, it is more difficult to find a large number of people to work in the fields. Many times, if ranchers and farmers need extra help, they hire local teenagers and young adults to help during the summer. With farm labor increasingly scarce and costly, farmers and ranchers must adapt to changing conditions and switch methods of production when necessary. Instead of a 6, 15, or 25 person work crew, with tractors and automatic balers, it only takes one person to put up all of the hay produced in a summer.

There are disadvantages to hay balers. One of the most significant disadvantages is the start-up cost. New large balers cost several thousand dollars. The newer large balers also require a tractor with enough power capable of pulling the haying device. Tractors of this size can cost hundreds of thousands of dollars. In the study area, the majority of tractors and balers seen were older models manufactured in the earlier part of the fourth era. Some ranchers and

farmers hire out their haying, either locally or from modern-day traveling work crews, called “custom balers.”

A relatively minor disadvantage to using balers is the twine and other fabrics that wrap the bales. Several ranchers and farmers commented on how much they hate the mess the twine leaves behind. The twine, if it is not picked up, can get caught in the livestock’s hooves or the machinery. Birds, such as the osprey also at times make nests out of roughage entangled in plastic twine.

Hay balers come in different sizes, and therefore produce different haystacks. Some produce small, rectangular bales (Figure 49), others produce large, rectangular bales (Figure 50), and the most common baler today produces large, round bales (Figure 51). There are various reasons for choosing certain sizes of bales, such as the size and type of ranch or farm, purpose of hay, and personal preference.



Figure 49. Hay baler gathering dried hay from field and producing small, rectangular hay bales. June 2009, southern Idaho. Photo: Linnea C. Sando.



Figure 50. Recently compressed large, rectangular hay bales. June 2009, northern Utah. Photo: Linnea C. Sando,



Figure 51. Large round bales are the most common hayscape today. July 2009, northwest of Helena, Montana. Photo: Linnea C. Sando.

A large number of ranchers and farmers in the West have used the small hay baler since the 1950s. When it was first adopted in the area, it was due mostly to a shortage of labor and increasing scales of farm operations. In the latter part of the fourth era, the small baler is ideal for smaller ranches and farms, as well as for those who put up hay to sell it, or people who keep only a few animals, such as horses, mules, or goats. The small bales are composed of sections, or flakes, that easily break off, thereby making it easy to feed a certain amount of hay to horses. Entire bales can be picked up by hand, as well. Smaller bales make it easier for buyers to purchase a more precise amount of hay. With only a few animals to feed, and little storage space required, these people prefer small, rectangular bales.

A large majority of the people who buy small, rectangular bales live on ranchettes, or rural plots of land of a couple acres or more. Ranchettes surrounding larger towns abound throughout Montana and parts of Idaho. Many of these residences have enough room for a horse or two, and instead of growing their own hay, they purchase it from local growers. Small stacks of hay bales are usually set up somewhere on their property. Hay growers near larger towns selling their small, rectangular bales find a ready market. It is common to see hay fields full of small bales surrounding cities and towns like Helena, Dillon, and Idaho Falls (Figure 52).



Figure 52. Hayfield on the outskirts of Helena, Montana. July 2009. Photo: Linnea C. Sando.

Large hay balers are more of a recent phenomenon. There are two main types of large balers, round and square. Balers producing large, round hay bales started adding to and transforming western haying landscapes beginning in the 1970s. Today, round bales comprise the largest type of hayscape. Whereas small bales are generally found on smaller operations, large bales are used in larger operations. Large bales can range in size between 1000 and 2000 pounds; this is the equivalent of approximately 20 to 45 small square bales (Agribility Project 2008). Round balers are the least expensive of the large baler types. Farmers and ranchers producing round bales are more likely to keep the hay for their operation or to sell their hay locally.

Hay balers that produce large square bales are gaining in popularity throughout the entire United States, not just the West. They started transforming and adding yet another dimension to

western hayscapes since the early 1990s. Hay bale dimensions range from 3 x 3 x 6 feet to 4 x 4 x 8 feet, and they can weigh up to approximately one ton. Large square bales provide the same benefits as large round bales; the bales contain more forage, so farmers and ranchers handle fewer bales compared to producing small, square bales. They also provide additional benefits. Square bales are easier to stack than are round bales. Equipment exists that allows workers to pick up the bales from the fields and stack multiple bales at one time (Figure 53). Stacks created with square bales are also higher and more compact, taking up less space (Figure 54). The most significant problem associated with the large square balers is the high cost of the equipment; large square balers significantly surpass the round hay balers in cost.



Figure 53. Truck picking up large, square hay bales from field. June 2009, southern Idaho. Photo: Linnea C. Sando.



Figure 54. Truck stacking multiple bales at once. June 2009, southern Idaho. Photo: Linnea C. Sando.

Large rectangular bales have a greater landscape presence on the landscape in eastern Idaho than they do in western Montana. Idaho contains a great number of dairy operations. Dairy farmers generally buy most of their hay. Some farmers in the eastern part of the state grow hay with the intent of selling it to the dairies. They must transport the hay, and square bales travel better than round bales because they stack better and are more compact on the truck bed (Figure 55). The large, rectangular bales also tend to have more of the nutritious leaves attached. Dairy farmers always try to buy the highest quality of hay available.



Figure 55. Truck transporting large, square bales on a southern Idaho highway. June 2009. Photo: Linnea C. Sando.

There has always been a wide variety of options for methods of stacking and storing hay. In regard to balers, there are a number of different sizes from which to choose. Taken further, there are also a number of different ways to wrap the bales. Twine is the simplest wrap, but it leaves the bale exposed to nature's elements (Figure 56). In the relatively dry West, many farmers and ranchers choose to wrap their bales with twine, which is effective less expensive than alternative methods such as plastic mesh.



Figure 56. Twine-wrapped hay bales. July 2009, Townsend, Montana. Photo: Linnea C. Sando.

To offer more protection from weather and other elements, some farmers and ranchers opt to wrap their hay bales with a type of net wrap (Figure 57). Net wrap is a strong, plastic mesh cover that binds the bales. It is more expensive, but there are benefits to using net wrap even in a drier climate. Net wrap reduces the amount of spoilage from the collection of rain and snow. With net wrap, hay bales require fewer revolutions to wrap the bales, meaning the baler produces more bales per hour. If hay growers sell their hay, and it is transported a long distance, net wrap keeps the bales together better than twine. Even if bales are not sold, because net wrap keeps the bales together better, ranchers and farmers might still opt for the more durable binding.



Figure 57. Net wrapped bales hold together better and protect the hay from weather and other elements. August 2009, Avon, Montana. Photo: Linnea C. Sando.

There are other options for protecting hay bales from weather and other elements. Securing a tarp over the top of the stack is one option (Figure 58). This prevents precipitation from seeping into the bales and causing them to rot. Hay storage sheds also provide protection for hay bales. The sheds have from one to all four of the sides open that allow the movement of air as well as easy access to store and retrieve the bales. The layout and style of hay sheds differs. Some are pole barns (Figure 59), while others are round hay sheds (Figure 60). Pole barns are generally sturdier and more common, but round hay sheds offer certain advantages. The main advantage to an umbrella structure, or round shed, is a lower initial cost. Round bales, rather than square bales, are easier to stack in umbrella structures.



Figure 58. Tarp is used to protect bales from the elements. June 2009, near Salmon, Idaho. Photo: Linnea C. Sando,



Figure 59. Bales stacked under a pole barn for storage. June 2009, northern Utah. Photo: Linnea C. Sando.



Figure 60. Round hay shed. August 2009, Avon, Montana. Photo: Linnea C. Sando.

Loaf Stackers

In the 1970s and 1980s, many ranchers used “loaf” hay stackers. They derive their name from appearances of the stacks of hay they produce. This stacker allows the stacking of hay loosely with a one-man crew. There are still some ranchers who choose to use the loaf stacker, although most have switched to different haying methods. The primary reasons for using a loaf stacker include a perceived better quality of hay, larger quantities of hay storage, and the avoidance of twine associated with balers.

Some users believe that loose hay is of better quality, especially when stored for some time. The loaf stacker allows the storage of loose hay by a small haying crew. The market, however, is limited, almost nil, for those still storing hay loosely. Ranchers and farmers who choose to put up hay loosely do not usually sell their hay simply because it is difficult to transport. If they do sell their loose hay, it is to a nearby neighbor. Another problem with loose hay is wind, which is more likely to blow the hay off the stacks. This problem is minimal with bales. Generally, farmers and ranchers have some type of stack-yard where they store their hay. Much of the time, the stack-yard is located on the perimeter of fields, or closer to the barn-yard. Farmers using the loaf stacker have the hassle of traveling between the hay field and the stack-yard for each loaf (Figure 61). If the stack-yard is not on the perimeter of the field, this process can be very time-consuming.



Figure 61. Loaf stacks that were transported from the hayfield to a fenced stack-yard. August 2009, Townsend, Montana. Photo: Linnea C. Sando.

Chopped Hay

Many large scale dairy farms and beef cattle feedlots prefer to include some chopped hay in the diet of their livestock. Chopped hay is easier for livestock to digest and is generally a higher quality because more leaves are attached. Farmers and ranchers mix moist chopped hay in with other feed, making the process of feeding large numbers of cattle easier.

Chopped hay is stored in long narrow white plastic bags where it ferments to some extent. The plastic-wrapped hay constitutes a noticeable, though impermanent, landscape feature. Rows of white plastic bags indicate a dairy operation or another type of large feedlot operation. Idaho is one of the top dairy producers in the United States, with output exceeded only by California, Wisconsin, and New York (NASS 2009). The many rows of chopped hay storage on the landscape are tell-tale indicators of the agricultural activities in the region.

Mixed Methods

Some ranchers and farmers combine old ways of putting up hay with contemporary methods. They stack the hay loosely in large piles similar in appearance to stacks created with the Beaverslide. Rather than using a Beaverslide, however, they use a modern day tractor with an extension (Figure 62). This “updated” way of stacking hay has been occurring in the West since tractors became affordable in the 1950s, although some of the equipment has been slightly updated.



Figure 62. Special tractor with a front loader extension to stack hay loosely. July 2009, Helena, Montana. Photo: Linnea C. Sando.

One family near Whitehall, Montana uses a mixed haying methods approach. They use older equipment, however, so the stacks are much smaller (Figure 63). They have been stacking hay this way for sixty years, ever since they stopped using horses and overshot hay stackers and

switched to the tractors and fork extension. For this small sheep ranch, it is the most cost effective way of putting up hay.



Figure 63. Small haystacks created by using a tractor with a limited-range extension. August 2009, Whitehall, Montana. Photo: Linnea C. Sando.

Another man on the outskirts of Helena, Montana also puts hay up with a tractor and attached extension. He grew up in western Montana using the Beaverslide to stack hay. As time went on, he was unable to find a large enough crew to operate the large stacker. Rather than a 15 to 25 person crew, this method employs a five to six person crew and stores hay in a stack nearly identical to that formed by the Beaverslide.

The advantages and disadvantages of putting up hay this way are similar to the Beaverslide. It can be less expensive if the rancher owns the equipment and it is in decent condition. Ranchers can put up hay when it is a bit moister compared to those who bale it

because as air blows through, it dries the stacks out. Hay that is baled must be drier, otherwise it molds. Although not as labor intensive as the Beaverslide, the use of a tractor with an extension for haying usually takes six people. On small ranches or farms, however, only a few people are needed in the haying process. The most experienced person forms the hay stacks. The others are involved in cutting, raking, and gathering the hay with buck rakes.

What's Next?

Haying technology is continually being refined to make haying more efficient. The primary goal of manufacturers is to produce equipment that saves the harvester time and lowers costs. Although printed nearly one hundred years ago, the following statement found in a 1918 Farmers' Bulletin is still relevant: "If an old method can be superseded by a new one that will enable a given crew to accomplish more than before in a given length of time, then it is a wasteful method and should be abandoned" (McClure 1918, 3). Manufacturers such as John Deere, New Holland, and Hesston are constantly working to develop more efficient haying equipment.

Haying technologies have increased in size and complexity with time. The market demands it because there are fewer workers harvesting more acres and putting up more hay. It is difficult to imagine that haying equipment will become even bigger, but if that is how farmers and ranchers can perform the job more efficiently, then manufacturers will produce it.

The size of the haying equipment alone does not dictate whether it is efficient in terms of time and cost. It is the intricacies of how the technology works that also matter. Alfalfa hay consists of leaves and stems. The leaves have the most nutrition, but are also more fragile. Manufacturers work to design haying equipment that is gentle enough to keep the leaves intact

during the process, but strong enough to bind the hay tightly. New balers are designed to keep the leaves intact, but as the saying goes, “There is always room for improvement.”

CHAPTER 8 - Conclusion

The cultural landscape is a document. It consists of a visible record of the decisions people have made regarding their interactions with the environment. It reveals clues concerning past and present technologies, economic institutions, and social systems. The landscape of haying, when thoughtfully read, does indeed reveal the aforementioned matters. Since the dawn of haying in the West, the region has experienced technological, economic, and social changes. These changes are visible with an analysis of the haying landscape.

Haying technologies used in the West have undergone a number of changes since people of European heritage initially settled the region. Changes in technology correspond with changes in the region's economic system. When haying landscapes first started to appear in western Montana and the eastern half of Idaho, most ranchers and farmers were engaged in more of a semi-subsistence folk economy with little commercial involvement. As time progressed, the economic system began to move toward a more contemporary, competitive cash economy. Farm and ranch numbers began to decline, but acreage increased. The scale of operation under which western farmers and ranchers operated also increased. With each of these economic changes, different haying technologies were introduced and used in order to keep up with the demand.

As each new technology was introduced to the region, a different hayscape took shape upon the land. Sometimes the new hayscape was drastically transformed, as it was when the hay baler became an option and hayscapes experienced a transition from loose hay stacks to landscapes composed of baled hay. At other times, new haying technologies created only subtle differences in the haying landscapes.

Western hayscapes today are the most diverse they have ever been. Whereas haying landscapes of the first era consisted of solely loose hay, today western hayscapes consist of loose

hay, baled hay, and chopped hay. There are many choices for farmers and ranchers to consider in ways of putting up hay. Each method of haying has its advantages and disadvantages. It is up to the farmer to decide which method that suits his or her agricultural operation and needs.

Technologies come and go. Rarely, however, does a technology and its distinctive landscape imprint suddenly vanish. Within the study region as a whole, transitions in haying technology and landscapes are gradual, often spread out over many decades. As newer, more effective haying technologies are introduced, the former technologies are gradually replaced (Figure 64). As this occurs, the landscape undergoes a transformation.

Some technologies persevere longer and have more of an impact than do others. In regard to haying technology, some methods of putting up hay imprinted the landscape more heavily and for longer time periods than did others (see Figure 64). The Beaverslide has had the longest imprint on western hayscapes. Since its first appearance at the beginning of the 20th Century, it continues today to create immense haystacks upon the landscape. Other, more inefficient haying technologies had only a minimal imprint on the haying landscapes of western Montana and eastern Idaho.

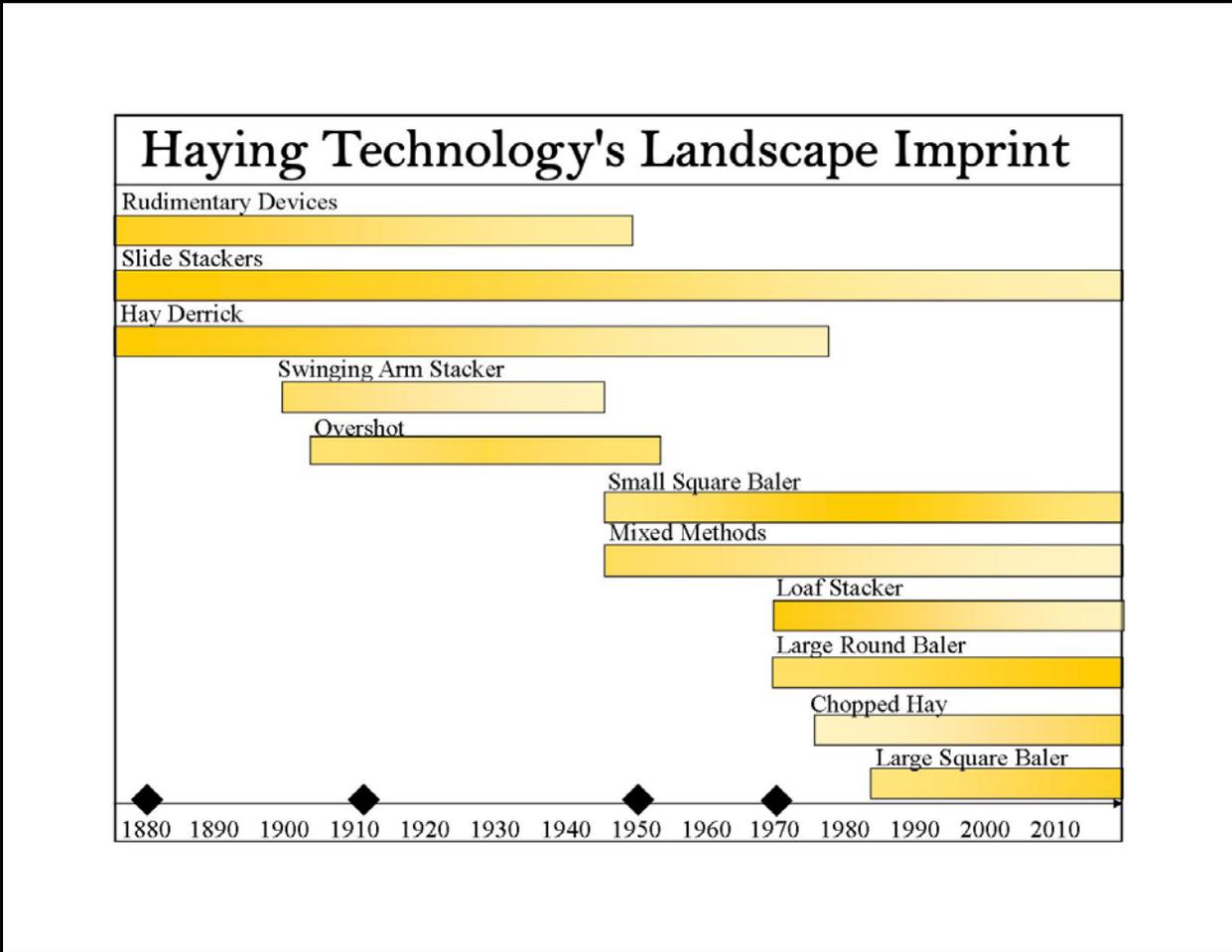


Figure 64. The primary haying technologies used in the West and their presence on the landscape. The diamonds along the bottom represent general beginnings of the four eras.

Sometimes we tend to think that the newest, most modern way of performing a task is the best way. Eric Sloane, however, cautions against this train of thought in suggesting that “it is important to remember, when comparing the past with the present, not to allow modern wonders to awe one into believing that all changes are synonymous with progress. ‘The old way’ is not necessarily an inefficient way” (Sloane 1956, 13). Farmers and ranchers putting up hay with older techniques such as the Beaverslide, the loaf stacker, or combinations of both old and new haying methods might agree with Sloane. Others may agree more with Wallach’s (2005)

observation that newer technologies take away some of the need for grinding physical labor. Haymaking with the newest methods today, such as some type of baler, is still a time-consuming, demanding activity. It is, however, less physically demanding than haymaking methods of the early 20th Century. Today, farmers and ranchers can choose the haymaking method that they believe to be the most effective, whether it is in terms of economics, time, or simply his or her personal preferences.

Landscapes are a story, providing the reader with pages and pages of information regarding the past. In some parts of the world, especially where urbanization is occurring at rapid rates, there are missing pages, sometimes even entire chapters. The West's hayscapes do not have entire chapters missing. There are a number of individuals who have taken an interest in the West's haymaking past. Some of these individuals are current ranchers putting up their hay with an older method primarily because they are traditionalists. As Jackson (1997) predicted, there will always be nostalgic individuals who will fall in love with evocative, earlier methods of performing tasks, even if it is inefficient. Others who have taken an interest in former ways of western haymaking are journalists who talk to previous generations and write their stories so that we do not forget the past.

We live in an era that is experiencing rapid changes in technologies of all sorts, including the agricultural sector. Changes in agricultural technologies bring about an alteration of the landscape. Even with more recent technologies imprinting the landscape, relics of the recent past or from long ago continue to occupy the landscape, revealing elements of an earlier period. The haymaking landscape is a document; it can be "read" and retold as a story.

In the first issue of *Landscape*, J.B. Jackson wrote, "A rich and beautiful book is always open before us. We have but to learn to read it" (1951, 5). Not only are western hayscapes

aesthetically pleasing, they also offer an engaging story of the transition of life and ways of the past to present-day living.

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