



Weathering Montana : the social meanings of extreme environments in the Big Sky
by Kevin Conradt

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in History
Montana State University

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Abstract:

Historians have largely ignored the influence of weather and climate on people. In Montana, this has certainly been the case. In a state where meteorological stability is ephemeral, society is consistently challenged by the extreme nature of Montana's environment. In my thesis I argue that the term weather, which is a social construction, is flawed for assessing Montana's meteorological instability because it relies on a methodology that sees temperature and precipitation in average or normal conditions. I also argue that the extreme nature of Montana's environment has helped to shape the societal infrastructure of the state, which has in turn strengthened the Treasure State's historical narrative. This nascent methodology requires a comprehensive understanding of meteorology from a state, regional, and global perspective. The combination of latitude, atmospheric circulation, land-water distribution, and topography act in concert to create the variability associated with Montana's natural environment. From a societal perspective I have relied on a combination of primary and secondary source information to interpret the perceptions of people and their relationship to Montana's natural environment. The human journey in Montana has historically been influenced by the severe nature of the state's weather and climate. From Native Americans to Euro-Americans, evidence of societal development in Montana, especially in agrarian enterprises, indicates that the construction of place has been largely influenced by the meteorological variability of Montana's natural environment. As long as Montana's natural environment continues to be influenced by meteorological instability, people will continue to challenge themselves against an environment of extremes. My hope is that future scholars interpreting the bond between people and weather will help to strengthen the methodology linking human beings with their nature environment.

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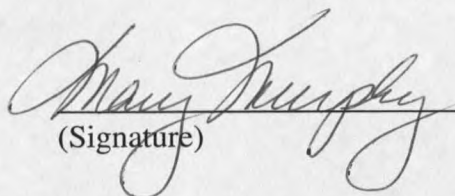
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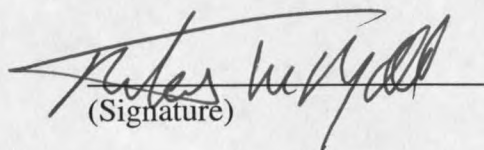
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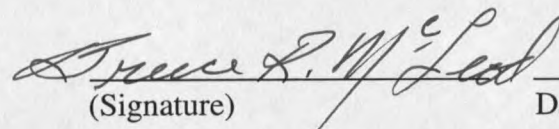
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TABLE OF CONTENTS

1. INTRODUCTION	1
2. EXTREME ENVIRONMENTS: THE AMERICAN WEST AND A METEOROLOGICAL EXPLANATION	5
3. THE PERCEPTION OF PLACE: MONTANA AS AN ENVIRONMENT OF EXTREMES AND THE CONSTRUCTION OF WEATHER	13
4. WEATHERING MONTANA: A SOCIO-HISTORICAL LEGACY	31
5. PEOPLE, PLACE AND THE ROCKY MOUNTAIN FRONT	61
6. CONCLUSION	77
BIBLIOGRAPHY	84

ABSTRACT

Historians have largely ignored the influence of weather and climate on people. In Montana, this has certainly been the case. In a state where meteorological stability is ephemeral, society is consistently challenged by the extreme nature of Montana's environment. In my thesis I argue that the term weather, which is a social construction, is flawed for assessing Montana's meteorological instability because it relies on a methodology that sees temperature and precipitation in average or normal conditions. I also argue that the extreme nature of Montana's environment has helped to shape the societal infrastructure of the state, which has in turn strengthened the Treasure State's historical narrative. This nascent methodology requires a comprehensive understanding of meteorology from a state, regional, and global perspective. The combination of latitude, atmospheric circulation, land-water distribution, and topography act in concert to create the variability associated with Montana's natural environment. From a societal perspective I have relied on a combination of primary and secondary source information to interpret the perceptions of people and their relationship to Montana's natural environment. The human journey in Montana has historically been influenced by the severe nature of the state's weather and climate. From Native Americans to Euro-Americans, evidence of societal development in Montana, especially in agrarian enterprises, indicates that the construction of place has been largely influenced by the meteorological variability of Montana's natural environment. As long as Montana's natural environment continues to be influenced by meteorological instability, people will continue to challenge themselves against an environment of extremes. My hope is that future scholars interpreting the bond between people and weather will help to strengthen the methodology linking human beings with their nature environment.

CHAPTER 1

INTRODUCTION

Here's the forecast for today: Probable northeast or southeast winds, varying to the south and west and east and points between . . . probable areas of rain, snow, hail and drought, succeeded or preceded . . . with thunder and lightning.

Mark Twain

Chances are, the person credited with coining the phrase, "If you don't like the weather, wait a minute, it'll change," may have been inspired by Montana's extreme weather and climate. In fact, had that person been Mark Twain, his whimsical weather forecast certainly would have seemed applicable considering Montana's place in national weather lore. Consider the following: coldest recorded temperature in the contiguous lower 48 states, -70.0 F at Rodgers Pass, Montana, on January 20, 1954; record for the most dramatic 24-hour temperature drop in United States, from 44.0 F to -56.0 F, for a total of 100.0 F, at Browning, Montana, in January, 1916; the national record for greatest differential between record low and high temperatures: -70.0 F to 117.0 F, for an astonishing difference of 187.0 F. The impact of extreme weather and climatic events on Montana's physical and societal landscape is profound, and it is that dynamic, I would argue, which has helped to create a distinct heritage in the Treasure State. To be sure, there is causation between the natural environment (weather and climate) and society that should be acknowledged. Just as human experience, in Montana, does not function

independently from the natural environment, neither does weather and climate behave apart from the global and regional meteorological paradigm. The general tenor of this thesis suggests that it is inappropriate for society to view weather and climate in terms of average or normal conditions, specifically temperature and precipitation. The classification of weather and climate are *social constructions*, not natural phenomenon. Weather and climate are the products of human ingenuity, descriptions and measurements, which are intended to comprehend, document, and predict the natural environment. Temperature and precipitation are the most important elements in this social construct because they have the most profound impact on human beings. And, although average and normal are important to weather and climate it is the variability and extreme conditions of meteorology that pose the greatest challenge on people and their activities. In Montana, this has certainly been the reality.

The crux of this study is concerned with the relationship between people and their natural environment (weather and climate) in Montana. I argue that the variability of weather and climate in Montana has helped to shape the societal landscape of the state. Moreover, the extreme nature of Montana's environment has influenced individual perceptions of place. And, finally, the association linking people to their environment in Montana has profoundly shaped the state's historical narrative. It is my belief that historians have largely neglected the role afforded to weather and climate and the impact on human beings, especially in an environment of extremes. My hope is that this scholarship will help inspire other historians to rectify this negligence.

I begin by directing my focus on a region that experiences its share of meteorological severity, the American West. In chapter two, I establish that there is a historical precedent for assessing the role of extreme weather in the Trans-Mississippi West. From the ill-fated Donner Party in the Sierra Nevada Mountains of California to the tornadoes, blizzards, floods, and wild fires that plague the region on a yearly basis, people are constantly challenged by severe meteorological conditions. I also examine the meteorological dynamics responsible for making the American West one of the world leaders in extreme weather. This section is significant because it recognizes that Montana is ultimately connected to a region that experiences similar climatic severity. Although Montana is certainly an environment of extremes, it would be inappropriate to place a label of "exceptional" on the state's meteorological variability.

The next section looks at some of the influences on people's perception of place and how weather and climate has shaped it. In chapter three, I suggest that the human relationship to the natural environment and societal constructions of place are largely influenced by the human ability to imagine their environments. Also, I examine how meteorologists construct weather in terms of average or normal conditions and how that methodology can be traced back almost two hundred years to an individual who had a profound impact on the American West and Montana. In addition, I also examine why Montana is home to such extreme meteorological conditions.

In chapter four, the focus of this study then shifts to Big Sky country and a socio/historical examination of how people have perceived their relationship to the

natural environment. From Blackfeet Indians, who have called Montana home for hundreds of years, to Lewis and Clark, the U.S. Army, and ranchers and homesteaders, the way in which people interpret their bond with physical environment is quite emotive. This section then explores how Montanans have developed a keen sense of place, and the influence that their perceptions and experiences have had on Montana literature.

In chapter five, my focus narrows to an assessment of a region of Montana that is famous for its extreme weather and climatic conditions: the Rocky Mountain Front. I examine the catastrophic flood of June 8, 1964 and assess the perceptions that people and communities exhibited towards this horrific event. In the end, people's perceptions in regards to their natural environment in Montana have evolved over generations of lived experiences, which have fostered a respect and an acceptance for the reality of their natural environment. First, however, it is imperative that I examine Montana's environmental relationship, from a meteorological and historical perspective, to a region that consistently produces some of the most severe weather in the world – the American West.

CHAPTER 2

EXTREME ENVIRONMENTS: THE AMERICAN WEST AND A
METEOROLOGICAL EXPLANATION

To fully appreciate the complexities of weather and climate in the American West and the environmental challenges faced by peoples who chose to settle in a landscape of extremes, I must examine the meteorological history of the region as well as the physical dynamics responsible for producing severe weather and climate. Commenting on the challenges settlers would encounter in the West, Dr. Kenneth F. Dewey, climatology professor in the Department of Geosciences at the University of Nebraska in Lincoln states, "The European homesteaders who came to the American West to find their new homes during the 19th century were in for a rude awakening."¹ Unlike the relatively stable weather conditions experienced by Europeans in their native lands, the American West with its propensity for severe meteorological conditions presented a plethora of environmental challenges. Severe storms in the form of tornadoes, thunderstorms, flash floods, and blizzards, along with extreme temperature variations would often become the primary obstacle in newcomers' construction of place. Certainly, "the hardships placed on these early settlers by the weather and climate of the West," explains Dewey, "were of epic proportions."² Environmentally speaking, most settlers were unprepared and ill equipped for what lay ahead of them.

One of the most documented, as well as catastrophic meteorological events to impact the American West was the period referred to as the "Dust Bowl Years" of the mid 1930s. During the summer of 1936, the American West experienced some of the hottest conditions ever recorded for the region. Many of the record-breaking temperatures that were established that blistering summer still hold true today. "These include North Dakota, 121 F; South Dakota, 120 F; Nebraska, 118 F; Kansas, 121 F; Texas, 120 F; Idaho, 118 F; Oregon, 119 F; and Montana, 117 F," explains Dewey, while in stark contrast, "the previous winter had been the second coldest on record with temperatures at 50 days below zero in areas of North Dakota."³ In addition to the incredible temperature extremes that gripped the West during the "dirty 30s," an unrelenting drought held the American West hostage. Thousands of destitute farmers were forced to flee the parched soils of the southern, central, and high plain states in search of a fresh start, providing the inspiration for John Steinbeck's classic novel, *The Grapes of Wrath*.

In addition to the extreme temperature variations and severe drought conditions experienced by people in the American West, the region is also capable of producing copious amounts of precipitation. The West has a long and storied history of prolific snowfalls, especially early in the autumn and late in spring when seasonal transitions are punctuated by unexpected severe storms. Take the example of the Donner party. In the early fall of 1846, already behind schedule and seriously unprepared for what lay ahead of them, the Donner party became casualties of unexpected winter-like conditions in the Sierra Nevada mountains. "The Donner Summit of the Sierra Nevada range in California," explains Kenneth F. Dewey, "is [aptly] named after the unlucky Donner

party, many of who perished in the winter of 1846-1847 when stranded by the deep snowfalls on the way to California.”⁴ Abundant and unpredictable snowfalls are not limited to the mountainous regions of the West, such as the Cascade ranges of Washington and Oregon, the Sierra Nevada of California, and the Rocky Mountains of the intermountain west. The Western High Plains are notorious for their severe blizzards. Illustrating the region’s propensity for unpredictable snowfalls, Dewey remarks, “In January of 1949, an airlift of wood needed for heating was provided to stranded residents of western Nebraska, who became victims of the ‘bookend-blizzards’ that dumped almost 3 feet of snow across the High Plains of the west and left drifts up to 50 feet high in Nebraska.”⁵

In addition to prolific snowfalls, flash floods are a major concern for people who decide to live in a landscape marked by the extreme weather and climate. Along the east facing slopes of the Rocky Mountains, stretching from Montana in the north to New Mexico in the south, residents are constantly reminded of nature’s ferocity. From late spring, and on into the summer months, severe thunderstorms are capable of producing incredible amounts of rain in short periods of time. Because of the mountainous topography of the region, the results of such heavy rains can prove deadly. A tragic example of this was the Big Thompson Canyon Disaster that occurred in the Colorado Rockies on July 31, 1976, during the peak of the summer tourist season. Campers and recreationists were packed into Big Thompson Canyon when, as night fell, a severe thunderstorm became stationary over the steep and narrow canyon. With little or no

warning, the storm unleashed an astounding amount of rain in a short amount of time.

Precipitation at the top of the Canyon was between 10 to 12 inches with 8 inches falling in only 2 hours, and with nowhere for the water to go, a 20-foot wall of water tore down through the Canyon killing 139 people and causing \$35.5 million in damage to property.⁶

If the threat of extreme temperatures, blizzards, severe thunderstorms and flash flooding are not enough to contend with, people in the American West must also be wary of tornadoes. Every year the Western High Plains, especially in the spring, are transformed into a spawning ground for one of nature's most frightening meteorological forces – tornadoes. Colliding air masses, one being dry and cold, the other warm and tropical in nature, can combine with deadly results. One example of dangers of this volatile phenomenon occurred when, "without warning, a series of tornadoes moved across Nebraska in March of 1913, cutting a destructive path through the center of Omaha, killing 101 people."⁷ People *usually* associate tornadoes with areas of the Great Plains, the South, and the Midwest. But mountain state dwellers also need to be alert. In the summer of 1999, residents of Salt Lake City, Utah, situated along the western slope of the Wasatch mountains at an elevation of over 4,000 ft. were shocked when a tornado ripped through the center of their urban landscape, injuring many and killing one person.⁸ The diversity of severe weather events with which people in the American West must contend are caused by a number of meteorological forces, some of which must be understood from a global perspective.

Climate and weather in the American West, and especially in Montana, are connected, and thus affected, by a global meteorological system of controls. The four

primary factors called climate controls that influence weather and climate are: land and water distribution, latitude, topographical features, and atmospheric circulation. Earth is predominantly made up of water. In fact, the surface of the earth is made up of almost 70 percent water. The portion of earth's surface that is land, 30 percent, is distributed between the two hemispheres. "The southern hemisphere land masses, except for Antarctica," explains Dewey, "cluster in the lower, near equatorial, latitudes with only a small land area in the mid latitudes."⁹ Most of earth's weather, specifically episodes of severe weather, occurs within the confines of each hemisphere's mid-latitudinal sections. Because only a small portion of the southern hemisphere's land mass resides within the mid-latitude section, episodes of extreme weather are not as prevalent.

In comparison to the southern hemisphere's land distribution, the northern hemisphere has a much larger area of land within its mid-latitude sections. Illustrating this important point, Kenneth F. Dewey states, "The comparable latitudinal transect in the northern hemisphere traverses the midsection of North America and the vast expanse of land stretching from central Europe across central Asia."¹⁰ As a result of the distribution of land masses between the two hemispheres in relation to their respective mid-latitude sections, 45 degrees north or south, the northern hemisphere experiences far more variability and has greater contrast in seasonal climates and day-to-day changes in weather than has ever been observed, or recorded, in the southern hemisphere.¹¹

Because the relationship of landmass in proximity to mid-latitude sections is so important to understanding the earth's weather, an explanation of *why* is in order. First, the earth derives most of its heat, or energy, from the sun in the form of solar radiation.

Energy is absorbed by the earth's surface, land and water, which is then transferred back into the atmosphere providing the atmospheric circulation necessary to create weather. In many ways, then, the sun can be viewed as the engine that drives earth's weather. Land is a very efficient absorber, as well as an emitter of heat, when compared to water. As a result, land tends to be much more efficient at absorbing energy, which is transferred from the incoming solar radiation of the sun, causing greater surface temperatures when compared to water. Conversely, when energy from the sun is at its weakest, during winter in the northern hemisphere, land surfaces are much colder than water. As a result, then, land surfaces, specifically in the North American West, experience a wide degree of temperature variations, which in concert with the mid-latitudinal transect, produce weather.

In addition to land/water distribution and latitude, topography as well as atmospheric circulation are also principal features responsible for the extreme weather conditions that exist in the American West. "The primary mountain range of North America, the Rockies," explains Dewey, "stretches from Alaska down through Western Canada and the Western United States and on into Mexico."¹² The topographical orientation of the Rockies is from a north to south direction. Also, the major mountain ranges of the West coast, the Cascades and the Sierra Nevada, are oriented in a north to south direction. Topographically, this point is noteworthy. In the American West, along the mid-latitude regions, contrasting air masses, which are responsible for influencing weather, move from north to south, or south to north. Because of the topographical orientation of the continent's mountain ranges, contrasting air masses are able to interact

largely unimpeded by topography, which can intensify storms as they move from west to east across the jet stream.

In contrast to the American West, the topographical orientation of mountain ranges in Europe and Asia, for example, are predominantly directed in a west to east track. As a result, Europe's mountain ranges act as barriers, keeping opposing air masses from colliding, providing for a much more stable environment. This is in stark contrast to North America, specifically the American West, where cold air masses from the north meeting tropical air masses from the south are unimpeded by mountainous terrain. "The ingredients for violent and rapidly changing weather conditions are brought into direct conflict throughout the year," remarks Dewey, commenting on the significance of the controls of climate, "making the Western United States the world leader in many types of severe weather."¹³ Clearly, Europe and Asia receive their fair share of extreme weather, but nowhere on earth do the conditions necessary for the creation of dramatic weather come together with such severity as they do here, in the American West

¹ Kenneth F. Dewey, "Climate and the West," Journal of the West, (Summer 2001): 6.

² Ibid.

³ Ibid.

⁴ Ibid., 7.

⁵ Ibid., 8.

6. Kenneth F. Dewey, "The Weather of the West," Journal of the West, (Summer 2001): 36.

⁷ Dewey, "Climate and the West," 7.

⁸ Ibid.

⁹ Dewey, "The Weather of the West," 31.

¹⁰ Ibid.

¹¹ Ibid.

¹² Ibid.

¹³ Ibid., 32.

CHAPTER 3

THE PERCEPTION OF PLACE: MONTANA AS AN ENVIRONMENT OF
EXTREMES AND THE CONSTRUCTION OF WEATHER

In her essay, "A Place of Extremes: Nature, History, and the American West," Susan Rhodes Neel eloquently argues, "What we need is a history that has at its heart this simple but enduring truth: nature has shaped us as surely as we have it."¹ In Montana, Susan Neel's assertion certainly rings true. As long as people have interacted with the natural environment of Montana, they have no doubt been influenced by its prevalence for extreme meteorological events. The very idea of place, and its stability, is largely predicated on people's ability to survive in an environment capable of rapid change. It is a landscape where average and environment rarely exist together.

The idea that weather and climate has been constructed in terms of average conditions, specifically concerning precipitation and temperatures, and applied to an environment like Montana seems flawed. Because one of the fundamental tenets of this thesis strongly argues that the construction of "average" is inappropriate for Montana, it necessary to explain how, and why, weather is so dominated by the term average or normal. When meteorologists say, for example, that the average temperature today is supposed to be 50 degrees, or that the average precipitation for a particular month is 2 inches, the question should be, "how is average constructed?" The answer is actually quite simple. Climatology is the study of weather on a macro scale, in other words, climate. Climatologists are meteorologists who study weather over an extended period of time, compiling numerical statistics into 30 day, month or year increments. Take

temperature, for example. A climatologist, at the National Weather Service in Great Falls will look-up the high temperature, using June 15 as an example, and compile the last thirty years' high temperature readings for our hypothetical date of June 15 and divide that number by thirty. Let us assume that the number divisible by thirty is 68 degrees. Sixty-eight degrees, then, is what weather forecasters will predict for the average high temperature for June 15. This formula holds true for calculating average low temperatures for a particular date and the same methodology applies to precipitation, too. Using the thirty-year formula for assessing average temperature and precipitation meteorologists compile this information, which can easily be accessed through internet web sites.

The answer to why is just as comprehensible. By assessing weather data and constructing it in terms of average meteorologists are afforded an idea of what weather may be like for a particular day, month, or even a year. This information is then disseminated to the general public. News organizations, weather service outlets, anyone, for that matter, can find out what the weather is supposed to be like for a given day or a month. As I have illustrated, and as I will continue to argue, this can prove to be quite problematic. Society has been conditioned to view, even expect, weather and climate to be average. This construction is incorrect. In Montana, society would be better served if weather and climate were, instead, seen in terms of extreme conditions. By choosing to view weather and climate in terms of *average* conditions our construction of weather relies upon a mathematical bias, which is blatantly inappropriate for the American West and Montana. The concept of constructing meteorology in average conditions is not only

biased, but it also falsely implies, for the region, an ecological coherence that does not in reality exist.² In Montana, the reality is that rapid change in weather and climate seems much more common, while average implies a false sense of environmental stability.

Thomas Jefferson speculated, upon the return of Lewis and Clark, that it would take a hundred years to settle the American West. Reality, however, was much more expedient. With the unearthing of gold in the Sierra Nevada of California in 1849 and the subsequent strikes along the Front Range of the Colorado Rockies ten years later, Americans began to see the West in a whole new light. In 1862, westering Americans set their sights upon the gold fields of Southwestern Montana as Euro-American settlement in Montana set into motion a relationship between human beings and their environment, which would time and again turn out to be problematic. As Elliott West notes, "People certainly remain ignorant about their full effect on their surroundings and about their environment's impact on them."³ In Montana, human ignorance about environment has been replicated throughout the state's history.

As Euro-Americans began their human journey into Montana, their perceptions of the natural environment were altered, or re-imagined, as Elliott West would argue, in order to take full advantage of the opportunity for the extraction of wealth from the physical environment. "Through imagination," explains West, illustrating the power of perception, "humans thus gain enormous manipulative influence over their surroundings, they can perceive a new effective environment from the current one."⁴ As people began the process of settlement into Montana, they did so mostly without an intimate knowledge of the environment, and of the severity of weather and climate.

By shifting their perceptions of the physical environment, Montanans could indeed manipulate their surroundings, or could they? "The problem is, just as we cannot truly perceive of all our effective environment at any moment, so we cannot imagine anything close to the full consequences of changing things," suggests West, "some repercussions are simply beyond our ability to understand."⁵ In Montana, peoples' ability to fully perceive their environment could only go so far. Extreme temperature variability, severe wind events, horrific blizzards, and catastrophic floods, contrasted with prolonged droughts were not what people imagined for themselves, how could they be?

Habitation in Montana would, and always will be, fraught with environmental consequences created by extreme meteorological episodes. "It is the downside of the human advantage," argues West, "we are vastly superior to any other species in stretching our world into the shape we want; that also makes us infinitely more capable of creating unforeseen difficulties."⁶ The human experience in Montana, cloaked by a perception of invincibility, has fostered a relationship between its people and a plethora of environmental challenges that has, and will always be, a problematic one.

Montana history is a narrative filled with heartache and stories accentuated by loss; it is an environmental trial-by-fire. In its most simple terms, weather and climate, especially its periodic extreme nature, have sculpted Montana's history with countless examples of tragedy, and sometimes triumph. "The relationship of human beings to their environment undergirds the 'Montana story'," writes historian Dave Walter, "as they suffer from it, battle it, struggle to understand it, adapt to it, and receive spiritual energy

from it.”⁷ It is, as Walter suggests, the connective thread, which enriches and strengthens our collective historical narrative.

In Montana the construction of place has consistently been a volatile undertaking, especially for those wishing to establish an agricultural enterprise. Moreover, in a state where agriculture is omnipresent, success is constantly in peril. Still, people continue to endure in the face of overwhelming odds. Perhaps no one has better understood these challenges and been able to articulate them than Ivan Doig. Passionately composed, reflective and inspiring, Doig’s *This House of Sky: Landscapes of Western Mind* brilliantly captures a Montana family’s enduring struggle against a hostile environment.

Doig’s description of his father’s struggle to manipulate an environment of extremes against what can only be described as *hopeless* odds, illustrates the desperation people competed with in their relentless construction of place. “Anyone of Dad’s generation,” remarked Doig, “always talked of a piece of land where some worn-out family eventually had lost to weather, not as a farm or a ranch or even a homestead, but as a *place*.”⁸ From its badland prairies on the eastern plains to the high mountain valleys of the west, Montana is littered with examples of failure, ghost towns where dreams lay frozen in time, “All of them,” sadly laments Doig, “epitaphed with the barest of words, *place*.”⁹ Unquestionably, Montana’s ability to produce extreme environmental conditions has left an indelible impression on its collective narrative and will always play a prominent role in the construction of both its physical and societal landscapes.

For people unfamiliar with Montana weather, the reality of its extreme nature can be an unforgettable experience. It was like that for Wilbur “Mac” McKinney. An

employee of the National Weather Bureau, McKinney was transferred to Great Falls, Montana, during the winter of 1940 to supervise the opening of the new Weather Bureau Office. His journey from Missoula, then to Helena, and on to Great Falls formed a first impression that would last a lifetime. "The ride from Helena along the old highway, straddling the Missouri River, was an adventure," recalled McKinney, "by the time we arrived in Great Falls the snow had been drifting and blowing – causing a delay so that a snow plow could clear the road – and the high temperature for Great Falls that day maxed out at a high of 0 degrees."¹⁰ Although McKinney had experienced hard weather in his native Colorado, he was, nevertheless, impressed by Montana's harsh climate.

Montana is the fourth largest state in the nation, trailing only Alaska, Texas, and California in size. It is a place of broad dimensions and sharp contrast; the "Treasure State" contains 147,138 square miles, averaging 535 miles from east to west and 275 miles from north to south.¹¹ And yet, despite its size, Montana is one of the smallest states in the country in population, with less than one million people. Topographically, the state can be viewed in terms of two distinct landscapes. The eastern two-thirds of Montana are a combination of plains, prairies, and badlands environments. Occasionally, small island mountain ranges, such as the Sweet Grass Hills, break up the monotony of a relatively flat and unbroken landscape.

In sharp contrast to Montana's eastern topography, the western third of Big Sky country is comprised of mostly mountains. Western Montana is where the state derives its name, from the Spanish word for mountainous. Separating the two distinct sections of the state is the Continental Divide, the Backbone of the Continent, running along the eastern

flank of the Rocky Mountains from Glacier National Park in the north to Yellowstone National Park in the south. Its altitude, averaging 3,400 feet above sea level, ranges from a high of 12,850 feet at Granite Peak, in the Beartooth Mountains of southwest Montana, to a low of 1,800 feet where the Kootenai River flows into northern Idaho near Troy.¹² It is in part because of Montana's extreme variability in topography that the Treasure State is capable of bringing to fruition the conditions responsible for producing severe meteorological events. The Continental Divide separates Montana into two distinctly different climatic regions: west of the divide, Montana's climate is influenced by marine air from the Pacific; and to the east, Big Sky Country is shaped more by a continental pattern.¹³ The diversity between the two distinct regions, meteorologically, can be profound.

Meteorologist Mike Heard, from KXL television in Butte and a native Montanan, has an intimate understanding of why Montana is such a volatile breeding ground for extreme weather. "In terms of Montana's latitude," explains Heard, "we are positioned in close proximity to the Pacific Northwest, which places Montana relatively close to the procession of storms that roll out of the Pacific Ocean and the Gulf of Alaska."¹⁴ In addition, Montana is influenced by Canadian and polar air masses which can move in from the north. The combination of moisture from the Pacific and cold air masses from the north often combine to create blizzards and heavy snow storms which can strike the Treasure State almost any month of the year. Making the volatile combination of Pacific moisture and cold air masses even more problematic is Montana's diverse topography. As storm systems move in off the Pacific Ocean and reach Montana,

the varied topography of the state's western portion can create a weather forecaster's nightmare. "The combination of mountains, valleys, canyons, and the Continental Divide," says Heard, "make forecasting accurate weather scenarios a real challenge."¹⁵

For example, as storms move across large bodies of water, the smooth surface conditions create little or no friction, which causes little or no disruption of the cyclone, or low-pressure system. Conversely, land surface conditions like the varied topography of western Montana, cause cyclonic storm systems to behave in drastically different ways. The friction associated with Montana's topography: mountains, canyons, and valleys causes storm systems to fracture and become micro-systems within a larger cyclonic complex. Two distinct different weather dynamics, which are associated with topography in Montana, orographic lifting and chinook winds, are distinctive features in the state's meteorological make-up.

Because Montana is mostly a region of semi-arid climatic conditions, the weather dynamic known as "orographic lifting" plays an important role in harnessing the state's water supplies. As storms move in from the Pacific Ocean they encounter the Northern Rocky Mountains of Montana, striking the north to south oriented ranges in a perpendicular fashion. Mountain ranges, acting as barriers to the incoming storms, compel the air to ascend, cooling it adiabatically as it rises, forcing moisture to condense and fall in the form of rain or snow.¹⁶ Mountain snow packs in Montana are critical because they store water, acting as natural sponges, providing water for the state's rivers, reservoirs, farms, and ranches. Unfortunately, orographic lifting can prove disastrous

when too much water is made available, producing catastrophic flooding. A tragic example of this occurred in June of 1964 along the Rocky Mountain Front.

Topography, combined with atmospheric circulation, also produces severe wind events; the most famous of these are chinook winds. "Chinook," a term derived from Native American culture, means *snoweater*. The warm winds that occur usually in the winter are most prevalent along the east facing slopes of the Rocky Mountains. From Livingston in the southwest part of Montana northward along the Rocky Mountain Front, chinook winds are a prominent aspect of Montana's severe weather features. As the air descends the leeward slopes of the mountains, it is heated adiabatically, or compressed, and as it falls and picks up speed, the winds and temperatures in the affected areas can rise dramatically.¹⁷ In areas like Great Falls, Augusta, Chouteau, and Cut Bank, people are consistently challenged by the dramatic chinook winds..

One of the most significant influences on Montana weather, in terms of atmospheric circulation, is the role of the jet stream. When asked why Montana is such a fertile environment for extreme weather, Rick Dittman, Warning Coordination Meteorologist for the National Weather Service in Great Falls, explained the importance of the jet stream. "Its like a river of air embedded high within the atmosphere," says Dittman, "separating contrasting air masses, one cold and dry, the other being warm and moist, which when combined can create severe weather events."¹⁸ The "river of air" is the highway upon which storms are usually transported. Embedded within the westerly flow aloft in earth's atmosphere, these narrow ribbons of high-speed winds meander for thousands of miles at elevations of between 25,000 and 40,000 ft.¹⁹ It is the mid-latitude

jet stream, which flows mostly in a west to east direction, that is largely responsible for the extreme weather in the American West, and especially in Montana. As the jet stream goes, so goes Montana's weather and climate, and the profound variability associated with meteorology in Big Sky Country.

Clearly, the diverse nature of Montana's geography, in concert with the combination of meteorological dynamics make the Treasure State an environment of extremes. How, then, should society perceive its natural environment in light of the overwhelming evidence which indicates that variability is more appropriately the norm, as opposed to average? Why is it that society is conditioned to see weather and climate in terms of average conditions? Ironically, that flawed construction can be traced back to an individual who, although he never personally developed an intimate understanding of the extreme nature of Montana's weather and climate, had a profound impact on the Big Sky. That person was Thomas Jefferson.

To say that Thomas Jefferson was a man of many talents would be a vast understatement. He is primarily recognized as one of our nation's great statesmen, but he was much more: architect, musician, agriculturist, lawyer, educator, inventor, philologist, and geographer.²⁰ In addition to Jefferson's many talents, it seems that he also recognized the significance of meteorology. What accounts for Jefferson's passion for understanding the relationship of atmosphere and environment? Of paramount importance in accounting for Jefferson's passion for weather and climate were the scientific rationalism of the Enlightenment and the influence of individuals like Frances Bacon, Sir Isaac Newton, and John Locke.²¹ As early as 1778, just two years after Jefferson had drafted the

Declaration of Independence, his interest in meteorology was recorded in a letter to Giovanni Fabbroni.

Indicating his displeasure at having little time to devote to his philosophical studies, Jefferson nevertheless responded to Mr. Fabbroni's inquiry about the American climate. "I make my daily observations as early as possible in the morning," responded Jefferson in regards to assessing temperature, "and again about 4 o'clock in the afternoon, these generally showing the maxima of cold and heat in the course of 24 hours."²² By taking twice-daily temperature readings, one the day's low, and most likely, the day's high, Jefferson could come up with a daily mean, or average temperature. In 1785, in response to another inquiry, Jefferson theorized that the difference between Americans, north and south, could be linked to climate. "In the North they are cool, sober, laborious, and persevering," mused Jefferson, while in "the South they are fiery, voluptuary, indolent, and unsteady."²³

In 1803, with his mind's eye towards the American West, President Thomas Jefferson drafted a letter to Meriwether Lewis with explicit instructions for his impending journey into the Louisiana Territory. Within those instructions were directions to document meteorology: "climate, as characterized by the thermometer, by the proportion of rainy, cloudy, & clear days, by lightning, hail, snow, ice, by the access & recess of frost, by the winds prevailing at different seasons," Jefferson also instructed Lewis to account for "the dates at which particular plants put forth or lose their flower, or leaf, times of appearance of particular birds, reptiles or insects."²⁴ Obviously, Jefferson felt it

important that he, and eventually the nation, should have an understanding of the natural environment in regards to weather and climate in the new west.

After his retirement from political life, Thomas Jefferson was pleased to devote more time to his passion for philosophical studies and the study of weather and climate. It was during this period in Jefferson's life that he responded to a series of questions posed by the French legation in Philadelphia. A compilation of information and opinions on a multitude of subjects, Jefferson's *Notes on the State of Virginia* is an intriguing look into the man eager to know nature. Within his *Notes on Virginia*, the budding meteorologist devoted an entire section to weather and climate. Query VII, titled Climate, begins with the epigraph, "*A notice of all that can increase the progress of human knowledge?*"²⁵ The question may reveal Jefferson's ambivalence in regards to weather and climate. Certainly, it illustrates his passion for understanding, or at least trying to understand the natural environment.

Query VII, devoted entirely to the study of meteorology, is a compilation of weather data and climatic observations in his native Virginia. It reveals the man of science eager to plumb nature for the intellect, but it also shows a man of almost romantic sensibility, enraptured by the grandeur of the American environment.²⁶ Unquestionably, Thomas Jefferson's work in relation to his methodologies for collecting and compiling weather and climatic data were quit visionary for his time. A tireless pursuer of useful knowledge, Jefferson extolled Enlightenment ideology in hopes that his efforts might lead to a more cerebral understanding of the natural environment. By diligently collecting weather data, and compiling that information into a formula of mean or average

conditions, Jefferson utilized a methodology that would guide the United States military as Americans began to settle the vast and unknown regions of the American West.

In 1814 the first successful attempts at gathering long-term weather observations in the American West were attempted. Orchestrated by the United States Army under the direction of James Tilton, Chief Physician and Surgeon ordered hospital, post, and regimental surgeons to keep diaries of the weather.²⁷ In fact, the first weather observations in Montana were recorded in 1866 at Camp Cooke and Helena. As settlement increased across the west, military posts became increasingly important for the gathering of meteorological data. Over the years, as the American West was organized into territories and eventually into states, the responsibility of collecting weather data shifted from the Signal and Surgeon General's offices to state colleges and universities. As had Jefferson and Benjamin Franklin, the collection of weather data was compiled into means, or averages, as a way for assessing the climate of the American West. This methodology, as stated previously, would prove to be problematic as the region's variability proved to be far more severe than the eastern parts of the nation. Even now, with all of the technological advancements made through scientific inquiry, the ability to understand and accurately forecast and predict weather in the American West, and especially in Montana, remains extremely troublesome.

Currently, the responsibility for weather forecasts and warnings of extreme conditions are provided by the National Weather Service (NWS) under the auspices of the National Oceanic and Atmospheric Administration (NOAA).²⁸ In Montana, the duty for forecasting weather is divided between four NWS offices in Missoula, Great Falls,

Billings, and Glendive. When asked about the difficulties of weather prediction in Montana, Warning Coordination Meteorologist Rick Dittmann of the Great Falls National Weather Service says, "The ability to accurately forecasts weather is impacted by the sudden and rapid change in the atmosphere above Montana; how can you forecast and measure what you can't see?"²⁹ Dittmann's challenges, associated with accurately forecasting weather in Montana are in fact influenced by all the controls of climate. "Everything that impacts weather and climate affects Montana," explains Dittmann, "land/water distribution, atmospheric circulation, topography, and elevation, basically, the primary controls of climate, are at action here in Montana, only exponentially so."³⁰

As an employee of the National Weather Bureau, and then the National Weather Service in Montana for almost four decades, Wilbur McKinney echoes Dittmann's frustrations for providing accurate weather forecasts in Montana, "Because of Montana's extreme topographical variability, creating a multitude of micro-climates, forecasting with any accuracy is very difficult."³¹ Meteorologist Mike Heard of KXLF television in Butte agrees with both Rick Dittmann, and Wilbur McKinney. "The varied topography of Montana, in combination with the state's proximity to the Pacific Northwest Coast to the West and Canada to the North," explains Heard, "makes forecasting weather in Montana extremely challenging."³²

Although technology continues to improve, providing meteorologists like Mike Heard and Rick Dittmann with more advanced forecasting tools, the ability to accurately forecast Montana weather, will continue to challenge and frustrate. As Rick Dittmann so accurately pointed out, "How can you forecast what you can't see?" The physical forces

governing the atmosphere are not, and may never be, fully understood. Because the flow aloft fluctuates in a somewhat unpredictable manner, weather prediction, especially long-range forecasting will continue to remain a challenge in Montana. For almost two hundred years, now, people have tried to understand the dynamics of meteorology. Yet to a large extent, weather forecasting still remains a mystery.

In Montana, the idea of weather and climate constructed in terms of average seems oxymoronic. The extreme variability of the landscape below combined with the complexities of the atmosphere above have made Montana's environment an inhospitable guest for human beings. Nevertheless, people for hundreds, perhaps thousands of years, from the earliest Native Americans who called Montana home, to the first Euro-Americans who dared to venture into the heart of the Big Sky have searched, and most likely always will be searching, for some way to reliably predict weather in order to make a place for themselves in Montana.

¹ Clyde A. Milner II, ed., A New Significance: Re-Envisioning the History of the American West, vol. 1, "A Place of Extremes: Nature, History, and the American West," by Susan R. Neel (New York: Oxford University Press, 1996), 105-120.

² Ibid., 112.

³ Elliot West, The Contested Plains: Indians, Goldseekers, and the Rush to Colorado, (Lawrence: University Press of Kansas, 1998), xix.

⁴ Ibid., xx.

⁵ Ibid., xxi.

⁶ Ibid.

⁷ Dave Walter, Montana Campfire Tales, (Helena: Falcon Press, 1997), xi.

⁸ Ivan Doig, This House of Sky: Landscapes of a Western Mind, (San Diego: Harcourt, Inc., 1978), 22.

⁹ Ibid., 23.

¹⁰ Wilbur Mac McKinney, Interview by Laurie Mercier, 25 February 1983, OH 654, Montana State Historical Society Archives, Helena, Mt.

¹¹ William L. Lang, Michael P. Malone, Richard B. Roeder, Montana: A History of Two Centuries, 2nd ed, (Seattle: University of Washington Press, 1976), 3.

¹² Ibid.

¹³ W.C.McRae and Judy Jewel, Montana Handbook, (Chico: Moon Publishing, Inc., 1994), 5.

¹⁴ Mike Heard, KXLF Television, Butte, Mt., Interview by Kevin Conradt, 28 September 2001, Tape Recording in Possession of Author.

¹⁵ Ibid.

¹⁶ Fredick K. Lutgens and Edward J. Tarbuck, The Atmosphere: An Introduction to Meteorology, (Upper Saddle River: Prentice Hall, 2001), 477.

¹⁷ Ibid.

¹⁸ Rick Dittmann, Warning Coordination Meteorologist, National Weather Service, Great Falls, Mt., Interview by Kevin Conradt, 10 October 2001, Tape Recording in Possession of Author.

¹⁹ Lutgens and Tarbuck, The Atmosphere: An Introduction to Meteorology, 200.

²⁰ Merrill D. Peterson, ed., The Portable Thomas Jefferson, (New York: Penguin Books, 1975), xi.

²¹ Ibid., xviii.

²² Ibid., 359.

²³ Ibid., 387.

²⁴ Ibid.

²⁵ Ibid., 112.

²⁶ Ibid., xxiii.

²⁷ Kenneth G. Hubbard, "The History of Weather Observations in the Western United States," Journal of the West, (Summer 2001): 26.

²⁸ Lutgens and Tarbuck, The Atmosphere: An Introduction to Meteorology, 332.

²⁹ Dittmann, Interview by Kevin Conradt.

³⁰ Ibid.

³¹ McKinney, Interview by Kevin Conradt.

³² Heard, Interview by Kevin Conradt.

CHAPTER 4

WEATHERING MONTANA: A SOCIO-HISTORICAL LEGACY

"The Blackfeet evolved a very reasonable form of pagan religion in their Sun-worship . . . they determined the phenomena of nature, and connected causes and effects into a system of natural religion, which did credit to their reasoning powers, their piety and their imagination." *-The Old North Trail (1910)*

Well before Euro-Americans set foot into Montana, Blackfeet Indians trekked southward along the "Old North Trail" and settled along the leeward side of Montana's Rocky Mountain Front. Influenced by their natural surroundings, Blackfeet culture developed an intimate understanding of the natural environment and a deeply spiritual perception of the natural phenomena of environmental extremes. In Montana, Blackfeet culture represents, perhaps, the most powerful example of a people's ability to exist in an environment of profound meteorological severity. It was the western edge of Blackfeet geographical topography, Montana's Rocky Mountain Front, which provides most of the conditions responsible for the region's extreme weather and climatic variability. "For centuries the Blackfeet have regarded the Glacier area as part of the Mistakis, the Backbone of the World," commented historian Mark David Spence, who reported the Blackfeet belief, "within the mountains lived powerful spirits such as Wind Maker, Cold Maker, Thunder, and Snow Shrinker (Chinook winds)." ¹

Spence's comments are significant for two important reasons. First, topography in Montana plays an important role in the region's prevalence for extreme meteorological events. The Backbone of the World, or the Continental Divide, depending on which cultural construction you choose to invoke, significantly influences the variability of weather and climate in Montana. In a state where extreme weather abounds from east to west and all points between, it is the Rocky Mountain Front that lies at the epicenter. Second, Spence points out the spiritual connectedness Blackfeet felt towards the Backbone of the World in relation to their natural religion, and in turn, the forces responsible for swift environmental change. It is the ferocious wind events, propensity for severe cold, extreme temperature fluctuations, violent blizzards, flash floods, and the chinook winds that have played a significant role in shaping Blackfeet society along the Rocky Mountain Front.

The Blackfeet construction of weather and climate is markedly different from the Euro-American alternative, which would eventually come to influence societal perceptions and the way that people imagine their environment. "Native Americans view their association with the natural environment as a deeply personal relationship," says Walter Fleming, Professor of Native American Studies at Montana State University – Bozeman; "it can be seen as a mutual co-existence between one another."² Conversely, Euro-Americans have tended to see the natural environment not as a partner in a personal relationship, but rather, as an external force to be controlled and known through scientific inquiry. By acquiring daily temperature readings and precipitation amounts, weather and climate could be arranged and ordered into average conditions.

Blackfeet believed that powerful spiritual figures, which were responsible for the dramatic environmental conditions of the region, resided within the local mountains. Blackfeet religious ideology held that powerful spirits such as Wind Maker, Cold Maker, Thunder, and Snow Shrinker could be persuaded to act favorably towards the Blackfeet. Spiritually significant to the Blackfeet mythology is the trickster known as the Old Man or Napi. The spiritual figure's geographical affiliation with the Mistakis, and his spiritual connectedness with the mountains make the trickster known as "Old Man," an important figure for the Blackfeet. Considering that the Blackfeet spiritual figure resides within proximity of the entities associated with environmental change (Wind Maker, Cold Maker, Thunder, and Snow Shrinker), it seems appropriate that tribal leaders would see Napi as a intermediary, a liaison of sorts, between people and environment. "Many often-told stories detail Napi's adventures in Mistakis," Spence claims, "and he is attributed with the origination of many of the tribe's most important ceremonies, spiritual practices, and everyday customs."³ Judeo-Christian belief systems, on the other hand, see the natural environment as a separate entity, which is in sharp contrast to the personal connectedness Blackfeet feel towards the natural environment.

Native Americans, and certainly Blackfeet Indians, viewed specific weather related events as a sign of changing seasons. For example, Blackfeet Indians would see the first thunderstorm as a sign of spring and the end of winter. In Montana, because of the long winters, this might not happen until May or June, especially on the Rocky Mountain Front. In addition, the first hard snow would indicate the beginning of winter, or the onset of Cold Maker. Again, in Montana, the first hard snow and arrival of cold

weather may happen in late September or October. With Montana's extreme meteorological variability, Native American constructions of seasonal change seem much more applicable given the state's environmental severity.

Euro-American constructions of seasonal changes are assigned fixed or static dates. For people living in the Northern hemisphere, June 21 or 22 is officially known as the summer solstice or the first day of summer and December 21 or 22 is known as the first day of winter or the winter solstice.⁴ The equinoxes are midway between the solstices; the autumnal equinox in the Northern Hemisphere is September 22 or 23, while spring equinox is assigned to March 21 or 22. In Montana, assigned dates indicating seasonal change are clearly problematic. As indicated earlier, winter-like conditions may occur two or three months before December 21 or 22. And, conversely, heavy snowfall and bitterly cold temperatures may linger well into May and June. Certainly, it would seem apparent that Euro-American constructions of seasons, if they are supposed to indicate climatic change, are ill-suited for Montana's extreme meteorological variability.

For almost ten thousand years Native Americans were the sole inhabitants of Montana. Their intimate understanding of the natural environment fostered a deeply personal relationship between people and landscape. That construction inspired a spiritual connection, which enabled both people and environment to mutually co-exist in a region where meteorological conditions can coalesce into potentially extreme episodes. Conversely, Euro-American experiences with the natural environment, specifically east of the Mississippi River, were confined to a region with far less extremity of environment. In 1803, Thomas Jefferson, the Louisiana Purchase, and a band of

interlopers would forever change the perceptions a young nation harbored for a distant land.

Until the early part of the nineteenth century, the extreme variability of weather and climate in the west was a mystery to most, if not all Americans. In 1804, however, the ignorance Americans possessed towards their understanding of the natural environment of the American West began to erode. "In fact, the first written form of documentation," says Kenneth G. Hubbard, professor in the School of Natural Resource Sciences and director of the High Plains Climate Center at the University of Nebraska, Lincoln, "was not in the form of measurements but rather observations made in diaries and expedition records, the most likely the Lewis and Clark expedition (1804-1806)."⁵ In terms of American history, and certainly western history, the Lewis and Clark expedition was a seminal event.

Throughout the journals of the Lewis and Clark expedition, examples of extreme weather paint a picture of an environment far different from the one they left behind. With the notable exception of Sacajawea, who was born into the Shoshone tribe and spent a considerable amount of her childhood in the area of southwest Montana, the majority of the Lewis and Clark expedition had never ventured west of the Mississippi. Lewis and Clark and the Corp of Discovery's exploration of the American West, and specifically Montana, were groundbreaking in many respects. Most importantly, perhaps, in respect towards this project, was the emphasis on detailed workings of the natural environment, through the methods of scientific inquiry. The journals of Lewis and Clark are richly inscribed with detailed accounts of flora and fauna, as well as descriptions of

weather and climate. Nowhere do the journals come to such vivid life, in regards to detailing the extreme nature of the natural environment, than during the expedition's trek through Montana. In terms of meteorology, the journal's rich narrative offers several accounts of the expedition's peril at the hands of extreme episodes of weather during their time in what would become the Treasure State.

In late March of 1805, the expedition left Fort Mandan where they had wintered-over and headed for Montana and an unknown environment. They entered Big Sky country on April 28, 1805 and soon discovered the volatility of their new surroundings. William Clark's journal entry on May 2, 1805 provides an apt description of Montana's volatile spring weather. "The wind blew very hard all the last night, this morning about sunrise began to snow, (The Thermomtr. at 28. above 0) . . . the Snow which fell to day was about 1 In. deep, a very extraordinarey climate, the evening verry cold, Ice fressing to the Ores."⁶ This particular entry is quite evocative. Clark is clearly in awe of the environment; his assertion of a "*very extraordinarey climate*" indicates his astonishment that such extreme conditions could exist in early May. All of these men were born and raised east of the Mississippi River, and although it is not unheard of to receive snow and cold temperatures in the mountainous regions of the eastern United States in May, it is not something that these men would have seen in their native environments with any regularity. Alternatively, the weather conditions, which Clark so vividly described, are actually quite common for Montana. Spring is usually the most volatile time of year for episodes of extreme weather: 60 to 70 degree days may be followed by blizzards in as

little as a few hours. Clearly, Clark's description of the environment turned out to be quite prophetic in regards to the expedition's continued travels through Montana.

As the expedition continued westward up the Missouri River, Lewis and Clark recorded many accounts of surprise at the volatility of weather and climate. As late as June 5, Clark took note of the rain and snow that fell the night before and the continued cold mornings, which both challenged and surprised the group. Perhaps the most challenging segment of the expedition's journey through Montana, in terms of extreme weather, was to unfold as the expedition approached the Great Falls of the Missouri. "From June 21 to July 15 the expedition remained at the Great Falls," notes Bernard DeVoto, "transporting the equipment across the portage and preparing for the next stage of the journey, it was a period of strenuous labor, the most strenuous so far, and of even more violent weather."⁷

The eighteen-mile portage around the Great Falls of the Missouri took almost a month to complete and proved extremely strenuous. Complicating matters were the violent thunderstorms, which severely impacted the expedition's already arduous task. Captain Lewis had this to say about the severe storms that rained down the group:

One unpleasant feature was the sudden storms. They filled the runoff channels that gullied the portage route and made the clayey soil an impassable glue. Sometimes the rains were preceded by hail so fierce that everyone had to take shelter from it. Once "at Capt. Lewis camp" it was 7 inches in circumference & weighed 3 ounces, fortunately for us it was not so large [along the portage route], if it had [been] we should most certainly have fallen victims to its rage as the men were mostly naked, and but a few hats or any covering on their heads. And, the same cloud will discharge hail in one part hail and rain in another and rain only in a third within the space of a few miles. Or a gail would blow up up and chill everyone.⁸

Summertime in Montana is the most common period for thunderstorms and some of them may be severe in nature when accompanied by lightning, hail, and strong winds. Captain Lewis's description certainly qualifies as such. In the Northern Rockies of Montana, thunderstorms are a common occurrence when maritime tropical (mT) air moves northward from the Gulf of California. Meteorologists refer to this feature as monsoonal moisture thunderstorms. When moisture interacts with the intense heating from the land surface, air is forced to rise, forming large cumulus clouds. When cumulus clouds reach a mature stage, heavy rain can occur, accompanied at times with hail and lightning. Severe thunderstorms like the one described by Captain Lewis, are capable of producing heavy downpours and flash flooding as well as strong, gusty, straight-line winds, large hail, and frequent lightning.⁹ Without knowing it, Meriwether Lewis had described with almost perfect precision one of the most common and destructive features of Montana's natural environment. Severe thunderstorms that occur over flat terrain can certainly be destructive. Over mountain and canyon topography, they can be deadly. Fortunately, the members of the Corps of Discovery survived their encounter with severe thunderstorms.

The expedition's trek through the Louisiana Territory proved invaluable for several reasons. They proved once and for all that an all-water route to the Pacific Ocean was simply pure fantasy. In addition, they encountered numerous indigenous cultures, and for the most part, these meetings proved to be benign in nature. Perhaps most importantly, Lewis and Clark described an environment vastly different from the one they had left behind. Certainly, their accounts of extreme meteorological events, especially in Montana, paint a picture far different from any they had experienced before.

Euro-American perceptions of weather and climate came face-to-face with an environment that would prove to be a formidable opponent for future peoples who wished to stake a place in Montana.

The exploration of the Louisiana Territory by Lewis and Clark and the Corps of Discovery helped to usher in future westward expansion by the United States of America. Eventually, as Americans started to settle in the vast expanses of the west, U.S. Army personnel began to establish military posts throughout the region. Montana was no exception. For United States Army troops stationed at Fort Shaw in north central Montana, the harshness and extremity of the environment would prove to be a deadly reminder of how different this environment was from the one they had left behind in the east.

The United States Army's indoctrination into the harsh landscapes of Montana proved how helpless humans could be when pitted against extreme weather. The 13th Infantry, for example, had an extremely problematical time with the environment while they were stationed at Fort Shaw,¹⁰ which is situated west of Great Falls, along the Sun River at the eastern periphery of Montana's Rocky Mountain Front. A majority of the troops had been transferred from the east following the Civil War, and for the most part, Montana's sudden blizzards and severe wind events were alien to them.¹¹ The fact that these men were alien to Montana's environment is indeed relevant. Time and again, people unfamiliar with Montana's harsh environment seem to be the most susceptible to its ferocity. Clearly, army personnel stationed at Fort Shaw were incapable of imagining what the environment could produce. Unfortunately, they would soon find out.

The winter of 1869 had been unusually mild for the region, according to U.S. Army records; temperatures were tolerant enough to allow for a steady flow of supplies between Fort Shaw and Fort Benton. On March 15 Colonel I.V.D. Reeves, who was Commander of the 13th U.S. Infantry, ordered three companies, B, D, and H, to Fort Benton under the watch of Major W.W. Prentiss.¹² Traditionally, March in Montana is often one of most volatile months of the year in terms of severe weather. As the days become longer, allowing for greater heating of the earth's surface, contrasting air masses are capable of producing severe storms at a moment's notice. Warm, mild sunny days can turn into sub-zero blizzards in the blink of an eye.

Nine days later, on March 24, as the command made their way back towards Fort Shaw, they continued to enjoy the mild spring-like conditions. With temperatures reportedly near 60 degrees under soft, sunny skies, Major Prentiss positioned 34 men from H Company as rear guards stationed about a mile behind the main supply train maintaining a visual contact at all times. Because of the mild conditions the men had taken their heavy winter clothing off and placed their gear on the supply train, keeping in mind, most of these men had been in Montana Territory, only a short while.¹³ Unfamiliar and ill prepared for the rapid change associated with Montana weather, disaster fell upon the alien soldiers.

At 3:30 p.m. on the afternoon of March 24, a blizzard struck the unsuspecting men with vengeance. Several of the men said that in looking across the prairie to the north, they had seen a large cloud formation, but were unable to estimate its distance from them, and that the wind suddenly accelerated and engulfed them.¹⁴ By all accounts

the storm that swept down upon the men would have been categorized as a severe blizzard, which is described as a storm with winds in of over 45 miles per hour, a large amount of falling or drifting snow, and temperatures approaching 10 degrees.¹⁵ In a storm of this severity, visibility would have been reduced to almost zero, essentially cutting off the men stationed at the rear of the main supply train. Dressed in short sleeve shirts and unable to be assisted by their companions, the 34 men from H Company were extremely susceptible to hypothermia and frostbite brought on by what must have been incredibly severe wind chill readings.

Wind chill is a formula created by meteorologists to measure heat loss from exposed skin caused by combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the core body temperature.¹⁶ With a temperature of 10 degrees F, and winds approaching 50 miles per hour, the men would have experienced wind chill temperatures of 40-50 degrees below zero. Fighting to save their lives, they would have quickly succumbed to the effects of hypothermia, which include symptoms of uncontrollable shivering, loss of memory, confusion, incoherence, slurred speech, lethargy and apparent exhaustion.¹⁷ Based on these types of conditions survival would have been extremely difficult.

As quickly as the storm had hit, it left. At around 5 p.m., the soldiers in the main supply train began forming a search party and within an hour, rescuers found 20 men and took them to shelters. The bodies of nine men were located and in some cases it was difficult to determine the cause of death. It was apparent that some had simply frozen to death, while other bodies were concealed in large drifts of snow, and may have even

suffocated in the blizzard conditions.¹⁸ The search for survivors and bodies continued throughout the night and into the next day. In the bitter end, the death toll stood at seventeen soldiers. In the aftermath of the disaster an investigation was held and it was ruled that no one had been found guilty of negligence in any manner, and no charges were leveled; the deaths were deemed an act of God.”¹⁹

What does the calamity that fell upon the unsuspecting soldiers at Fort Shaw tell us about Montana’s environment? Several things. Meteorologically speaking, it indicates that change can come quickly, in fact, almost without warning, as it did for the men of H Company. In addition, as aliens in an unfamiliar environment, the United States Army shed responsibility for the disaster and put the onus in the hands of Providence. Unable to offer a suitable explanation for the loss of seventeen lives, God, it seemed, was the only viable answer. Inexperienced with Montana’s severe environment, the men were simply guilty of ignorance. Alien soldiers, as it would turn out, were not be the only casualties of Montana’s extreme environment.

Driving across Montana, from east to west, or north to south, and taking in a full visual perspective of the landscape reveals that the Big Sky is agriculture country. Like most of the American West, the discovery of gold and other precious metals in the early 1860s, enticed settlers to the Treasure State. Shortly thereafter, enterprising men with visions of endless open ranges saw another valuable resource prime for the taking, free range grasslands. In 1863, James Fergus, an early pioneer to the Big Sky state suggested, “Montana must eventually become the great grazing country of the United States.”²⁰ Fergus’s enthusiasm, it appeared, spread like wild fire across the region as cattleman

from the high mountain valleys of the southwestern part of the state, and stockmen from Texas looked to the eastern two thirds of Montana and saw unlimited potential in the open range. If, however, the enterprising stockmen had looked a little bit harder, through their rose colored glasses, they may have seen that reality was much more problematic. Although it is true that much of central and eastern Montana was suitable for livestock, the greater truth is that the large proliferation of cattle and sheep, which were funneled into these open ranges during the 1870s and 1880s, were tremendously susceptible to the harsh realities of Montana's weather and climate.

As far as winter weather goes, Montana's meteorological history is long and distinguished. If, however, a grand champion were to be crowned, it would probably go to the winter of 1886-87. It was during this horrific winter that an aspiring young artist, Charles M. Russell, working for the O-H Ranch near Utica, Montana, attempted to sketch a drawing of the calamity that had unfolded. Russell sketched his 2x4 inch masterpiece of a starving cow humped over in the snow, ready to keel over while hungry coyotes waited for their feast.²¹ More familiarly known by the title "Last of the Five Thousand," or "Waiting for a Chinook," Russell's vivid depiction of the extreme conditions was chilling. The drawing shows in graphic detail the suffering inflicted upon livestock as a result of the incredibly severe winter of 1886-87.

The disaster, which unfolded that terrible winter, actually began the previous summer as soaring temperatures and exceedingly dry conditions combined to adversely task the already overcrowded livestock on the eastern high plains of Montana. From June through August, temperatures across the region were consistently over 90 degrees, with

many days over 100 degrees. Summer extremes in eastern Montana can be critical: the state record is 117 degrees F. In concert with the high temperatures, precipitation numbers reflected a severe drought across the region. Despite the extreme conditions, cattle continued to be brought into eastern Montana in record numbers. By the autumn of 1886 more than one million head of cattle were crowded on the open ranges of eastern Montana.²²

As a hot and dry summer turned into autumn, with cattle prices dropping and livestock already weak, winter came in hard. "In November we had several snowstorms," Teddy Blue Abbott, a cowboy from Texas, recalled "and I saw the first white owls I have ever seen . . . The Indians said they were a bad sign, 'heap snow coming, very cold.' . . . It got colder and colder. . . . It was hell without the heat."²³ In late November, an arctic outbreak rolled into Montana, plunging temperatures. Then, a blizzard hit the region with full force. On November 27, 1886, the Great Falls Tribune reported that the blizzard had inflicted heavy losses of sheep and that a large herd had drifted into the Teton River and that the herder had frozen to death.²⁴ Conditions abated for a few weeks after the blizzard only to return with more ferocity by Christmas time. With the arrival of the New Year in Montana, another arctic outbreak struck the Treasure State: this one even worse. On January 8, 1887 a report from Fort Keough said, "The weather last night was the coldest of the season, the thermometer at the post hospital registered 50 below zero, which is their minimum, but it must have been much colder, six days later, on January 14, the post paper at Fort Keough reported a temperature of 60 below zero."²⁵ What seemed impossible was actually happening; the weather continued to worsen.

As the horrific winter of 1886-87 continued on, with conditions deteriorating, livestock across the region began to fall prey to the extreme weather. They were unable to cut through the heavy snow and ice to feed; their noses were cut and became raw, bloody and swollen, and they stood still like statues until their lower legs were frozen and then they fell down and died.²⁶ Huge losses of livestock were beginning to mount with no end in sight. It seemed like winter would never end. By February, some of the coldest temperatures ever recorded in the state of Montana, up to that point, continued: 40, 50, and 60, degrees below zero with estimated wind chills of around 95 degrees below zero continued to batter the eastern high plains.

It was during this period of astonishingly cold temperatures that the region was held hostage under a very strong dome of high pressure. Under the influence of high pressure, with mostly clear skies, heat is able to escape back into the atmosphere during the night, creating a condition called radiational cooling. With sinking air and no cloud cover to act as a blanket, whatever heat does exist is quickly lost into the nighttime sky. Making the conditions even worse would have been the heavy snow cover on the ground. Conditions similar to this would have occurred when Montana established the record for coldest temperature in the lower forty-eight states at 70 degrees below zero in January of 1954, at Rodgers Pass, northwest of Helena.

By the end of February, a chinook arrived on the high plains of eastern Montana, ushering the first sign of an end to the deadly winter. As the snow and ice began to melt, the catastrophe of the situation became bitterly clear. A rancher described the following carnage:

Dead animals were everywhere, hundreds of thousands of them, sprawled across the hillsides and along fence lines, heaped at the bottom of coulees, where the snow had trapped them, swollen and bobbing in the rushing rivers. I saw a grim freshet pouring down the river valley as no man had ever seen before or would ever see again. Countless carcasses of cattle were going down with the ice, rolling over and over as they went, sometimes with all four stiffened legs pointed skyward. For days on end, tearing down with the grinding ice cakes, went Death's cattle roundup.²⁷

By winter's demise, the open range era in Montana had come to an end. The cattle industry was devastated. Ranching outfits and ranching men were ruined. Granville Stuart, one of Montana's early cattle barons, mournfully summed up the collective feelings of many of his colleagues when he said, "A business that had been fascinating to me before, suddenly became distasteful, I wanted no more of it, I never wanted to own again an animal that I could not feed and shelter."²⁸ Alien men, similar to the troops stationed at Fort Shaw, in an extreme environment with an alien commodity were humbled by the ferocity of Montana's harsh environment. "Like the homesteaders who had learned that their mere presence could not change the climate of the West," warns N. Scott Momaday, "the ranchers who had rushed in during the beef bonanza had learned that they could not ignore it."²⁹ Although the cattle industry in Montana would eventually recover from the winter of 1886-1887, and continue to this day, the lessons learned were deeply painful for many. If people in Montana were going to succeed in ranching or farming, as Momaday argues, they were going to have to understand the realities of the environment. It could be extreme, much more so than they had ever experienced before. They would have to be prepared for the challenges.

With an end to the open range era of cattle ranching in Montana a large majority of Big Sky country became re-imagined as the state embarked upon a new century. As Montana moved into the twentieth century, the state experienced an extraordinary growth

in population as homesteading farmers transplanted cattle ranchers on the eastern plains of Montana. In large part, the impetus for this movement began in the early 1860s, as indicated by Laurie K. Mercier, "Specific government acts, such as the Homestead Act of 1862 and especially the Enlarged Homestead Act of 1909, which allowed farmers to claim up to 320 acres, played key roles."³⁰ In addition to the Homestead Acts of 1862 and 1909, improvements in farming technology, from equipment to the increasing popularity of dry land farming, combined with a period of above average precipitation across eastern Montana in the early part of the twentieth century to increase the state's population from about 250,000 to almost half a million people.

An important part of Montana's new image as a largely agricultural state rested in the resolute hands of women. "Women were an essential part of that new frontier," argues Mercier, "yet their role is invisible in census statistics and agricultural records, often because they were not considered full-time agricultural workers."³¹ It is unfortunate that the contributions that women made during this trying era in Montana history have, for the most part, been marginalized into the back-chapters of historical narratives, especially considering that women were responsible for *so much*. Historian Richard B. Roeder has suggested that much of the economic success of farming and ranching operations during the Homestead Era in Montana history can be attributed to women. "Primarily, women contributed to the care of family and farm workers: producing, preserving, and preparing food; making and mending, washing and ironing clothes; caring for and training children," claims Mercier, "and any other task required to keep

together body, soul, and household.”³² Moreover, women were stewards of all these responsibilities, and more, while in an environment of profound meteorological extremes.

The eastern two-thirds of Montana is a region dominated by severe wind events, dramatic temperature extremes, and unpredictable precipitation. Down sloping winds, which descend off the leeward side of Montana’s Rocky Mountain Front, are common features of this region. From Cut Bank to Livingston and Miles City to Glendive, the wind has done much to shape, not only the physical landscape, but the societal landscape, too. In addition to the prevalence of wind, dramatic temperature extremes also punctuate the environment. In the wintertime, chinook winds often accompany arctic outbreaks, creating astonishing swings in temperature. It is not uncommon to have 50 to 100 degree fluctuations in temperature as a result of these weather dynamics. In summer, temperatures can easily exceed 100 degrees. And, if all this was not challenging enough, precipitation is unreliable. Drought has often visited the region, already challenged by a semi-arid climate that annually receives less than 15 inches.

Still, despite the great extremes in environment, homesteading women faced the challenges before them. One of them was Pearl Price Robertson. Pearl, along with her husband and three children, arrived from New York at the Judith Basin in central Montana in 1910. In 1911, the family homesteaded land west of Big Sandy, Montana, where Mrs. Robertson bore six more children, and farmed and taught in a one-room schoolhouse until drought forced the family out in 1922.³³ Pearl’s recollections are a vivid reminder of the immense challenges women faced in their construction of place, and of the role that weather and climate played.

Mrs. Robertson's remembrances of her early homestead experiences indicate both a heart felt appreciation for her prairie home, and at the same time, an apprehension for her environment. "I Loved the prairie, even while I feared it – God's country, the old timers called it – there is something about it which gets a man, or a woman," she thoughtfully remarked, and then continued, "Still in my dreams I can feel the force of that wind, and hear its mournful wail around my shack in the lonely hours of the night."³⁴ Pearl's remarks suggest a certain ambivalence, I would argue, in regard to her sense of place. On the one hand, she clearly expressed a kind of reverential affinity for the landscape. The endless vistas afforded under the Big Sky held special meaning for Pearl Robertson, as it did for many others. And, at the same time, that affinity was juxtaposed by an undeniable fear of the natural environment. "God's country," as she calls it, was unpredictable. It could also prove deadly.

During difficult times, which were often for homesteaders, husbands would seek employment away from the farm or ranch as a way of supplementing the family's meager resources. Pearl Robertson's family was no different. "Most of them [husbands] went away to work while the women and little children stayed on in the homes, carrying on as best as they might."³⁵ Part of the increased responsibility meant caring for livestock, even during periods of bad weather. "With the help of my twelve-year-old boy," remembers Roberston, "I braved the storms, waded snowdrifts to keep the horses fed, and stood upon an icy platform in below-zero weather drawing water while the horses crowded and pushed about the watering trough."³⁶ Try as she and her children certainly did, the

extremity of environment could strain the family's economic resources by inflicting death upon their livestock.

Resources such as timber were often in short order on the eastern prairies of Montana. As a result, shelter for livestock was hard to come by. In cases such as Pearl's, animals were usually left to survive in the open environments during periods of extreme weather. Animals often paid the ultimate price. Unable to keep both a mare and her young colt together in a small barn, the adult was left outside the small building, exposed to the harsh elements. "When mourning came Willie and I found her crumbled form in the snow by the barn door, frozen dead," lamented Mrs. Robertson, "mother and son, we wept together over the loss of a faithful friend, while the wind ruffled the icy mane and sent little eddies of drifting snow across the frozen body."³⁷

The loss of the horse, in this case, represented not only an economic hardship for the family, but also the loss of a favored companion. Isolated from neighbors, animals like the Robertson's mare were more than just commodities. As Pearl remarks, the horse was also a "faithful friend." Besides the loss of their horse, the family also experienced the death of other animals on their farm. Horses, pigs, and cattle were all susceptible to severe cold temperatures and extreme wind chill.

The homesteading era in eastern Montana represented a profound leap of faith by settlers. For women like Pearl Robertson, that faith was often challenged exponentially by the absence of husbands and fathers. The success of remaining in a *place*, then, was usually out of the control of most, if not all, homesteaders. Weather and climate almost always had the last word. "Courageously but hopelessly," Pearl remarks, "the settlers

struggled on, trying vainly with borrowed money to battle the elements, to tame the desert, and to carve home and fortune out of the raw land.”³⁸ Blind faith, it seems, was no match for the reality of the environment and the precariousness of the atmosphere.

The Robertsons, like many who homesteaded, left their windswept prairie homes for more benevolent surroundings. Pearl and her family moved and settled in the valleys of western Montana. “We have no regrets; life is fuller and sweeter through lessons learned in privation,” said Robertson of her time on the eastern prairies of Montana, “Desolate, silent it stands, grim witness to the frustration of a man’s hopes and a women’s dreams.”³⁹ God’s country proved to be an exercise in futility for many who homesteaded the eastern prairies of Montana. Their imaginations saw the best in the environment. Reality, however, was much more humbling.

The forces of weather and climate have culminated within the Big Sky to help shape Montana’s geographical landscapes. It is also be true that Montana’s social terrain has been influenced by the same meteorological dynamics that have played such a prominent role in shaping the state’s physical environments. In Montana, the correlation between people and environment has helped to give voice to a generation of talented writers who have articulated the unique bond between human experience and the concept of place. Mary Clearman Blew, James Welch, and Ivan Doig are some of the more prominent examples of Montanans who have been molded by a sense of place in an environment of extremes. In their words, as well as others, lies the influence of weather and climate on the collective narrative of Montana.

By the mid-twentieth century, Euro-American settlement in Montana had been established for almost one hundred years. The hardships endured by white settlers, in terms of environmental challenges, were passed down from generations of people whose perceptions of the natural environment had, over time, been tempered by the reality of their experiences. The accumulation of lived experiences by Montanans had facilitated a respect for the reality of their environment, which in turn helped to foster an acceptance of their condition. Human beings, like other animals, must learn to adapt to their surroundings: if not, they will simply perish or move on in search of more benevolent locations. Stories of hardship and deprivation have been passed from one generation to the next, through written accounts, like the story of Pearl Price Robertson, and oral narratives so prominent in Native American societies like the Blackfeet. Metaphorically speaking, people in Montana have been genetically encoded with the lived experiences of relatives and ancestors, which has enabled people like Blew, Welch, and Doig to give voice to the unique bond between people and place.

Mary Clearman Blew grew up in the Judith Basin Country of central Montana's Fergus County, not far, probably, from where Pearl Price Roberston and her family had homesteaded. A distinguished writer, Blew has authored several fine works. She also served as coeditor of *The Last Best Place: A Montana Anthology*. It is, however, her book, *All But the Waltz: A Memoir of Five Generations of a Montana Family*, which best displays her ability to verbalize what it means to exist in an environment of extremes. Like other Montana authors who have embraced the significance of place and its

relationship to the natural environment, Blew obviously understands the severity that often accompanies Montana weather, especially winter weather in the Judith Basin.

In a chapter titled, *January 1922* Blew portrays winter's hopelessness when she writes, "The world is reduced to a north slope, oppressed by the weight of snow in the sky and the dull prairie, where for months the snow has blown and drifted . . . But on this side of the slope there is no sign of river current, no movement – it will be dark in an hour and already it is twenty below zero."⁴⁰ Similar to sentiments expressed by Pearl Roberston, Blew's passage reflects the darker side of Montana's winter weather extremes. Although Montana winters are occasionally given a reprieve by the presence of chinooks, which can bring welcome relief from the bitterly cold temperatures, the reality is that it is the periods of severe winter weather that provide the greatest challenge to people and their perception of place. "It will be dark in an hour and already it is twenty below zero," explains Blew, suggesting a grudging acceptance of the extreme conditions, and the frigid night to come. Winter in Montana can last for months at a time. In January, as Blew's passage suggests, people and place are caught in purgatory, a middle ground, with no apparent end in sight, as articulated by Blew's melancholy description of winter's icy grip.

Like Mary Clearman Blew, James Welch's ability to describe the relationship of people to their environment, articulated through his knowledge of Blackfeet society, is keenly illustrated in *Fools Crow*. "Now that the weather had changed," Welch explains, "the moon of the falling leaves turned white in the blackening sky and White Man's Dog was restless . . . He chewed the stick of dry meat and watched Cold Maker gather his

forces.”⁴¹ It is appropriate that Welch begins *Fools Crow* with a passage focused on weather; throughout *Fools Crow* the meaning afforded to weather is deeply significant. For Native Americans, like the Blackfeet, weather and climate were not constructed in degrees of temperature or inches of precipitation. And, statistics were not compiled into a climatological construct. Cold Maker, as Welch points out, represents a spiritual force, which resides within the Back Bone of the World, Montana’s Rocky Mountain Front. His credibility as a writer, as is Mary Clearman Blew’s is enhanced by his ability to articulate the association of people and place to their environment. Embedded throughout his narrative, Welch illustrates time and again that he is keenly aware of the role that the natural environment plays in Blackfeet society. Generations of lived experiences passed down through oral histories help to keep people connected to their physical surroundings. And in that past are stories of Blackfeet, like White Man’s Dog, “watching Cold Maker gather his forces.”

Recently, during the autumn of 2001, Ivan Doig’s *This House of Sky: Landscapes of a Western Mind* was selected as “number one” in a list celebrating the top one hundred books in Montana literature. No Montana author, in my opinion, has been able to convey the significance of place and its relationship to the natural environment with the wisdom and acute sense of understanding and awareness as does Doig. His ability to encapsulate the environmental challenges of the Montana landscape and its effects on family and the construction of place make Doig’s *House of Sky*, a true Montana Classic.

Ivan Doig’s vivid reminiscences of his father’s early struggles with extreme weather in Montana are a chilling reminder of the brutality of environment and the

hopelessness of winter's wrath. Consider the following recollection from the winter of 1919:

It became the winter which the Basin people afterward would measure all other winters against. The dark timbered mountains around them went white as icebergs. The tops of sagebrush vanished under drifts. And up around the bodies of bawling livestock, the wind twirled a deadlier and deadlier web of snow. Day upon day, hay sleds slogged out all across the Basin to the cattle and horses as mittened men and boys fought this starvation weather with pitchforks. By late January, the weather was gaining every day.⁴²

Throughout *This House of Sky* Doig's readers are constantly reminded of the challenges faced by people and place, at the hands of severe weather related events. From the Basin country of central Montana, to the Rocky Mountain Front region, Doig brilliantly describes the precariousness of existence in an environment of extremes and the impact of that relationship on both people and place. When Doig and his family relocated to the Rocky Mountain Front he had been conditioned to expect the worse in terms of weather and the Montana environment. In a passage where Doig and his father are looking towards the mountains that formed the western boundary of their new home, experience, respect, and acceptance of his environment are evoked. "Summit after summit bladed up thousands of feet as if charging into the air to strike first," Doig explains, "at storm and lightning, valleys and clefts chasmed wide as if split and hollowed by thunderblast upon thunderblast."⁴³ Like Blew and Welch, Ivan Doig knew what to expect.

What binds the previous collection of authors to their position among Montana's literary elites is their ability to depict the relationship of people and place to their physical landscapes and the challenges often associated with that association. As historian David Walter suggests, "It is the relationship of people to their environment, which undergirds —

or strengthens – the Montana story.” Not only does the relationship between people and environment strengthen the Montana story, in large part, it is the Montana story. And, if asked to define where that enduring narrative is most sternly challenged by the complexities of extreme weather and climate it would have to be Montana’s Rocky Mountain Front region.

¹ Mark David Spence, Dispossessing the Wilderness: Indian Removal and the Making of the National Parks (Oxford: Oxford University Press, 1999), 73.

² Walter C. Fleming, Associate Professor, Center for Native American Studies, Montana State University, Bozeman, Interview by Kevin Conradt, 12 October 2001, Bozeman, Mt.

³ Spence, Dispossessing the Wilderness: Indian Removal and the Making of the National Parks, 73.

⁴ Frederick K. Lutgens and Edward J. Tarbuck, The Atmosphere: An introduction to Meteorology (Upper Saddle River: Prentice Hall, 2001), 31.

⁵ Kenneth G. Hubbard, "The History of Weather Observations in the Western United States," Journal of the West (Summer 2001): 26.

⁶ Bernard DeVoto, ed., The Journals of Lewis and Clark (Boston: Houghton Mifflin Company, 1953), 104.

⁷ Ibid., 147.

⁸ Ibid., 148-149.

⁹ Lutgens and Tarbuck, The Atmosphere: An Introduction to Meteorology, 273.

¹⁰ Carolyn Cunningham, ed., Montana Weather (Helena: Montana Magazine, 1982), 77.

¹¹ Ibid.

¹² Ibid., 78.

¹³ Ibid.

¹⁴ Ibid.

¹⁵ Lutgens and Trabuck, The Atmosphere: An Introduction to Meteorology, 142.

¹⁶ "Winter Storms: The Deceptive Killers," handout, N.O.A.A.

¹⁷ Ibid.

¹⁸ Cunningham, Montana Weather, 79.

¹⁹ Ibid., 80.

²⁰ William L. Lang, Michael P. Malone, and Richard B. Roeder, Montana: A History of Two Centuries 2nd ed. (Seattle: University of Washington Press, 1976), 145.

²¹ Cunningham, Montana Weather, 70.

²² Ibid., 71.

²³ Geoffrey C. Ward, ed., The West: An Illustrated History, "The Great Die-Up: The American West and the Burden of Belief," by N. Scott Momaday (Boston: Little, Brown, and Company, 1996), 368.

²⁴ Cunningham, Montana Weather, 72.

²⁵ Ibid., 73.

²⁶ Ibid.

²⁷ Momaday, The Great Die-Up, 369.

²⁸ Cunningham, Montana Weather, 74.

²⁹ Momaday, The Great Die-Up, 370.

³⁰ Harry W. Fritz and Robert R. Swartout, Jr., eds., An Anthology of Historical Essays: The Montana Heritage, "You Had to Make Every Minute Count: Woman's Role in Agriculture," by Laurie K. Mercier (Helena: Montana Historical Press, 1992), 131.

³¹ Ibid., 132.

³² Ibid., 134.

³³ William Kittredge and Annick Smith, eds., The Last Best Place: A Montana Anthology, "Homestead Days in Montana," by Pearl Price Robertson (Seattle: The University of Washington Press, 1988), 532.

³⁴ Ibid., 533.

³⁵ Ibid., 539.

³⁶ Ibid.

³⁷ Ibid.

³⁸ Ibid., 542.

³⁹ Ibid.

⁴⁰ Mary Clearman Blew, All But the Waltz: A Memoir of Five Generations in the Life of a Montana Family (New York: Penguin Books, 1991), 181.

⁴¹ James Welch, Fools Crow (New York: Penguin Books, 1986), 3.

⁴² Ivan Doig, This House of Sky: Landscapes of a Western Mind (San Diego: Harcourt, Inc., 1978), 35.

⁴³ Ibid., 180.

CHAPTER 5

PEOPLE, PLACE, AND THE ROCKY MOUNTAIN FRONT

Montana's Rocky Mountain Front stretches from Glacier National Park in the north to near Rodgers Pass in the south. Geographically, it is as dramatic a landscape as you will find anywhere. The high plains of northern Montana, are abruptly met by the shining mountains, which stand like giant sentinels for over one hundred miles in length. In terms of meteorology, the Rocky Mountain Front region is just as awe-inspiring. At Browning, on January 23, 1916, the thermometer plunged from 44 degrees F, to 56 degrees below zero in twenty-four hours, for a total of 100 degrees, establishing a national record. A subsiding chinook receded and was quickly replaced by an arctic air mass, accounting for the phenomenal drop in temperature.¹ At Rodgers Pass, north of Helena, on January 20, 1954, the thermometer fell to 70 degrees below zero, establishing a national record for lowest recorded temperature in the contiguous United States.

Besides the incredible temperature variability of the region, the Rocky Mountain Front is also home to relentless winds. Down slopping winds off the leeward face of the mountains have been recorded as high as 147 miles an hour: for a storm to be classified as a hurricane, it must have sustained winds of at least 75 miles an hour. The Rocky Mountain Front is a landscape sculpted by severe blizzards, especially between the months from March to May, as the troops stationed at Fort Shaw discovered in March of 1869. In addition to the occurrence of spring blizzards, the region is susceptible to flash

flooding. And, in stark contrast to the heavy snows and flash floods, the Rocky Mountain Front is also witness to periods of extreme drought.

Clearly, Montana's Rocky Mountain Front is home to the most extreme weather and climatic conditions in the Treasure State. The controls of climate, which are responsible for making weather; topography, atmospheric circulation, latitude, and land/water distribution, combine to make Montana's Rocky Mountain Front region an environment of profound meteorological extremes. People and place are constantly in peril. Dr. William Wyckoff, Professor of Geography at Montana State University-Bozeman describes the concept of place as the "process by which people give meaning to location, particularly to how they create social geographies that are rooted in community."² In Montana along the Rocky Mountain Front, people, meaning, and location, have been tempered by extreme environments and false expectations. The region is a meteorological battlefield where the geography of hope is held in check by the geography of reality. In June of 1964, the geography of reality forever altered individual and community perceptions of place along the Rocky Mountain Front.

In 1999 senior meteorologists at the National Weather Service in Great Falls, Montana, reflected back on Montana's weather over the past one hundred years. Together, they compiled what they believed to be the ten most significant weather/climatic events of twentieth century in Montana. Because of state's reputation for extreme meteorology, several events garnered serious consideration. But when it came to picking one seminal episode, the catastrophic flood of June 8, 1964, was listed as the number one weather event of the twentieth century. Its sheer meteorological

magnitude, coupled with the impact on human beings along the Rocky Mountain Front, garnered the disastrous flood its place as the most dramatic weather related event of the twentieth century.

Flooding is a common feature in Montana's meteorological make-up. Typically, May and June are the wettest months when the state experiences its largest monthly rain totals. With melting snow packs in the mountains and potentially heavy rainfalls, flash flooding can become deadly. Usually, Montana experiences severe floods about every ten years or so. It was the power of the June 1964 rainstorm, however, that made the flood the most destructive and amazing on record in the Treasure State.³ Nothing in their past had prepared the people living along the Rocky Mountain Front region of north central Montana for the severity of this storm.

Meteorologically, all of the conditions necessary to create such a catastrophic event came to fruition. A large supply of relatively warm moist air and large scale cyclonic circulation created a condition called uplifting, which sustained these overlapping effects for several hours.⁴ It was the perfect formula for disaster. On June 7, 1964 an area of low pressure had situated itself over Wyoming. Warm moist air from the Gulf of Mexico was being funneled northward, and with the counter-clockwise flow of circulation associated with low-pressure systems, the thick saturated air was directed into eastern and north central Montana. A strong flow aloft from an easterly direction over north-central Montana was elevated by the ascending terrain, sharply upslope the last ten miles or so just east of the Rocky Mountain ridge.⁵ As the energy associated with this storm, moving from east to west, encountered the mountains that face in a north to south

orientation, the air and moisture were forced upwards at a highly accelerated rate, creating a strong orographic effect.

As illustrated earlier, when moisture encounters mountainous terrain it is forced upwards, and as the air rises condensation occurs and precipitation falls. The direction of energy, in concert with the geographic orientation of the Rocky Mountain Front, created a perfect situation for copious amounts of rain to fall. During this period of strong upslope conditions, rain was falling at a rate of up to 1 inch per hour accounting for total rainfall amounts of 14 to 16 inches in some areas, with 10 to 12 inches falling in an area parallel to the Continental Divide.⁶ The combination of a melting winter mountain snow pack, and heavy rains forced reservoirs, streams and rivers to become stressed beyond their capacity.

The area parallel to the Rocky Mountain Front is typically a semi-arid region, meaning that precipitation amounts are usually less than 15 inches per year. For example, Augusta, on average, records about 14 inches per year; Choteau receives just over 11 inches; Valier about 12 and a half inches; and Browning almost 15 inches annually.⁷ June is usually the wettest month, with the aforementioned communities receiving between 2.5 to 3 inches of precipitation annually. In order to fully understand the magnitude of this particular event, ponder the following. In some cases, the area along the Rocky Mountain Front received, on average, their yearly annual precipitation totals in less than two days. And, this does not take into account the water released from the melting snow pack. Given this fact, pure water totals generated from the 1964 storm were truly catastrophic.

It was not long after the torrential rains began to fall that small communities started to feel the adverse effects of the unfolding catastrophe. The South Fork of the Sun River inundated much of Augusta; thirty-four homes and 17 businesses were damaged as water three feet deep roared into town.⁸ Amazingly, Gibson Dam west of Augusta held, despite being pushed beyond its capacity. Built in 1929, Gibson Dam was constructed to hold fifty thousand cubic feet of water per second, the largest flow imaginable over a 500-year period, but 53,000 ft. of water per second came down the Sun River and through the glory hole, which is intended to act as a reserve for the dam, during the peak of the flood.⁹ North of Augusta, the flood also impacted the small community of Choteau. Floodwaters from the Teton River and Spring Creek combined to cause the entire town of nearly 2,000 residents to be evacuated.¹⁰ Thankfully, residents of Augusta and Choteau came away relatively unscathed. Farther north, near the communities of Valier and Browning, residents were not as fortunate; almost sixty people lost their lives as a result of the floodwaters.

Swift Dam, originally constructed as an irrigation product to hold back water along Birch Creek failed as a wall of water and debris rushed down the valley. Birch Creek Valley was a scene of total devastation. All the trees and most of the brush were swept away, as a wall of water reported to be 20 feet high, destroyed buildings and bridges that stood in its way. In all, 19 people along Birch Creek lost their lives; eight from the Hall family.¹¹ North of Swift Dam, in Glacier National Park, the dam on Lower Two Medicine Lake also failed under the stress of the heavy rains. Native Americans were hit particularly hard by the flash floods, as more than 30 drownings were reported

on the Blackfeet Indian Reservation, victims of nature's wrath.¹² People along the Rocky Mountain Front, regardless of ethnic affiliation, were helpless against the extreme nature of this particular event.

Metaphorically, Ivan Doig's phrase "Lost to Weather," seems applicable in regard to the flood of 1964. Certainly, weather won that day as demonstrated by the incredible destruction of property and the large loss of life. But, although the perception of what people imagined in terms of place was undoubtedly challenged by the severity of their environment, in the aftermath, people and communities were ultimately strengthened by the catastrophe. The flood hit people and communities along the Rocky Mountain Front, especially those dependent on ranching and farming, particularly hard. Because of the sparse population of the region, and the close-knit identity of people and community, tragedy and the aftermath associated with the devastation of the flood affected almost everybody and every community. In the northern region of the Rocky Mountain Front the flood, given its proximity to Birch Creek, Swift Dam, and the Blackfeet Indian Reservation dramatically impacted the community of Valier. The following recollections of the flood of June 1964 are valuable insights into personal and community perceptions and responses to the tragic events, as well as the impact on society and place.

Bernard Widhalm has lived and ranched most of his life on the outskirts of Valier, thirty miles or so from the Rocky Mountain Front. In June of 1964, he was between his junior and senior year at Valier High School, and will never forget what transpired when the rains fell hard that June. Robert Kuka also lives on the outskirts of Valier, and has lived and ranched in the area for most of his seventy-four years. He, too, never lost sight

of what happened that June. And finally, Dick Cassutt, a rancher living near Fort Benton, at the confluence of the Teton and Marias Rivers, will never forget the tragedy that unfolded. Their stories help to define the Montana narrative and clarify the relationship of people to their natural environment.

In June of 1964, the Rocky Mountain Front region of Montana was entering its fourth year of drought. Bernard Widhalm had been working on the family ranch with his brother that weekend when the rains started. "We were glad for the rain, especially considering the drought situation, as were most ranchers, and by Sunday night we must have gotten about four inches."¹³ On Sunday, June 7, Robert Kuka was working his land on the Blackfeet Reservation, looking for livestock along Birch Creek drainage. "It was raining for most of the afternoon and getting harder as evening approached," remembered Kuka as he reflected on the day, "on the ride home, the clouds were hanging over the ridge top of the mountains, and it continued to rain throughout the night."¹⁴ The rains were a welcomed relief for area ranchers and farmers. So much of their success is predicated on having sufficient moisture for crops and livestock. To the west, however, heavy rains and the melting snow pack in the mountains were beginning to stress Swift Dam. Unlike today, areas like Swift Dam were not equipped with remote sensing stations that monitor current weather conditions, like precipitation totals and dam flow rates, which would have indicated potential disaster. What happened the next day, without today's modern technology, could not have been predicted.

By Monday morning, June 8, the heavy rains that moved into the Rocky Mountain Front the day before had failed to abate. "The rain was coming down in

sheets,” remembered Robert Kuka, as he went out to assess the conditions, “clouds and rain seemed to be one; you couldn’t tell the difference between the two.”¹⁵ At this point, Swift Dam had filled to capacity; water began to spill over the top. Sometime around 11:00 that Monday morning, Swift Dam collapsed under the stress of the rain and melting snow. At 11:20, KSEN radio station out of Shelby, Montana, issued the first warning to residents along Birch Creek drainage that Swift Dam had failed. For people along the northern Rocky Mountain Front, KSEN was, and remains today, an important source of information and on Monday morning, June 8, KSEN’s live radio broadcast was for most residents of these inundated communities the only source for warning and information regarding the ongoing catastrophe.

Robert Kuka had left his home in Valier to assess conditions at his ranch along Birch Creek when news of the Swift Dam failure was broadcast. What he saw unfolding before him was unbelievable. “The visibility was extremely poor, with the rain and low cloud cover, some of the hills covered under the low ceiling,” says Kuka, “Birch Creek had become a raging river, large swirling eddies of water with mature cotton wood trees 40 to 60 feet tall bobbing up and down like tiny tooth picks in the brown water.”¹⁶ He watched with amazement from high ground as houses in the low land bottoms along Birch Creek were ripped from their foundations and cast downstream with the rest of the floating debris. “If you were in the wrong place at the wrong time,” remembered Robert Kuka, “chances are you would probably be swept away: it was just so much larger than anything you could have *imagined*, it was unlike anything I have ever experienced.”¹⁷

Reports from KSEN had estimated flood crest at between 20 to 40 feet high rushing down through Birch Creek drainage.

Immediately after the breach of Swift Dam, KSEN radio and station manager Bob Norris became very active in responding to the emergency. KSEN set up emergency headquarters in Valier, broadcasting live to residents along the Rocky Mountain Front, and dispatched reporters to assess the current conditions. Two reporters were dispatched, one by small airplane, and one by car, risking their lives to keep residents assessed of conditions over the next few days. In addition to the laudable efforts of KSEN, the Red Cross also set up headquarters in Valier. The radio station pleaded for volunteers to help assist personnel in finding missing people. One of those who volunteered was Barnard Widhalm.

On Tuesday, June 9, Widhalm and some friends offered their services to the volunteer effort. "At first people were concerned that we were too young," remembered Widhalm, "but we talked them into letting us help, we searched along the bottoms looking for any signs of life, or for bodies, the devastation was just so amazing."¹⁸ Thankfully, they did not find any bodies, especially people whom they might have known, but they were awestruck by the amount of debris. "We found pieces of houses, clothes, cars, dead livestock, and even an old gun that had been bent like a pretzel; afterwards we had to have tetanus shots."¹⁹ Both Widhalm and Kuka, in their accounts of the disaster, were shaken by the total devastation of the flood. Even today, especially below the rebuilt Swift Dam, the area looks like a war zone. Pieces of the old dam, concrete and bent steel, some as large as cars and small houses, litter the flats. No trees

remain, except for small scrubs not more than a few feet high, which struggle against the extreme winds that plague the area.

Dick Cassutt, a Montana rancher and storyteller, was one of the individuals directly affected by the tragedy. "I can tell you about the terrible flood in June of 64," recalls Cassutt, "but it's not my favorite story: too much loss, too much sadness for friends and family: it was one those freaks of nature."²⁰ Cassutt had family up along Birch Creek drainage, below Swift Dam. His sister-in-law, Marilyn, had been waiting for her husband, Wally, when the flood wave hit. Wally had stopped above the hill to open a gate when he heard the roar:

He said he could see a 100, 150 foot column of water with horses and cattle and trees and rooftops swirling. He could see things coming up over the top of this big wave, and then dropping to the bottom. He screamed to his family, and they ran back in the house, and that's the last he saw of them: his wife and two kids, who would have been about eight and eleven years old. . . He just knew his family was dead, and he went plumb out of his mind – went off across country, afoot – didn't turn up till the next day down by Valier, about nine miles away.²¹

Amazingly, the mother and two children were able to get to the roof of the house as it was ripped away from its foundation. Marilyn and the daughter had attached themselves to a log, which had floated downstream a few miles in the flowing torrent. "The mother thought she had ahold of the girl but she only had the scarf, she'd lost the girl, they never found her, many bodies were never found,"²² Cassutt sadly recalled. The son, Guy, had drifted downstream on a piece of roof with a propane tank attached to it and had been enveloped by the gasses. He eventually washed ashore with a pile of debris. "He stumbled into an old shed near him on the bank and went to sleep," said Cassutt of the boy, "who must have been near dead because he laid there for a day and a half before he

came to, a neighbor found him walking down the road.”²³ Dick Cassutt like many residents on the Rocky Mountain Front experienced, first hand, a sense of amazement over the loss of life, destruction of property and livestock, and the severity of weather. Those feelings are evoked in the following passage as he reflected on the flood. “Dozens of people lost their lives that day along the Rocky Mountain Front,” Cassutt recalled, “as well as thousands of cattle and horses, and millions of dollars in property damage: you bet, the weather can be violent on this range.”²⁴

The initial impact on people along the Front was that of bewilderment. “I was completely shocked,” says Bernard Widhalm, reflecting on the flood, “the loss of life, people I knew were gone; the Hall family lost eight members, the husband was gone when the flood hit and was left to deal with the horror, alone.”²⁵ After the flood, Robert Kuka also expressed shock. “I was stunned, I still to this day could not believe what my eyes were seeing: it just didn’t seem possible.”²⁶ Bernard Widhalm, Robert Kuka, and Dick Cassutt’s reflections of the events of flood of June 1964 are representative of people who have dealt with disaster first hand. It would have been extremely difficult to come to grips with the reality of the catastrophe, the devastation, and the loss of friends and loved ones.

People came together from all along the northern Rocky Mountain Front to help those in need of assistance. KSEN radio station acted as a communication link to those stranded, passing messages over the radio to family and friends. Schools and churches in Valier opened their doors providing shelter, food, and clothing for those in need. The Red Cross, the National Guard, and hundreds of volunteers continued to look for survivors

and offer any assistance possible. Asked if he was surprised by the community's cohesiveness during and following the disaster, Bernard Widhalm shook his head and said, "People helped people, that's just what we do in times of need."²⁷ Ranchers in the immediate area banded together to construct a bridge across Birch Creek following the flood, linking Valier to the Blackfeet Reservation, well before state and federal forces were able to marshal assistance for the ravaged communities.

People on the Blackfeet Reservation were hit particularly hard by the floods. Following the disaster, Robert Kuka recalled that the Bureau of Indian Affairs was extremely helpful. "The B.I.A. brought in pre-fabbed houses and shelter for livestock," noted Kuka "and took a major role in the clean-up efforts."²⁸ Also, KSEN radio station coordinated a collection effort, gathering food and clothing, and other offers of assistance for the people of Browning. All of this happened as President Lyndon Johnson declared the Rocky Mountain Front a National Disaster Area, clearing the way for federal assistance. People and communities came together to help one another in the time of need: Swift Dam and Two-Medicine Dam may have failed, but individuals acting as one held together.

Even now, almost forty years after one of the worst weather related disasters in Montana's history, people and communities are extremely reflective about the flood of June 1964. During times of disaster it is natural for individuals and communities to experience the cyclic nature of loss: shock, followed by anger, then grief. To be sure, people on the Rocky Mountain Front were personally shaken by the enormity of the flood; it seemed impossible that such an event could actually happen, but it did. Also,

people as well as communities shared in the grieving process that takes place following a disaster of such magnitude. Because of the sparse population of the region, people who may not have lost loved ones, most likely knew families who did.

People on the Rocky Mountain Front understand the precariousness of their environment and their relationship with it. "There was some talk among the ranchers who questioned the lack of warning," explains Robert Kuka when asked if people were angered by what transpired that June, "but essentially, man-made things were not made to stand up to mother nature when she unleashes upon the earth."²⁹ Bernard Widhalm echoes Kuka's feelings. "It was a fluke of nature, melting snow pack with heavy rains," says Widhalm, "we just didn't know."³⁰ The weather system responsible for the catastrophic rains developed quickly, and with the technology available at the time, advanced warnings were not possible.

¹ Sherm Ewing, The Range (Missoula: Mountain Press Publishing Company, 1990), 120-121.

² William Wyckoff, Creating Colorado: The Making of a Western American Landscape 1860-1940 (New Haven: Yale University Press, 1999), 6.

³ Carolyn Cunningham, Montana Weather, (Helena: Montana Magazine, 1982), 81.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ Western Regional Climate Center, Montana Climatology, www.wrcc.dri.edu.

⁸ Cunningham, Montana Weather, 84.

⁹ Ewing, The Range, 124.

¹⁰ Cunningham, Montana Weather, 84.

¹¹ Ibid.

¹² Ibid., 95.

¹³ Bernard Widhalm, Rancher, Valier, Mt., Interview by Kevin Conradt, 26 December 2001, Tape Recording in Possession of Author.

¹⁴ Robert Kuka, Rancher, Valier, Mt., Interview by Kevin Conradt, 26 December 2001, Tape Recording in Possession of Author.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Widhalm, Interview, 2001.

¹⁹ Ibid.

²⁰ Ewing, The Range, 125.

²¹ Ibid., 126.

²² Ibid., 127.

²³ Ibid.

²⁴ Ibid.

²⁵ Widhalm, Interview, 2001.

²⁶ Kuka, Interview, 2001.

²⁷ Widhalm, Interview, 2001.

²⁸ Kuka, Interview, 2001

²⁹ Ibid.

³⁰ Widhalm, Interview, 2001.

CHAPTER 6

CONCLUSION

In Montana people and place have a unique and at times an extremely challenging relationship with the natural environment. Weather and climate and the rapidity of change that seems to characterize the Treasure State's meteorological annals have conspired to make Montana an environment of extremes. "It is, first and most basically, a culture and society built on, and absolutely dependent on," suggests environmental historian Donald Worster, "a sharply alienating, intensely managerial relationship with nature."¹ Worster's reference to the relationship of people to their physical environment, and how that affiliation can be administered, sparks worthwhile debate for individuals and communities living in extreme environments. In Montana, that discussion might lead to the following question. "How can society best manage their relationship with the forces of weather and climate?" The stark reality is people cannot manage their relationship with the environment, they survive it and adapt to its variability, and ultimately if people are going to maintain their sense of place, they must grudgingly accept the reality of their environment. It is that seemingly constant state of struggle with weather and climate that forever challenges those trying to create a sense of place and defines our existence in an environment of meteorological severity.

The human condition in Montana has been predicated on society's ability to create stability, regardless of the environmental obstacles. That stability, for the most part, lives inside the human imagination. "Only people have tried on a massive scale to

move imagined environments out of their heads," suggests historian Elliot West, "and to duplicate them in the world where others live."² Native Americans were the first peoples to attempt to create enduring environments in Montana, by manufacturing reality out of imagination. For the most part, this replication was made more sinuous because of their mutual existence with the natural environment, and because they saw their landscape for what it was, an environment in a constant state of becoming, a faith in motion. Most importantly, they realized that the natural world could not be controlled, only endured.

As Euro-Americans began to inhabit Big Sky Country, a series of conflicts, befuddlements, and consternations seemed to punctuate their relationship with the natural environment. Unfamiliar with the meteorological severity of Montana, early explorers, homesteaders, and agrarians, seemed to be in a perpetual state of battle with the Treasure State's weather and climate. As interlopers in a foreign environment, they were simply guilty of false expectations. Elliott West might suggest that in Montana "we need to recognize the play between the 'natural' world and human minds: If the environment is always helping shape and limit human understanding, people (and only people) are forever imagining new environments and trying to muscle them into being."³ It is akin to trying to place a square peg into a small hole; the unfortunate reality does not always fit. Regardless of how hard people try to shape their perception into reality, the consequences of that action can be extremely problematic.

When Ivan Doig, his father, and grandmother re-located to the Rocky Mountain Front region of Montana, they knowingly attempted to recreate a sense of place, fully aware of the realities of their new environment. "In front of us now loomed the reefline

of the entire continent," Doig reflected, "where the surf of weather broke and came flooding across, and both of us knew what could be ahead when full winter poured down off these north peaks."⁴ Therein lies the key to understanding the concept of place in extreme environments. Prophetically, Doig sees the reality of their new environment, "both us knew what could be ahead when full winter poured down off these peaks," speaks volumes. Experience, respect, and the acceptance of their environment, had taught them well. Their perception of place had been conditioned to accept the stark reality of their environment, and in that, was garnered a small measure of success. Looking at the mountains, as they did, made them fully aware that the combination of landscape and atmosphere in Montana could be terribly cruel. Decades of small successes, contrasted by periodic episodes of failure and disappointment, had conditioned them to expect the worse and hope for the best. Like Ivan Doig and his family, Bernard Widhalm, Robert Kuka, and Dick Cassutt understood that the reality of their environment demanded the acceptance of potential disaster at the hands of weather and climate. "You develop a series of scenarios; what if, what if, what if the weather doesn't cooperate" stresses Robert Kuka, "you could be the perfect farmer and rancher, but if the weather doesn't pan out, all the perfect planning adds up to nothing."⁵ For people like Robert Kuka, as well as countless others, the construction of place is ultimately dependent upon weather and climate.

The connective narrative of Montana and its people are bounded by their relationship to the natural environment. Historian David Walter of the Montana Historical Society argues that it "undergirds" the Montana Story. Taking this assertion one step

further, I would suggest that it is the Montana story. Past, present, and future in Montana are incontrovertibly linked to the relationship of environment to people. William Cronon reminds us that, "Stories about the past are better if they increase our attention to nature and the place of people within it."⁶ In Montana people, place, and environment, especially in terms of weather and climate are joined together like links in a chain. Take away one of those links and the Montana story is incomplete. In the beginning, as in the end, people are forever united to their environment and the meteorological challenges it presents.

On Wednesday, June 13, 2001, Bozeman, Montana set several weather records. Almost 15 inches of snow fell, shattering records that had been in existence since 1892. With leaf bearing trees beginning to canopy, the heavy wet snow that fell created havoc for Bozeman. "The heaviest damage from the storm appeared to be hundreds of broken tree limbs," read the article in the Bozeman Daily Chronicle, "many which crashed onto houses, parked cars and power lines reaching into most coroners of the region."⁷

Typically, June is a transition month, meteorologically for Montana: in Bozeman, the average maximum temperature for the month of June is 71.4 degrees, average minimum temperature is 45.2 degrees, and average precipitation for the month is 2.85 inches, with an average monthly snowfall of 0.2 inches.⁸ Clearly, there was nothing average in terms of weather, on June 13, 2001. Although snow in Bozeman in June is not unheard of, the storm of June 13 was certainly not what meteorologists had in mind when they look at weather in average terms. "This is big," said John Ford, who takes weather readings in Bozeman for the National Weather Service, "it's a record for snow, and a record for

precipitation (including rain), for any day in June.”⁹ In fact, it was the most snowfall ever recorded in Bozeman for the month of June, and it all occurred in one day.

Meteorologists still continue and strive to understand the complexities of the atmosphere. Recently, the National Oceanic and Atmospheric Administration began a new program, which hopes to unwrap some of the mystery of storms by using new technology. “We’re measuring the atmosphere surrounding the storm,” said Jack Parrish, aboard a Gulfstream G-IV, “think of a storm as a floating cork in a stream, it can only go where the stream takes it, we’re measuring the stream.”¹⁰ Human understanding of weather and climate still remain, to a certain degree, a mystery.

Clearly, the role that weather and climate play in the Big Sky is critical to understanding the Montana narrative. This relationship between humans and their environment has an enduring and powerful legacy that deserves further research by historians. “Scholars interpreting the role of the environment on Westward travelers,” argue professors Cary J. Mock and Merlin P. Lawson, “have primarily ignored meteorological and climatological perspectives.”¹¹ This has been true for Montana as well. There are countless stories, richly embedded narratives, waiting to be discovered, which can only strengthen Montana’s storied historical foundation.

As Montanans continue their attempts to construct a sense of place under the Big Sky, they are perpetually challenged by the environmental variability of the Treasure State. In stark contrast to the deadly floods of 1964, Montana is currently entering its fourth year of drought: records indicate that the state’s current water deficit is worse than the Dust Bowl period of the 1930s. “Snow is sparse in the mountains and missing from

the plains, reservoirs and streams are low,” representatives from the Montana Drought Advisory Committee recently warned, “and the kind of heavy winter or spring snows needed to improve conditions significantly are not in the forecast.”¹² How Montanans deal with this drought will be another chapter in the Treasure State’s environmental history. Weather and climate have had and will continue to have a substantial responsibility in the way that the state’s physical and social terrain is shaped. In Montana, If you don’t like the weather, wait a minute, it’ll change.

¹ Donald Worster, Rivers of Empire: Water, Aridity, and the Growth of the American West (Oxford: Oxford University Press, 1985), 5.

² Elliot West, The Contested Plains: Indians, Goldseekers, and the Rush to Colorado (Lawrence: University Press of Kansas, 1998), xx.

³ Ibid., xxiv.

⁴ Ivan Doig, This House of Sky: Landscapes of a Western Mind (San Diego: Harcourt, Inc., 1978), 181.

⁵ Robert Kuka, Rancher, Valier, Mt., Interview by Kevin Conratt, 26 December 2001, Tape Recording in Possession of Author.

⁶ Clyde A. Milner II, ed., A New Significance: Re-Envisioning the History of the American West, "A Place of Extremes: Nature, History, and the American West," by Susan Neel (New York: Oxford University Press, 1996), 120.

⁷ Bozeman Daily Chronicle, Thursday, June 14, 2001, 1.

⁸ Western Regional Climate Center.

⁹ Bozeman Daily Chronicle, (Bozeman), June 14, 2001,

¹⁰ Bozeman Daily Chronicle, February 11, 2001,

¹¹ Merlin P. Lawson and Cary J. Mock, "Meteorological Experiences, Climatic Variability, and the Overland Trail Emigrants," Journal of the West (Summer 2001): 10.

¹² Bozeman Daily Chronicle, January, 14, 2002.

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