THESIS

THERMAL LANDSCAPES: TEMPERATURE AND SITE PLACEMENT IN NORTHWEST WYOMING

Submitted by

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WE HERBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY KELLY MARIE DERR ENTITLED, THERMAL LANDSCAPES: TEMPERATURE AND SITE PLACEMENT IN NORTHWEST WYOMING, BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS.

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ABSTRACT OF THESIS

THERMAL LANDSCAPES: TEMPERATURE AND SITE PLACEMENT IN NORTHWEST WYOMING

Biotic communities are shaped primarily by interactions between temperature, effective moisture, topography, soil, disturbance regime and time. In a montane ecosystem, temperature and effective moisture vary with topography across short distances. These topographically driven changes cause concordant variation in habitat structure. Prehistoric hunter-gatherers in a montane ecosystem may have incorporated topography, temperature, and habitat structure into site placement strategies. This study seeks to understand the correlation between topographically mediated temperature gradients (the thermal landscape) and montane prehistoric activity areas.

Over 50 newly recorded prehistoric sites have been identified in the Central Absaroka Range in Northwest Wyoming. In order to test the hypothesis of temperature effecting site choice, thermal landscapes were constructed by placing data collectors across the two watersheds, Greybull and Jack Creek, within the study area. The gauges were placed at elevation gradients to capture topographic change. Gauges were also placed on prehistoric sites ranging from 7500 Before Present (BP) to 100 BP in age. Temperature gradients were compared to the surficial archaeological record to test a temperature-driven prehistoric site placement hypothesis. It was determined, contrary to the main hypothesis that the sites would be placed in warmer locations, that the archaeological sites actually recorded the coolest nighttime temperatures regardless of elevation. There are some demonstrated

correlations between nighttime temperatures and site placement in the montane watersheds. Daytime temperature, which varies independently of nighttime temperature, may play more of a role in site placement than previously thought. These data indicate that contemporary notions of elevation and temperature with regards to prehistoric site placement in montane watersheds should be re-evaluated.

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CHAPTER 1: INTRODUCTION

Understanding hunter-gatherer site distribution and the biological, cultural and environmental factors that contribute to prehistoric site choice are an important focus of North American archaeology (Kennett 2005:12). Those factors most crucial to sustaining human life, distance to water for example, are more frequently analyzed (Bettinger 1991:47). Prehistoric hunter-gatherers may have had a more acute understanding of the subtle changes in climate and weather, as they were constantly affected by change in precipitation and temperature on the local level (Warren et al. 2000). One factor, above-ground temperature, may have also been a constraint of site choice during the prehistoric. This thesis seeks to capture the topographically mediated temperature gradients across two drainages in the Upper Greybull watershed, within the Greater Yellowstone Ecosystem, to test the hypothesis that above-ground temperature and elevation play a role in site choice. The Upper Greybull is part of the Central Absaroka Range. This area of Wyoming is currently being researched by Colorado State University. Archaeological lithic distribution data were collected by Colorado State University archaeology field school students, as part of the Greybull River Sustainable Ecology program, between the 2001 and 2004. These archaeological data will be compared against 159,000 lines of individual temperature data collected during this study.

Capturing localized above-ground temperature gradients has been a problem for meteorologists due to logistical and financial difficulties in constructing and maintaining weather stations (Bolstad et al. 1998; Chen et al. 1999; Curtis and Grimes 2004). These difficulties have led to the application of coarse regional climate data at specific archaeological site locations. This study will demonstrate the importance of considering temperature as a factor in human site choice as well as the importance of collecting local temperature data when considering human use of montane ecosystems.

Chapter 1 introduces the history of site placement studies within the discipline of archaeology. Various theoretical perspectives that are used by archaeologists to account for settlement patterns and site placement will be provided. A basic site placement model will also be presented to demonstrate the factors that are thought to contribute to site choice. The region and study area that will be used to explore the thermal landscape concept will then be introduced. Previous archaeological research within the region surrounding the Central Absarokas will also be discussed. Chapter 2 provides definitions of the thermal landscape and other pertinent terms. The research design for capturing the thermal landscape and the methods of analysis and the results will also be provided. The use of Geographic Information Systems (GIS) to analyze aspect and elevation of lithic material in the study area is presented in Chapter 3. Suggestions for further research and conclusions, including the collection of climate data that can be compared to the Late Prehistoric time period, are discussed in Chapter 4.

A MODEL OF SITE PLACEMENT

The purpose of this chapter is to present a model to aid in the evaluation of site choice by prehistoric peoples. The choice of site placement and orientation of activities within a specific site is a product of several factors. Cultural adaptations, climate and the local environment, both biologic and geologic, all contribute to site location (Figure 1.1). Environmental constraints, such as availability of raw material types, can influence the types of technologies and tools humans create and use. Global climate change can cause concordant change in localized environments but also has been though to contribute to cultural shifts. Anthropogenic influence on localized environment has been demonstrated as one of the causations of climate change and global warming in the last century (Dincauze 2000:156).

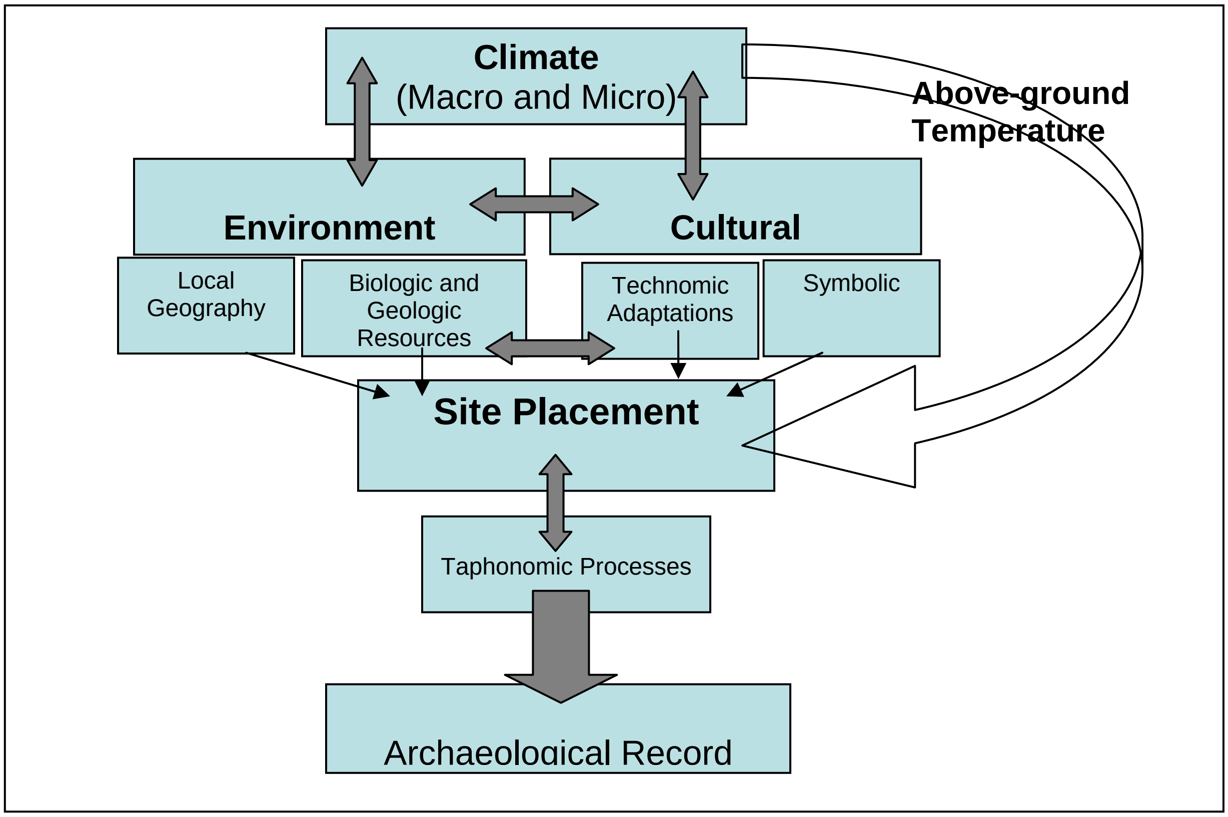

Figure 1.1. Site Placement Model. Inspired by the Landscape Taphonomy Model (Todd et al. 2004) that suggests physical, cultural and biological factors feedback upon each to produce the present landscape. In the above model similar feedback loops are present.

First, it is crucial to recognize the role taphonomy plays in the creation and distribution of the archaeological record. The *archaeological record* defined by Schiffer consists of discarded artifacts or "cultural materials that are no longer part of an ongoing society" (1987:3). These materials then become part of the natural environment and are subject to taphonomic agents. Binford add that the *archaeological record* exists in the present. Since the archaeological record is only what is tangible we can only apply our interpretations and make contemporary statements and observations (Binford 1983:19;

1987:393). A variety of geological and environmental factors, such as erosion, earthquakes, upheaval, glacial advances and retreats and flooding have affected the distribution of artifacts in both surficial and excavated archaeological sites (Butzer 1982; Schiffer 1987; Tveskov and Erlandson 2003; Yellen 1996).

The site placement model presented here has been greatly influenced by the study of *landscape taphonomy,* defined by Todd as "Landscape.. resulting from a complex, evolving, and integrated set of cultural, biological, climatological, chemical and geological processes." (Todd et al. 2004). Landscape taphonomy not only considers the natural environment as an agent of change but also socio-cultural and biological behaviors of humans and other animals (Burger 2002). Anthropogenic affects on the archaeological record, in the recent past, for the Upper Greybull study area have been minimal due to the lack of industrial development as is common in other areas of Wyoming (i.e. Powder River Basin). One goal of the Greybull River Sustainable Ecology program is to measure those biological, physical and cultural affects to the landscape in order to sustain and preserve cultural and natural resources (www.greybull.com).

Recognizing that the archaeological record is not static, but rather a changing and dynamic dataset, the tripartite definition of landscape (biological, cultural and physical) can also be applied to the explanation of site placement. The archaeological record that is present after undergoing the taphonomies described above, differs from that present during the prehistoric. In essence we are trying to interpret remnant settlement patterns. First defined by Dewar (1991:604), *remnant settlement patterns* are the product of subsequent occupations and the diachronic nature of the archaeological record. Figure 1.1 depicts the factors that influence the location of prehistoric sites across a given area. It is important to note that the environment available for analysis is not directly applicable to that which existed during the past.

Culture, seen by some as either as an extrasomatic means of adaptation not unique to humans (Binford 1972) or as a trait that sets humans apart from the rest of the animal kingdom (Deetz 1967), contributes to site choice. Two strategies are identified in the site placement model above; technomic and symbolic. Technomic, or technological adaptations are apparent throughout the archaeological record and provide humans with the ability to adapt to even the most inhospitable places. Kang (2002) identified technomic and symbolic strategies in the placement and orientation of prehistoric dwellings in the Southwest. He suggests that symbolic behaviors did contribute to the type and orientation of structures constructed by semi-sedentary prehistoric peoples, but that factors of macro and micro climate were the major influences in site placement. His research looked specifically at the thermal efficiency of dwellings by studying depth below ground surface, shape, and orientation (Kang 2002). Unfortunately the sites studied in this thesis do not contain visible structural features. The question of thermal efficiency of site locations and the adaptive strategies employed by prehistoric peoples can still be applied through the study of above-ground temperature. Culturally adaptive technomic behaviors, like construction of shelters and clothing, also contribute to survival and success of humans in certain environments (Binford 1989).

Symbolic and/or religious behaviors may also contribute to site choice. Vision quest locations or Ghost Dance houses were not necessarily chosen for their proximity to resources but instead, spiritual needs of prehistoric peoples, were a likely consideration (Francis and Loendorf 2002:6). Mount Shasta, located in northern California, is a good example of a sacred place that held and still holds spiritual meaning to many northern California tribes. The Karuk and Hupa tribes both recognize the mountain as a place of power and have trained their medicine people at sites above treeline for generations (Theoradoratus 1981:15). Without knowing the folklore of these tribes those sites may be interpreted as high altitude encampments, raw material procurement locales or given other non-religious meaning. The post-processual interpretations of the cognitive landscape have accounted for some site placement strategies in Wyoming as well (Francis and Loendorf 2002; Whitley 2001). Big Horn Medicine Wheel, located to the east in the Big Horn Mountains, is a culturally sacred Late Prehistoric site (Frison 1991). Using culture as the explanation for patterning in the archaeological record is at times dangerous since archaeologists are dependent upon contemporary ethnographic information (Binford 1987:398)

Human cognition and agency is an important part of site choice that is difficult to determine from the archaeological record (Tveskov and Erlandson 2003). Whitely has attempted to understand human decision making processes, by creating neural network models, to explain site choice elsewhere in the Greater Yellowstone Ecosystem (2001:3). His work posits, that although humans are not necessarily aware of it, their decisions are often subject to minor environmental influences. These subconscious effects can influence site choice (Whitley 2001). Above-ground temperature is a good example of a subtle influence. Prehistoric hunter-gatherers did not deliberately measure temperature in the places they wished to camp, however, it is possible that they experienced subconscious influences when conducting lithic reduction or building structures in specific places. No reliable way exists to gather information from the ancient hunter-gatherer mind, there is some validity in collecting above-ground temperature data and comparing it to known archaeological sites.

There is however, a mutual cultural/environmental causation of prehistoric site placement and settlement patterning that has been recognized (Binford 1980; Butzer 1982; Kang 2002; Kennet 2005). The location and availability of environmental resources contributes to settlement patterns and exploitation of certain locations. The migratory patterns of elk and deer in prehistoric times coupled with the availability of water will affect the range of activities and length of habitation by hunter-gatherers (Binford 1980). Resource availability will also predicate group size and thus determine size and function of specific sites (Binford 1980:9; Yellen 1977). Local topography, moisture availability and the rate of evapotranspiration in montane areas are controlled by topography. Lower humidity and prevailing wind patterns from the west and northwest also contribute to an increased rate of evapotranspiration (Hiemestra et al. 2002). Some archaeologists have assumed that high altitude locations were not occupied by prehistoric peoples during winter months due to snow pack, the lack of floral and faunal resources and extreme temperatures (Benedict 1991; Frison 1991.). However, localized wind patterns or windscapes may also impact evapotranspiriation and snow distribution by creating areas free from snow (Burke et al. 1989; Hiemstra et al. 2002). These locations provide clear ground for winter forage and allow for some herbivores to remain at high elevations during harsh winters and may have provided open areas for prehistoric winter encampments (see Chapter 4: Further Research).

Climatic influence on site placement, cultural behaviors and the local environment cannot be overlooked. Both macro and micro climatic factors also have bearing on human exploitation of certain locations. Extreme temperatures hinder the amount of activities that can take place. Temperature, wind chill and available sunlight not only affect humans physiologically, but also influence many of the natural resources upon which hunter-gatherers are dependent. Studies, such as those relating to the effective temperature (ET) and length of growing season (see Bailey 1960) provided Binford with a proxy measures for predicting and interpreting hunter-gatherer systems organization (1980:9).

Selecting one of these above criteria (cultural, environmental, or climate) does not provide a substantive argument for a single factor that forces human behavior. A suite of factors, both cultural and environmental, combine to produce what we identify in the archaeological record. These factors are not equally weighted. Certain factors play a larger role in influencing human behavior than others. Availability of resources will affect where and how long hunter-gatherers occupy a region (Bettinger 1991:68). In turn, the symbolic or religious significance of a specific locality to a group of people does not affect their physical survival on the landscape. It could be argued however that information regarding the local environment and culturally transferred information about the landscape is important to human survival (Kelly and Todd 1988). However, in order to parse out the factors that are more influential in the selection of sites on a given landscape, it is important to focus on specific criteria. For the purposes of this thesis, the above-ground thermal temperature per elevation, will be analyzed.

THE STUDY OF SITE PLACEMENT

"[A]rchaeology by nature is a multi-disciplinary subject and its study a highly eclectic affair." (Powers 1988:459)

Archaeology has been dependent on models of social dynamics borrowed not only from anthropology and history, but also on insights from geology, biology and geography (Binford 1972; Butzer 1982; Trigger 1999). The study of archaeology is inherently multi-disciplinary since the questions we seek to answer range from behavioral to environmental (Powers 1988). This study, like many others in archaeology, adapts, combines, and molds different perspectives to fit a specific research goal. Many archaeological research designs have considered why sites are located in certain locations on a landscape (Binford 1980; Kang 2002; Whitley 2001), but few frameworks presently used by archaeologists can be directly applied to the study of above-ground temperature and prehistoric hunter-gatherer behavior. This section will review the major concepts applied to the study of prehistoric site placement, as well as discuss models concerning temperature and topography used by other disciplines.

Models of site placement have been implemented by archaeologists interested in understanding hunter-gatherer behavior and diachronic change. Due to the preservation conditions most often encountered, the archaeological evidence of hunter-gatherer behavior exists primarily in the form of lithic material, faunal remains, and other non-perishable materials. The spatial distribution and context of these remnants of human activities are also affected by cultural and environmental (i.e., taphonomic) forces (Brain 1981; Butzer 1982; Lyman 1994; Schiffer 1987; Stiner 1994; Tveskov and Erlandson 2003). Despite these challenges, understanding the factors that condition how sites are distributed across a region can be useful for identifying the ecological factors that guided the choices made by ancient hunter-gathers in locating their activities.

The interest in landscape-scale site placement emerged in the 1950s following the work of Julian Steward on the cultural ecology of the Great Basin Paiute (1938). Gordon Willey's work in the Viru Valley of Peru is considered one of the first analyses of landscape and regional settlement patterns (1953). Willey and his colleagues identified a full hierarchy of site types across a single river valley, and related the diachronic and synchronic distribution of those sites to ecological and culture-historical factors. The work of Willey and others (e.g., Beardsley 1955; Taylor 1964; Chang 1958, 1968) marked the beginning of a shift from the interpretation of site specific locales to attempts to understand and describe the distribution of sites across a given region, the relationship of those patterns to ecological phenomena and relating those distributions to behavior. Most importantly they defined *settlement patterns* as the spatial distribution of cultural activities across the landscape in relation to the physiographic environment (Chang 1958:299; Vogt and Leventhal 1983). This definition of settlement pattern is the most applicable to the study of the site distribution in the Upper Greybull study area presented in this thesis. The synthesis of regional data was not new to archaeology but at this time there is a shift away from culture-historical interpretations to a focus on human behavior and ecology.

Following Willey's influential analysis, settlement archaeology became increasingly important to the understanding human behavior and site choice (Chang 1968). This process combined social, cultural, and economic factors to explain hierarchical relationships that are observed in spatial context (Vogt and Leventhal 1983). This was furthered by various studies devoted to the interpretation of spatial patterning of artifacts and region distribution of sites (Dewar 1991; Hodges 1987; Houtsma et al. 1996; Hurlbett 1977; Jochim 1976; Plog and Hill. 1971).

Ethnographic research and ethnoarchaeology attempt to explain settlement patterning and site distribution through observation of modern hunter-gatherer subsistence behaviors (Binford 1980; Kent 1984; Yellen 1977). The connection between resource distribution and/or abundance and site choice, described by Taylor (1964) as "tethered nomadism", was further studied by others (Binford 1980; Yellen 1977). Both intersite and intrasite spatial analyses of modern human behavior and activity areas have been studied and those findings have contributed to deciphering the archaeological record (Binford 1980; Kent 1984). Repeated use of specific locations on the landscape leads to multi-component assemblages. Spatio-temporal definitions of site occupation and site boundaries become blurred. Duration of occupation varies and often cannot be parsed out from a surficial artifact scatter. Similar research problems exist in the Greybull study area, where many surficial sites exhibit repeated occupations from early Archaic through the Late Prehistoric assemblages. With these types of lithic scatters it is difficult and at times dangerous to assume a site type.

Site distribution and artifact assemblages will vary according to an established hierarchy of activities (Binford 1980). A *settlement system* is the spatio-temporal distribution of subsistence activities across a given landscape. The number of times a specific locale is used and revisited is dependent upon the settlement system as a whole. The makeup of a settlement system differs depending on ecological variables and the foraging or collection strategy employed by a specific group. In those areas with the lowest effective temperature, environments were les creating a greater dependence on storage techniques. Equatorial locations, with high effective temperatures were also resource rich, requiring little storage technology (Binford 1980:5-18). Off-site archaeology became popular during this time and still influences survey methodology and landscape-scale interpretations of prehistoric behavior (Foley 1981).

From ethnographic accounts hunter-gatherers chose their occupation sites for various reasons including proximity of economic resources, availability of shelter, protection from the elements, observation of game or strangers (Jochim 1976), as well as religious or symbolic meaning (Gamble 1999). According to Trigger (1968), observed settlement patterns can be accounted for in two ways. The first is by understanding the interaction between the environment and human technology (Figure 1.1). Secondly, settlement patterns can also be deciphered through analysis of the social, political, and religious behaviors of a specific cultural group. While the latter certainly existed and played a role in the lives of prehistoric peoples, it is difficult to translate an *in-situ* surface record of chipped stone, as is presented in this study, using this method. The influence of cultural factors in determining settlement pattern is more applicable to the proto-historic time period, for which ethnographic or written records exist (Kent 1984).

Jochim (1976) suggests that time and energy for resource exploitation is the main factor in site placement. He does distinguish between choice. Hunter-gatherer site choice is tied to either that of opportunistic exploitation or long range planning. In both cases he stresses that minimum effort forces the economic behavior of hunter-gatherers. The cost-benefit model graphs the amount of calories expended to exploit a specific resource against the amount of calories gained (Hardesty 1983; Kennett 2005; Whitely 2001).

Cost-benefit analysis is more applicable to areas with known prehistoric resource locations and evidence of subsistence behaviors (Kennett 2005). Application of the cost-benefit model has worked well for prehistoric sites in the Midwest river valleys and upland zones of the United States (Brontsky 1983; Dennel 1987; Ebert 2000). It is difficult to apply this model, aside from distance to water analysis, to the Upper Greybull archaeological data. No excavations have taken place in the study area; therefore there is no temporal control or site seasonality determined. No animal bone or plant remains were recovered providing little information as to the specific resources exploited by prehistoric peoples in the study area.

Most recently the study of human behavioral ecology has gained favor with archaeologists concerned with behavioral evolution and the influence of the environment on human behavior. The theoretical perspective has been met with some reservations as to applicability of foraging models to specific environments (Kennett 2005). While others have argued human behavioral ecology's Darwinian approach is too environmentally deterministic and the direction and goals of the discipline are not clear (Bamforth 2002; Kennett 2005; Schiffer 1996). The central place foraging model is at the center of many human behavioral ecological research designs. The central place foraging model, first implemented in the biological sciences (Kennett 2005), has developed from behavioral ecology principals and has been applied to various prehistoric hunter-gatherer situations, ranging from maritime to high altitude environments (Bettinger et al. 1997; Bird 1997; Kennett 2005; Nagaoka 2002). Central place foraging is a locational model that posits that foragers will occupy a location that will maximize a resource relative to transportation costs (Aldenderfer 1998; Vogt and Leventhal 1983). Most applicable to this study is the correlation between high altitude archaeological site distribution and foraging strategies. Aldenderfer attempted to apply central place foraging to his study of high altitude archaic sites in the Andean highlands. He points out that most archaeological research has occurred at low altitude locations and the lack of data for sites above 2500 m in elevation poses a problem for those wanting to apply and compare central place foraging and high altitude land use (Aldederfer 1998). Living at higher altitude also requires an increase in caloric intake. The subsistence needs of hunter-gatherers at altitude may not be comparable to groups living at lower elevations (Grover 1974; Ward 1989). Central place foraging also posits that resources will be evenly distributed across a landscape. Montane environments usually exhibit a heterogeneous distribution of resources. Central place foraging was also applied by Madsen et al. (2000) in their study of alpine/sub alpine site placement in the Unita Mountains in northeast Utah.

In Wyoming, Bender and Wright have applied a logistical collection model to montane locales in an attempt to better understand prehistoric resource extraction (1988). The concept was first applied to Jackson Hole, Wyoming, approximately 90 miles southwest of the Upper Greybull study area. They define the model as an "ecological and adaptive system which involves lower elevations" (Bender and Wright 1988:613). The study of high altitude occupations of mountainous environments, especially in the Rocky Mountains or other North American mountain ranges, requires understanding hunter-gatherer exploitation of lowland areas as well (Bender and Wright 1988; Benedict 1991; Frison 1991). The mountains were but one of many ecotones employed by prehistoric peoples on an annual basis. The high country model suggests that prehistoric peoples had an understanding of mountain environments, especially the seasonality of many floral and faunal resources. Terrain, slope, soil, climatic variability, vegetation, resource distribution, and decreased growing season all affected prehistoric groups leading to the creation of different adaptive strategies. The use of local base camps and the exploitation of specific regions per elevation zone are the two strategies discussed by Bender and Wright (1998). Site choice in the high country is controlled by ground cover, local vegetation, and location to a resource that requires the least effort for extraction. Activity loci or satellite camps: that are smaller task specific locations with shorter duration of occupation. The seasonal satellite camps are not used for long periods and their placement is dependent on resource availability in specific elevation zones during the season. This model may be overly simplistic, but it has provided archaeologists in northwest Wyoming a starting point to assess to the subsistence behaviors of montane hunter-gatherers.

Temperature and Site Choice

Temperature has arguably been considered the most crucial variable of montane, high altitude climates (Barry 1992; Barry and Ives 1974). Temperature is considered an influential factor in the rate of evapotranspiration, carbon fixation, photosynthesis and decomposition in montane regions (Bolstad et al. 1998; Ferreya et al. 2001). Lookingbill and Urban suggest that, "It is at the landscape scale that our current climate models are particularly insufficient" (2003:148). Application of these climate models to interpret prehistoric human behavior and the observed distribution of artifacts poses a problem for the archaeologist.

Also of importance are how major temperature shifts in the past effected flora and faunal proliferation or extinction (Guthrie 1984; Shuman et al. 2002). The collapse of the Laurentide Ice Sheet in North American between 8400-7900 cal yr. BP produced a shift in not only climate regimes but also vegetational zones. There is a demonstrated correlation between pollen data and lake level change showing that vegetation responded not only to moisture fluctuations but also temperature change during the early Holocene (Shuman et al. 2002). Paleoclimatic data analyses have demonstrated the temperature regulated vegetation change, but few archaeological studies have dealt with temperature as a factor in site placement. Those that do look at temperature usually focus on regional climate and resource availability (Aldendefer 1998; Bender and Wright 1988; Benedict 1991) or effective temperature and foraging strategies (Bailey 1960; Binford 1980). Temperature information is rarely gathered by the archaeologist but instead applied to a study area from coarse landscape or regional ecological models often derived from available National Oceanic and Atmospheric Administration (NOAA) data (Lookingbill and Urban 2003). Archaeological studies usually present a mean annual temperature for a large region and extrapolate the role of temperature on resource availability and exploitation of various ecotones by hunter-gatherers (Binford 2001)

Borrowing climatic models without recognizing the discrepancies acknowledged by that discipline can undermine the archaeological comparison. For example, climatologists and ecologists have often used elevation as an explanation for landscape level floral and faunal distributions without testing such assumptions (Christensen et al. 2000; Lookingbill and Urban 2003). These assumptions are then applied to landscape level management of natural resources. Archaeologists should be cautious in the application of these data to archaeological site placement models. Recognizing the possible problems with applying data of various scales to a local archaeological record, this study seeks to determine, if any, the influence of temperature and elevation on prehistoric site choice through the comparison of accepted temperature gradients and actual data collected.

Temperature and High Altitude

At the macro-scale, with increased elevation the ambient temperature decreases (Aldenderfer 1998; Little and Hanna 1978). Baker first presented a temperature gradient formula that has been adopted and built upon by many (Baker 1944; Hanna and Yang 2001;

Lookingbill and Urban 2003). Little and Hanna (1978) present three major thermal factors that can usually be shown to operate just above-ground at high altitude. First, the variation in seasonal temperature is less at altitudes higher than 2500 m than at sea level. Second, diurnal variation in temperature is maximized and third, as previously stated, temperature decreases with increased elevation. These factors aside, it is thought that mid-slope locations are warmer due to inversions in valleys and peaks. At night cold air sinks to valley bottoms.

The effects of temperature on the human body have been studied by various disciplines. Although the study area considered here is not considered extreme high altitude, it is important to discuss the limitations of the human body. The physiological responses of the body are many and the amount of effect varies (Monge and Leon-Valarde 1991; Moore et al. 1998). Solar radiation increases with elevation as the air becomes thinner and fewer solar rays are blocked. The transfer of oxygen through the circulatory system also decreases at high altitude. Some studies suggest that at 4500 m only 70% of the aerobic capacity exists than at sea level. With these physiological responses, habitation is more confined by temperature than at lower elevations (Grover 1974). Physiological human adaptation to living at high altitude year round, such as in the Himalayas and the Andes, has been documented (Monge and Leon-Velarde 1991; Torroni et al. 1994). Some adaptations such as increased lung capacity have been demonstrated by peoples living year round at high altitude in the Andes (Hochachka et al. 1999; Winter 1983). Since the high altitude sites in the study area were likely only seasonally occupied, discussing the ideas of genetic adaptation to altitude is beyond the scope of this paper.

Most studies of temperature and humans have dealt with the extreme environments that people inhabit. The Andes, Himalayas, Arctic and desert environments have been of particular interest (Aldenderfer 1998; Winter 1983). High altitude agriculture in the Andes suggests that early agriculturalists culturally adapted to their environment by domesticating high altitude plants and animals (Winter 1983). Humans “react to cold more effectively by behavioral rather than by physiological means” (Ward et al. 1989:461). This statement justifies the study of above-ground temperature and human behavior, in this case site placement.

More recent and reliable studies differ in their interpretation of the function of temperature in montane environments. Two major studies have provided two separate lapse rates. Rolland (2003) compiled data from 100 different temperature studies and existing stations in the Italian Alps. The temperature lapse for this study was -0.65 per 100 m (Rolland 2003:1033). Temperature studies in the Columbia River valley suggest a lapse rate of -0.39 degrees Celsius per 100 meters in elevation (Dodson and Marks 1997). However, neither study provides a perfect comparison to Northwest Wyoming. The Mediterranean climate of the Italian countryside does not produce the variability nor does it include high altitude locales. The Columbia River valley study also differs from the Wyoming study area in that the Colombia River creates its own climate in some places. The Greybull study area does not contain a river with the same characteristics. Dodson and Marks (1997) included more than nine years of data. Most of the data sets were from stations located and maintained in inhabited areas. Those areas that do not have modern human populations were not studied (Rolland 2003).

Alpine surface temperature models are often borrowed from the environmental sciences by archaeologists to describe conditions. Models of temperature lapse rates per elevation developed by atmospheric scientists have been implemented in this thesis to provide a comparison for the data presented. Environmental studies in montane regions have demonstrated a correlation between above-ground temperature and vegetation communities, as well as temperature and growing season. Variability increases in mountain climates with increased elevation. These variations are often a product of slope and aspect (Rolland 2003).

Analysis of above-ground temperature, independent of precipitation, on the Patagonian Steppe demonstrated above-ground temperature change as the primary factor in the length of growing season (Jobbagy et al. 2002). The same study also found that existing floral communities influenced temperature change along regional gradients (2002:316).

THE STUDY AREA

The Greybull River Sustainable Landscape Ecology (GRSLE) project area encompasses two major watersheds of which the Upper Greybull is a part. Beginning in 2001 to present, the GRSLE survey project, under the direction of Colorado State University Professor Lawrence C. Todd, was established to record and analyze cultural resources of the Upper Greybull drainage within the Greater Yellowstone Ecosystem in Park County, Wyoming. Colorado State Archaeology field schools have been held in the watershed along the Greybull and Wood Rivers and students have aided in the collection and analysis of various data and projects including, archaeology, botany and dendrochronology. A series of research projects and MA theses have been produced out of this new archaeological data (www.greybull.org). The work of Paul Burnett, who has developed a cultural chronology for the Upper Greybull River drainage, is most applicable to the research presented in this thesis (Burnett 2005). The cultural chronology provided by Burnett is discussed further in his work and will only be addressed here to describe prehistoric time periods of occupation within the study area.

The Greater Yellowstone Ecosystem

The Greater Yellowstone Ecosystem (GYE) encompasses roughly 18 million acres of northwest Wyoming, southwest Montana and eastern Idaho, and contains both Yellowstone and Grand Teton National Parks, nine national forests and eight major mountain ranges (Hansen et. al 2000; Whitley 2001; Greater Yellowstone Organization 2003). Large predators that once roamed much of the Western United States are still present in the ecosystem, including grizzly bear (*Ursus arctos*) and gray wolves (*Canis lupus)*. The extent and range of grizzly have been considered a good indicator of the GYE boundaries. Due to Euro-American decimation of the wolf population in the late 19th and early 20th centuries, the gray wolf was reintroduced within Yellowstone National Park between 1995-96 (Smith et al. 2005). Various wolf packs have expanded outside the park boundaries into the larger GYE. Two different packs have been documented within the study area (Smith et al. 2005). One pack was observed by Colorado State students during the 2001 field season. Like the wolves, the range of grizzly has also grown outside of Yellowstone, and has continued south along the Absaroka Mountains. The GYE has been increasing in size during the past few decades but human encroachment and land development along the wilderness/urban interface currently hinders the exponential growth of the habitat (Smith et al. 2005).

The GYE has been defined by Patten as a "pristine ecosystem" (1991:22) since much of the ecosystem is within roadless wilderness areas or National Park boundaries the effects of contemporary humans on the environment are minimized. Most of the ecosystem is still "wild" with little development in the mountain areas or watersheds, although much of the lowland plains surrounding the GYE have become an agricultural and ranching landscape (Parameter et al. 2003). The lack of development and minimal present day human use of the Upper Greybull watershed makes the study area a mostly unspoiled archaeological area and provides nearly limitless possibilities for research.

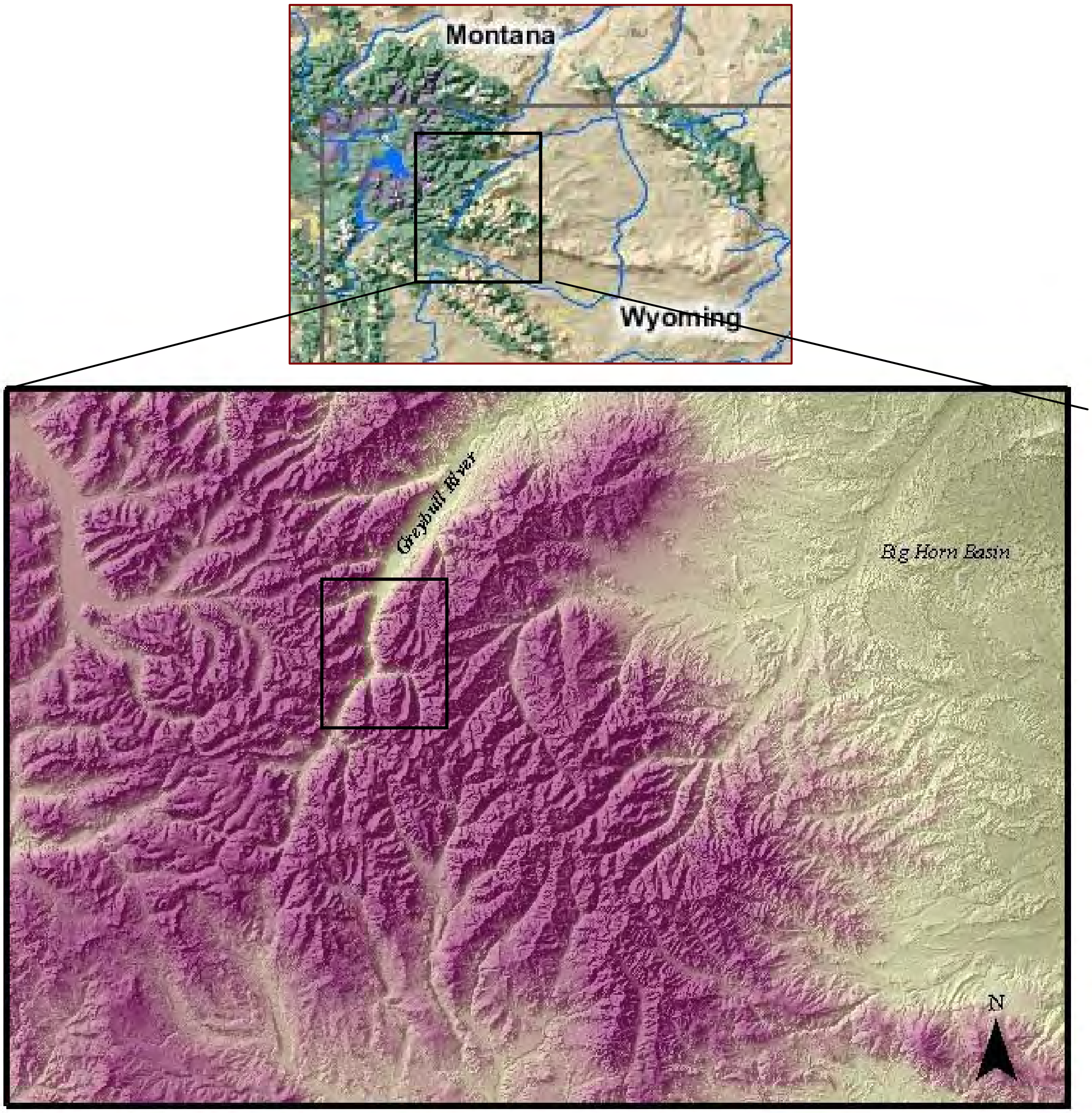

Figure 1.2. General location of the study area (within black boundary) and the surrounding region in Northwest Wyoming. Map created from 1:100,000 DEM.

The Upper Greybull Watershed

The project area analyzed in this thesis sits within the Upper Greybull watershed. The area is part of the north-south trending Absaroka Mountain range, that measure roughly 100 km in length by 50 km wide (Figure 1.2). The terrain produced by the Absarokas is steep and broken with incised river beds, ridges and hill slopes. This area of northwest

Wyoming is geologically complex. The region is volcanic in origin and is part of the larger Yellowstone Plateau (Husted and Edgar 2002). Three separate super-volcanic eruptions of the Yellowstone Caldera between two million and 600,000 years before present dramatically reshaped the region and formed the present day Yellowstone Plateau (Gansecki et al. 1998; Meyer 2005). Much of the geology of northwest Wyoming consists of basalt and rhyolite flows, all quaternary in age. Within the Upper Greybull watershed specifically, Eocene volcanic events and subsequent glaciations affected topography and deposition. Glacially carved canyons and drainages are visible and relate to various Pleistocene glaciations (Chadwick et al. 1997; Meyer 2005).

Bedrock geologic data from the study area has identified three major formations of the Thorofare group, part of the larger Absaroka Volcanic Supergroup. These strata consist of mostly andesite, breccias and volcaniclastic bodies. The dominant stratum is the Ecoene aged Wiggins Formation (44-47 million years ago (ma)) (Love and Christiansen 1985). Some eroded exposures of the older Aycross Formation (49 ma) are also present. Intrusive igneous rocks that consist of felsic and mafic bodies are interspersed throughout the formations. A few remnant glacial deposits exist at the highest elevations (Chadwick et al. 1997). Quaternary landslide events have created various deposits along the Greybull River. Pleistocene sediment deposits are also found. Minimal sedimentary deposition has occurred, aside from major colluvial and alluvial slopewash events. At least two dramatic mass wasting events can be observed north and south of the project area along the Greybull River (Knight 1994; Love and Christiansen 1985). It is unclear to when these events took place , but the occurrence of archaeological sites decreases across these areas when compared with the rest of the study area (Burnett 2005).

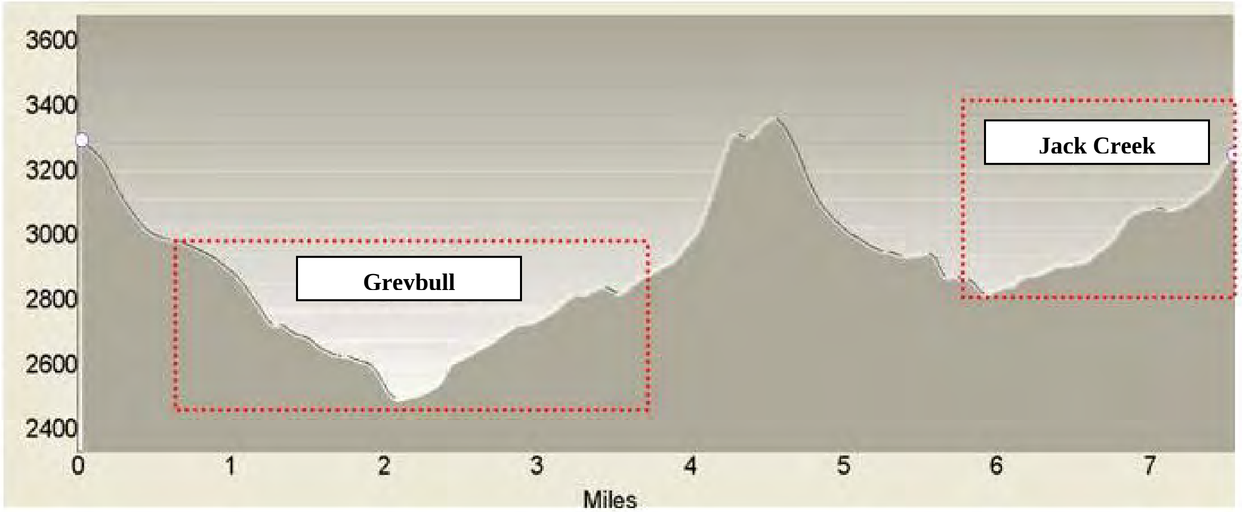

Figure 1. 3. Profile of both the Greybull and Jack Creek study sites demonstrating topographic relief, looking north. Elevation provided in meters.

Greybull and Jack Creek Study Sites

For this thesis the study area is comprised of two adjacent drainages, the Greybull River drainage and the Jack Creek drainage (Figure 1.3). Both are part of the Upper Greybull watershed that drains north and east to the Big Horn Basin. The two sites were chosen because of topographic and archaeological similarities. The Greybull study site is within a wide U-shaped drainage that contains the Greybull River. The river lies at roughly 2500 m with elevation nearing 3300 m at ridge line. The topographic relief of the area is approximately 700 m. Archaeological evidence of diagnostic projectile points and lithic debitage suggests that this portion of the drainage has been continuously used by prehistoric peoples from the Early Archaic through the Late Prehistoric (Burnett 2005). An *in-situ* surface record of prehistoric occupation containing lithic material and diagnostic artifacts, spans the length of the flats east of the river.

The Jack Creek study area lies within the Jack Creek drainage system and is higher in elevation beginning at 2700 m and continuing to the ridgeline at 3800 m (Figure1.3). Jack

Creek, a year-round water source, is within 1 km of most recorded sites. The slopes are more densely forested than the Greybull study area, but still exhibit small ribbon and island spruce/fir communities. Recruitment of *Pinus albies* was also noted across the drainage during the 2003 field season although many of saplings exhibited water stress (Derr et al. 2004). Jack Creek also contains seasonal ponds and wetland/hummock locations (Figure 1.4b) differing from the dry slopes of the Greybull study area. The modern climate and biota as well as the paleoclimate are similar for both study areas. Both are described below.

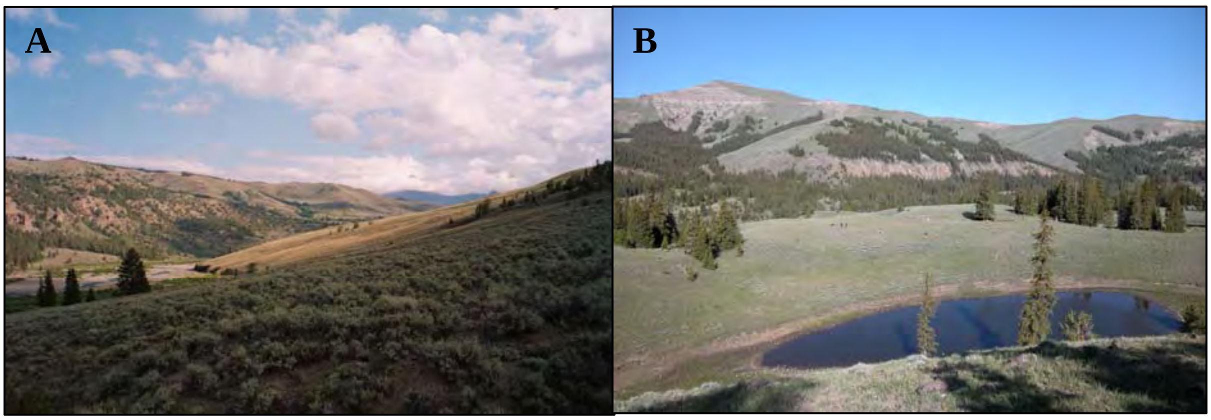

Figure 1. 4. Depiction of environment of the Greybull (A) looking north, and Jack Creek (B), looking west. Note the difference in sagebrush cover. Photos taken by L. Todd.

Modern Climate and Biota

The overall climate of Wyoming is often described as cool and dry with lower than average humidity and temperatures compared to the rest of the contiguous United States (Knight 1994). Average relative humidity for the Central Absarokas is between 50-54%. In general, relative humidity usually decreases with increased elevation. Aside from the Green River Basin with a mean relative humidity of 40-45%, the Absarokas and Yellowstone Plateau have the lowest humidity in the state (Curtis and Grimes 2004: Figure 9.1).

Northwest Wyoming is affected by two distinct weather patterns, the Pacific Oscillation and southwest monsoonal moisture. The 7-10 year periodicity of the Pacific Oscillation affects climate in the western GYE, while Atlantic climatic oscillations impact the eastern portion (Whitlock et al. 1995). Annual precipitation ranges from 20 cm at the western edge of the Big Horn Basin to approximately 130 cm in the Absarokas (Curtis and Grimes 2004). The majority of annual precipitation in the region arrives in the form of snow during the winter and early spring (Whitlock et al. 1995). The average temperature for the entire state of Wyoming is 7.5 °C. July is typically the warmest month statewide with most of the maximum, record setting temperatures, occurring then. While temperatures can exceed 37 °C in the major Basins (Big Horn and Powder River) mean annual temperatures in the study area are between 1.6 and 4.4 °C (Curtis and Grimes 2004). Minimum temperatures can range between -1.1 and 4.4 °C. Temperature lapses in the mountains have been estimated at 9.8 ° C per 1000 m (Knight 1994:30). In the last 120 years, a minimum of 1,000 weather stations have provided climatological data for Wyoming. Unfortunately, very few of these stations have recorded data for more than 10 years at a time or have been moved, thus affecting the validity of the information collected. Climatologists have experienced difficulties in comparing data from various weather stations. Curtis and Grimes (2004: preface) recognize that the application of averages taken from the four major weather stations at Wyoming airports may be troublesome since the stations are near major cities and "heat-islands" or areas with heat reflecting materials such as pavement.

Wyoming's semi-arid environment is a product of high evapotranspiration and low soil moisture (Knight 1994). Drought hardy species including sagebrush, short grasses and greasewood are able to sustain and flourish. These climate factors place the Central Absarokas, along the barrier of two eco-regions; the Northern Rocky Mountain steppe and the Intermountain Semi-Desert province (Curtis and Grimes 2004; Knight 1994). Mosaic distribution of vegetation communities in the Upper Greybull include riparian areas (along the Greybull River), foothill meadows, and sub-alpine environments. Alpine and tundra-like environments are found to the south in the highest elevation of the Wood River Drainage (Rietze 2004). As in many montane areas, distribution of floral species are controlled by elevation, annual precipitation, soil moisture availability and geologic substrate (Knight 1994). The foothills and mountain meadows exhibit more mesic conditions while the open windswept sub-alpine and alpine zones are more xeric. Within the study area, mixed conifer forests cover most of the eastern aspects. Open park-like meadows containing Big and silver sagebrush (*Artemisia tridentata* and *A. cana*) and various grasses are broken by spruce-fir islands and ribbon forests on the western aspects. Canopy cover is moderately closed in the mid-elevation forests with smaller krumholtz islands and solitary trees at the highest elevations. Whitebark pine (*Pinus albicaulis*) grows solitary or in small ribbon-like formations in both drainages. Many of the pine stands exhibit fire survival, likely from low intensity grass fires. Some deciduous species, mostly quaking aspen (*Populus tremuloides*) and willow (*Salix sp.*), are located in disturbed soils near the river or springs.

Ground cover varies between the Jack Creek and Greybull study sites. Both drainages have been grazed historically by cattle and other livestock. The Jack Creek drainage exhibits more modern livestock influences with shorter grasses and less sagebrush (Figure 1.4b). The eastern slope of the Greybull drainage contains moderate sagebrush distribution and does not exhibit heavy grazing (Figure 1.4a).

Alpine meadows in the Greater Yellowstone Ecosystem provide a variety of edible resources and textile materials including blue camas (Whitley 2001). Evidence of hunter-gatherer exploitation of floral resources has been documented in the surrounding region (Husted and Edgar 2002; Larson et al. 1995; Bender and Wright 1988). Several species of wildflowers including slender blue penstemon (*Penstemon procerus*), prairie smoke (*Genum* *triflorum*) and silvery lupine (*Lupinus argenteus*) are present (Kershaw et al. 1998). While both drainages exhibit similar vegetation, topography appears to play a role in floral distribution. *A. tridentata* distribution has been shown to be topographically controlled in the mountainous environments of Wyoming (Burke et al. 1989; Knight 1994).

Varieties of fauna inhabit the area and were observed during summer/fall seasonal fieldwork. These include large ungulates such as elk (*Cervus elaphus*), pronghorn (*Antiliocarpa americana*) and moose (*Alces alces shirasi*). Smaller mammals such as beaver (*Castor canadensis*) and muskrat (*Ondatra zibethcus*) were observed in riparian zones. Evidence of predators including grizzly (*Urus arctos horribilis*), black bear (*Ursus americanus*), gray wolves (*Canis lupus*), coyote (*Canis latrans*) and bobcat (*Lynx rufus*) were also present.

Paleoclimate

Paleoclimatic reconstructions for North American in the last 15,000 years demonstrate major climatic oscillations about every 1500 years (Viau et al. 2002). The last major glaciations in the region was the Pinedale at roughly 23,000 – 15,000 BP (Chadwick et al. 1997). Unlike the climate of the twentieth and early twenty first centuries, seasonality during the early Holocene was less pronounced (Whitlock 1993). Temperatures were slightly cooler, but the long, cold winters and hot dry summers typical of historic times were likely not experienced by Paleoindian peoples. In turn, floral communities were less constrained by elevation zones as they are today, but instead exhibited mosaic patterns (Whitlock et al. 1995). Floral species in northwest Wyoming during the early Holocene differed from the foothill/mountain meadow communities that are present today. A transition from sagebrush steppe communities to increased closed canopy sub-alpine communities is apparent in the

Loon Lake pollen data from within the GYE (Whitlock et al. 1995). Determining the difference in temperature between the past and the present has allowed researchers to explain floral and faunal shifts. During the late Pleistocene, temperature change did indeed play a role in environmental change. The climate during this period changed from a cool-dry pattern (14,000-12,000 BP) to temperate with relatively mild temperatures and less seasonality (12,500 -10,000 BP) (Whitlock and Bartlein 1993).

Since no strong Paleoindian cultural component has yet to be identified within the study area (Burnett 2005), the climate that most concerns this study is that during the Archaic through Late Prehistoric. Also, it is more difficult to apply thermal landscapes to the early Holocene climate because of differences in seasonality and vegetation communities identified in the fossil pollen record (Whitlock 1991). Pollen analysis from the stratified Mummy Cave site and Loon Lake have provided most of the information for paleoenvironmental reconstruction for the region (Husted and Edgar 2002; Whitlock et al. 1995). During the Late Glacial the Yellowstone plateau can be described as a tundra environment dominated by sagebrush and forbs (Baker 1983; Viau et al. 2002). Engelmann spruce (*Picea engelmannii*), a species still present today in island communties, were spread across the landscape (Baker 1983; Whitlock and Bartlien 1993). The palynological record from 11,000 to 7,000 BP for the Yellowstone Plateau represents a change from an alpine to sub alpine environment (Husted and Edgar 2002; Whitlock 1993). At the Pleistocene/Holocene transition, cooler temperatures and more demarcated seasons created zonal, temperature controlled plant communities. Floral communities that survived the transition were those more relegated by elevation and temperature than previously instead of the previous heterogeneous overlapping communities (Guthrie 1984; Millspaugh et al. 2000). *Picea engelmanni* and various *Pinus* species began to replace the tundra environment. Between 8,000-4,000 BP lodge pole pine (*Pinus contorta)* emerges as the dominant tree species in the Yellowstone Region. During the past 7,000 years, the vegetation communities present in the GYE have changed little with some evidence of upward vertical movement of communities and tree line. Mixed spruce-fir (*P. engelmannii* and *Abies sp).* stands that are present today in the study area are observable in the pollen record for the past 4,000 years (Baker 1983; Whitlock et al. 1995).

Advance and retreat of tree line has been extrapolated for the region by R.G. Baker (1983) who suggests that tree line may have been up to 1200 m lower than present in the Rockies during the late-glacial period. For the Yellowstone Plateau, 900 m to 500 m below present tree line is now thought to be a better estimate (Whitlock and Bartlein 1993). Tree line and tree species diversity fluctuated with climate change throughout the past 7,000 to 8,000 years. As will be discussed in Chapter 4, more samples and studies need to be conducted in the study area to understand the question of tree line fluctuation.

Archaeological Research

The GRSLE research has identified over 50 new archaeological sites across both the Greybull and Jack Creek drainages. This data has contributed to the relatively sparse prehistoric chronology for the Central Absarokas. During the 2001-2004 field seasons, controlled pedestrian surveys of the project area were undertaken. Areas that were likely to yield archaeological sites were first targeted (i e., along river banks or flats) with successive surveys conducted between known site locations. Comprehensive in-field documentation of the lithic scatters was also implemented. Each artifact was thoroughly described, measured and piece plotted. Location information was obtained either through hand-held GPS units or sub-centimeter GPS units (EDM total station and the Sokkia Locus). Within the Greybull and Jack Creek drainages, diagnostic prehistoric projectile points provided relative dates for use of the watersheds ranging from hints of Paleoindian occupation to more substantial Archaic through Late Prehistoric use.

Frison's (1991) synopsis of cultural time periods is the most comprehensive presentation of prehistoric hunter-gatherer occupation of the High Plains environment. The Absarokas are considered to be on the western edge of the High Plains and the use of montane environments by Plains hunter-gatherers has been established (Frison 1991). The following dates were also defined by Burnett (2005) who compiled a prehistoric chronology for the Upper Greybull watershed through the identification of temporally diagnostic artifacts.

Cultural Period	Radiocarbon Years Before Present
Paleoindian	11,500 – 8,000 RCYBP
Early Archaic	8,000 – 5,000 RCYBP
Middle Archaic / McKean	5,000 – 3,000 RCYBP
Late Archaic	3,000 – 1,500 RCYBP
Late Prehistoric	1,500 – 200 RCYBP
Historic	200 – Present

Table 1.1. Cultural time periods defined by Frison (1991) and adapted by Burnett (2005).

Archaeological research in northwest Wyoming has focused mainly in the Big Horn Basin, the eastern side of the Big Horn Mountains and within Yellowstone National Park (Frison 1962, 1973, 1991; Husted and Edgar 2002; Janetski 2002; Larson et al. 1995; Shortt 2001; Whitley 2000). The Greybull watershed area in particular has not received the same attention by archaeologists as have the Big Horn Mountains. One contributing factor is that much of the Big Horn are easily accessible from improved roads while most of the Upper Greybull Ecosystem, examined by Colorado State, is within the Washakie Wilderness area and other National Forests. Access to the Greybull study area is only by foot or on horseback, increasing the time and cost of archaeological survey and making excavation difficult. Access to the Jack Creek study area is easier as there are established roads in the area. Wyoming archaeology has produced some excellent stratified chronologies. The Big Horns have produced a high number of intact stratified cave sites such as the Bentzen-Kaufmann Cave site (Grey 1962), Carter Cave (Frison 1991), Shiffer Cave (Frison 1973) Wedding of the Waters Cave (Frison 1962), and rock shelters like Medicine Lodge Creek and Southsider Cave (Frison 1991). The possibility for such sites in the Absarokas, aside from extensive excavations at Mummy Cave, has been little explored. These cave and open air sites have contributed important environmental, behavioral and cultural data to montane and High Plains studies.

Prehistoric sites located by Colorado State University in the Upper Greybull watershed are predominately large lithic debitage scatters (Figure 1.5). Most contain diagnostic projectile points from various temporal periods representing successive revisits to sites. Two prehistoric hearths, at sites 48PA523 and 48PA2772, were identified in the Jack Creek watershed. No radiocarbon dating has taken place, but both thermal features were found in association with Late Prehistoric projectile points and may date the site to that time period.

Evidence of Paleoindian utilization of the Upper Greybull watershed is minimal (Bechburger et al. 2005, Burnett 2005). Only two projectile points that likely date to the Late Paleoindian period have been recorded within the Greybull and Jack Creek study areas (Burnett 2005:32). Five other diagnostic Paleoindian points have been recorded in the Upper Greybull watershed (Bechburger et al. 2005). Paleoindian evidence in the Absarokas is sparse in general. Mummy Cave and the Helen Lookingbill site, both located in the Absarokas, contain Paleoindian components. Faunal and floral remains at Mummy Cave suggest that Paleoindian hunter-gatherers were exploiting both montane and open plain environments, with mountain sheep represented throughout the stratified deposit (Husted and Edgar 2002). Frison suggests this evidence of subsistence in the montane and inter-montane areas defines two “mutually exclusive subsistence strategies” (1991:67); one of bison hunting and processing, like that represented at the Horner site in the Bighorn Basin, and the other of a “hunting and gathering subsistence in the foothill and mountain slope area”(Frison 1991:67).

This gathering subsistence strategy is also apparent at the Helen Lookingbill site, where a terminal Paleoindian occupation has been documented (Frison 1991; Larson et al. 1995). Faunal remains found at the site consists of smaller mammals as well as mountain sheep and bison (Kornfeld et al. 2001).

The Colby site, located in the southeastern Big Horn Basin, is thought to be a Clovis-aged mammoth kill site. Some discrepancies with the radiocarbon dates places the site between 11,200 and 8,719 RCYBP (Frision and Todd 1986:22-23). At the Horner site, a bison kill site also located in the Big Horn Basin, Cody Complex tools and points demonstrate Late Paleoindian occupation and use of bison during this time (Frison and Todd 1987). Points and tools, diagnostic of the Paleoindian Cody Complex, have also been identified at the stratified Osprey Beach site on the Yellowstone Plateau (Shortt 2001). The site exhibits a assembladge similar to that of Horner (Shortt 2001L234). Blood residue analysis of one of the Cody knives from the assemblage was positive for rabbit and big horn sheep but not bison (Shortt 1991:238). The faunal evidence is in keeping with other faunal remains from Mummy Cave and Helen Lookingbill but does not fit the Plains vs. Foothill-Mountain Paleoindian subsistence strategies suggested by Frison and others (Frison 1991; Husted 1969).

Faunal remains have not been found in associated with Paleoindian components in the Upper Greybull watershed. The Paleoindian points that have been identified to date are similar to those at other sites in the region (Burnett 2005, Bechburger et al. 2005; Shortt 2001). With the conflicting subsistence strategy evidence from Osprey Beach and ephemeral presence of Paleoindian occupation of the Upper Greybull, further research in the watershed may contribute more information our understanding of Paleoindian subsistence strategies in northwest Wyoming.

The Archaic and Late Prehistoric components of High Plains hunter-gatherer use of the area are more substantial (Frison 1991:80). Mummy Cave, located outside of the eastern entrance of Yellowstone Park, contains a complete stratified cultural sequence ranging from the Paleoindian through the Late Prehistoric. Faunal remains recovered at the site are indicative of the species that are currently present in the GRSLE study area (Husted and Edgar 2002). The Archaic component in the deposit is especially well represented (Husted and Edgar 2002). The pollen sequences from Mummy Cave and at the open-air Helen Lookingbill site, provide data for a regional paleoclimatic reconstruction (Kornfeld et al. 2001; Larson e. al. 1995). Both Mummy Cave and Helen Lookingbill contain synchronous, well radiocardbon dated Early Archaic deposits. Helen Lookingbill, located south of the Greybull study area, is one of the few stratified open air sites in the GYE that displays evidence of occupation from during Paleoindian through Late Prehistoric periods. Located at 2620 m the site is considered high altitude. A 10,500 year occupation sequence has been established (Frison 1987; Kornfeld et al. 2001). Pollen studies have produced valuable information on the changes in *Artemisia sp*. populations from the Altithermal to present (Larson et al. 1995). The stratified pollen and plant remains also suggest that floral resources were a major part of hunter-gatherer subsistence. There also is evidence of limber (*Pinus flexilis*) and white bark pine (*Pinus albicaulis*) seed utilization at the site (Larson et al. 1995).

Some believe this increased use of the Big Horn Basin and near by foothill-mountain ectone during the Archaic is also supportive of a shift in subsistence during the drier and hotter climatic conditions of the Altithermal (Metcalf and Black 1997; Mulloy 1958). Both Bender and Wright (1988) and Metcalf and Black (1997) believe that montane areas were used during the summer by hunter-gatherers. Their summer foraging based subsistence was complemented by more sedentary winter encampments in the warmer areas of the Basin (Bender and Wright 1988).

In the Upper Greybull study, area Burnett (2005), through analysis of diagnostic project points, has recognized a pattern in Archaic assemblages. The Early and Late Archaic components are well represented with a decrease in use of the watershed during the Middle Archaic. There is some evidence of Middle Archaic use of the watershed, as evidenced by nine Mckean style points. Burnett (2005:48) also reports 41 unspecified points that exhibit morphologies similar to those present during the Archaic but cannot be placed into a specific style or time period.

A total of 80 prehistoric projectile points from the Greybull study area were identified as Late Prehistoric (Burnett 2005). Archaeologically, Helen Lookingbill (Larson et al. 1995) exhibits a similar chronology to that found in the Greybull watershed. Obsidian and other exotic materials increase in appearance through the Late Archaic and Late Prehistoric at Lookingbill (Burnett 2005; Larson et al. 1995). Obsidian sourcing of the Lookingbill raw material demonstrates obsidian coming from the Obsidian Cliffs in Yellowstone National Park, the Tetons and Idaho. This pattern of increased obsidian use has also been recognized in the Greybull watershed (Burnett et al. 2003) and has been sourced to similar localities (Bohn et al. 2004; Bohn and Todd 2005).

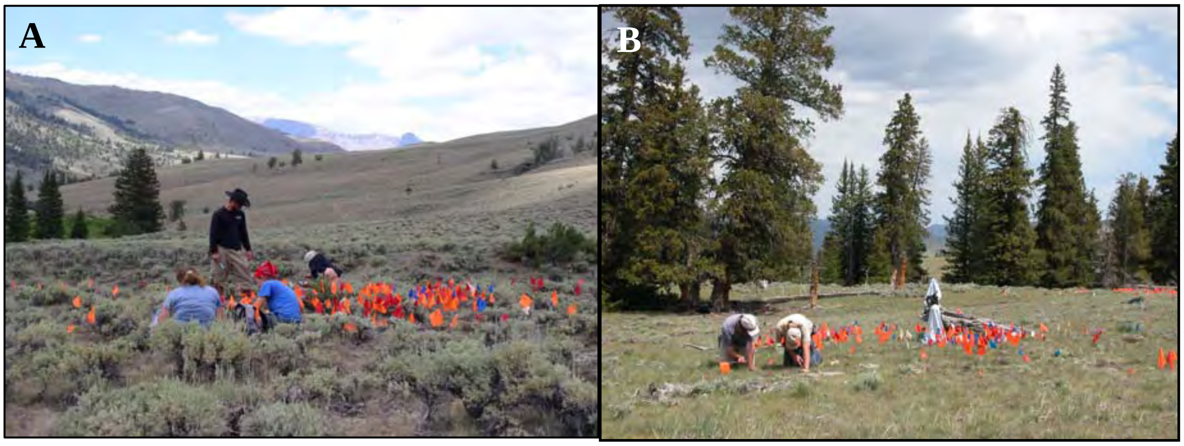

Figure 1.5. Typical lithic scatters in the Greybull (A) and Jack Creek (B) study areas. Pin flags represent >5 artifacts. Photos by L. Todd, 2003.

Many of the archaeological studies that have taken place in northwest Wyoming have focused on the cave and open air sites of the Big Horn Mountains or studies within the Big Horn Basin itself. Published research within the GYE in the Absaroka Range has mostly dealt with cave and rock shelter excavations (Frison 1991; Husted and Edgar 2002). While these studies, such as those at Mummy Cave, have provided valuable cultural chronologies and data for paleoenvironmental reconstruction, no published research pertaining to temperature and site placement has been presented. The only study that has dealt with the study of above-ground temperature and site placement, is the unpublished work of Mark Stiger in the Gunnison Basin of Colorado (Stiger 2004). Although not located in Wyoming, the Gunnison Basin, ranging from 2200–4300 meters above sea level (masl), is similar in altitude and species distribution to the Central Absarokas. Using similar methods as this thesis, Stiger also wanted to understand temperature as a factor of site placement. His work will be further discussed in Chapter 3.

CHAPTER 2: THE THERMAL LANDSCAPE

"Climatic control appears to be supported at the mega- and macro-scales in both space and time, but there are so many locational factors operating at smaller scales that the issue remains unresolved." (Dincauze 2000:390)

This thesis seeks to answer three questions about temperature and site placement. Should temperature be considered a factor in site placement? If it is a factor, what is more crucial to site choice, the variation of night temperature or daylight temperatures across a given landscape? And last, is there validity to constructing a montane thermal landscape and applying it to other locations outside of the Greater Yellowstone Ecosystem? This chapter presents the methods and analysis employed in this study to capture and construct above-ground temperature gradients for the Jack Creek and Greybull drainages.

In order to define the thermal landscape, it is important to first define landscape and high altitude. The term landscape has become commonplace in archaeology, and due to its multiplicity of meanings, requires a specific definition used in this thesis to be clearly stated. Landscape is a concept used by many disciplines to describe environmental, biological and even cognitive interactions. It is also employed as a descriptive tool to determine scale or to explain a particular geographic area. For Vale (2002:2-8), the landscape that we as humans see and experience is a complex, multi-scalar product of both environmental variables and human adaptation. He provides a sliding scale ranging from the natural landscape to the human-modified landscape (Figure 2.1). This concept has been used most recently by fire ecologists to describe the state of the pre-Euro American environments and to what extent those locations were influenced, modified and managed by Native Americans (Vale 2002 and references therein). Archaeologists have also defined landscape dependent on their theoretical perspective and research goals. For example, Gamble defines three separate landscapes when referring to European Paleolithic settlements. The *landscape of habit* refers to a region were specific tasks are preformed (1999:65). In the Upper Greybull , this may be hunting locations or plant extraction locales that are known by a specific group and are revisited. A *landscape of habit* is human constructed and is a physical manifestation or a way people map their lives to a specific region. For prehistoric peoples, the landscape of habit can be observed in successive occupations of an area throughout time, or passing on knowledge of specific hunting and gathering locations and technology to successive generations (Kelly and Todd 1988). The *social landscape* differs from the *landscape of habit* as a cognitive construction that includes symbolism and symbolic behaviors (Gamble 1999:85). Thoughts about landscape and what landscape means to people is difficult to decipher from mere lithic debitage. Understanding how people describe, categorize and interpret their surroundings is not a goal of this paper, but for an overview of socially constructed landscapes see Ashmore and Knapp (1999).

The definition of landscape that most concerns this study is that of the *physical* or *natural*. This landscape is the totality of natural features (soils, vegetation, and landforms) and may include specific environments and ecotones (Vann 1971). A combination of connected landscapes creates a region (Gamble 1999). Natural landscapes, or those that have not been modified or impacted by humans, are arguably rare and due to human encroachment into most environments may not be attainable (Dincauze 2000). For the purposes of this study, a thermal landscape can be applied to both human-modified locations, or the natural landscape as defined by Vale (Figure 2.1). Whether human constructed variables, such as pavement, skyscrapers or reservoirs, or natural environmental variables like steep topography or subalpine forests are taken into account, temperature is present and the thermal landscape can be measured. The thermal landscape measured and constructed in this thesis encompasses both the natural landscape and the minimally human-modified landscape in the study area (Figure 2.1).

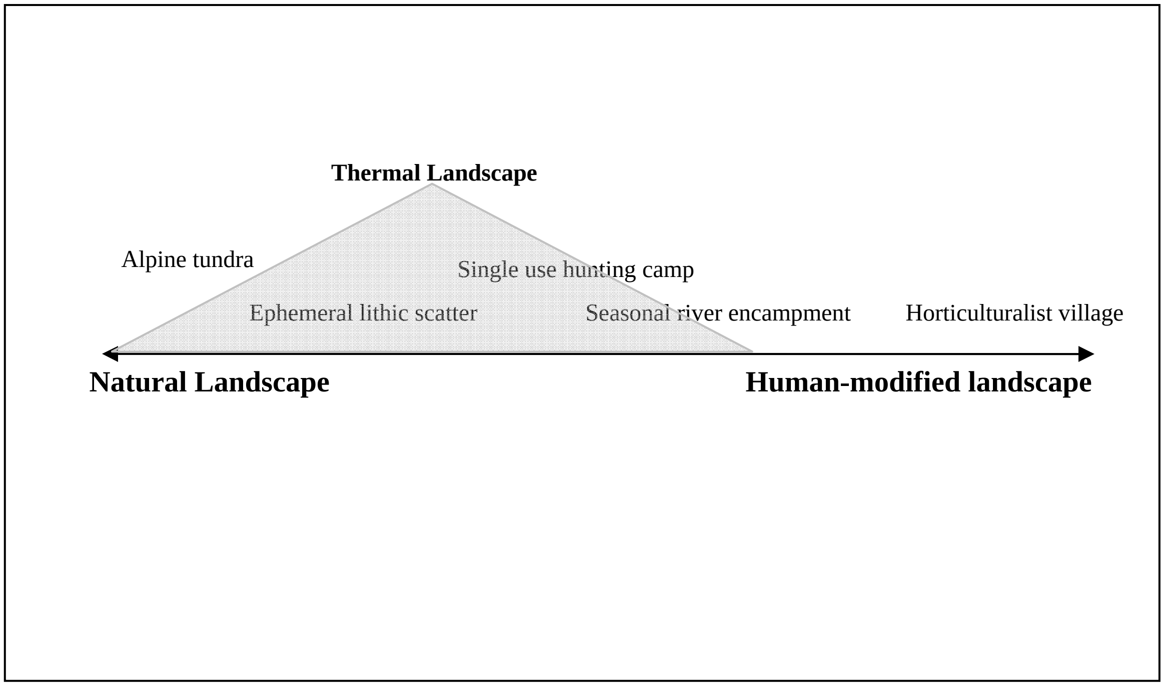

Figure 2. 1. Sliding gradient of landscape definitions (inspired by Vale 2002 and Butzer 1982). Levels of prehistoric human influence on the environment are depicted. The thermal landscape defined here encompasses both the natural and slightly modified landscape.

An underlying purpose of this study is to also understand high altitude prehistoric site placement at the landscape level. The term *high altitude* is often used by archaeologists as a general term for areas that are considered mountainous. The demarcation between low and high altitude is dependent on latitude. With increasing latitude the actual physical elevation of high altitude can vary (Aldendefer 1998; Pawson and Jest 1978). For example, the high altitude environments utilized in the Andes may exhibit similar constraints to those of the Northern Canadian Rockies, even though the Rockies may be 1500 m lower. For the purposes of this paper, high altitude can be defined as those areas above 2500 masl. This cutoff has been used by Aldenderfer (1998) and Pawson and Jest (1978) for different regions.

High altitude does not necessarily mean a mountainous environment. The characteristics of high altitude vary by region. In the Andes, high altitude hunter-gatherer sites are located in a region of steep topographic relief, referred to as high-mountains or montane plateaus, such as the Peruvian Highlands (Aldenderfer 1998). In the American Southwest, plateaus are often defined as high altitude, even if mountain ecotones are not present (Plog et al. 1971). This discrepancy poses a problem in comparing high altitude studies across time and space because these environments can differ greatly in topography, vegetation and climate. Since local topography can influence the relationship between temperature and elevation the application of the thermal landscape to varied environments may also be difficult (Barry 1992).

In Colorado, Benedict's work in the Rocky Mountains has contributed to our knowledge of high altitude prehistoric land use. The Ptarmigan Site, at 3460 m in altitude, is a multi-component site that demonstrates increased use during the Middle Archaic (Benedict 1981). The Coney Lake site demonstrates repeated use from the Late Archaic through the Late Prehistoric periods (Benedict 1991, 1992). All of the open air sites, although higher in elevation, contain similar vegetation to the study area and most are near or at timberline. He suggests that the timberline ecotone provided a seasonally resource rich environment. The evidence from Benedict's work demonstrates that high altitude mountain locations were used throughout the Archaic and Late Prehistoric.

Defining the Thermal Landscape

The *thermal landscape*, as defined here, refers to the variability of temperature over a given area. Temperature readings depicted just above-ground surface to delineate between thermal gradients affected by major wind patterns and to account for reflective heat. Above-ground temperature is also used to delineate from soil temperature. Soil or sediment temperature is often recorded to understand vegetation recruitment or net primary productivity (NPP). With the thermal landscape, concern is not with specific temperature readings but rather the range of temperature between elevation gradients. Since we are dealing with evidence of human use of the area during the prehistoric it cannot be assumed that the modern temperature readings reflect that of the past. The goal of constructing the thermal landscape in the study area is to understand how temperature operates across the two watersheds and how the differences in temperature correlate with the documented archaeology.

Effects of wind and inversions on temperature are acknowledged but were not accounted for during data collection for a few reasons. Since the coarse grained data from the NOAA weather stations were not used in this study, there is also no need to extrapolate regional wind speeds to determine wind chill. The localized topography at both study sites is so variable that applying wind chill readings would do little to explain the microenvironment. Inversions pose another problem because they too cannot be accounted for, only extrapolated by what is known about air temperature and mountain environments. Wind chill and inversions were likely present in the drainages during prehistoric occupation, but trying to account for them is beyond the scope of this analysis. Further research should be conducted to understand these two factors.

The thermal landscape not only relates to humans but applies to all aspects of an environment. Vegetation distribution and growth are controlled by temperature. Some species are more susceptible to diurnal or annual temperature fluctuations than others. For example, growth in ponderosa pine (*Pinus ponderosa*) respond more to soil temperature and water availability (Johnson and Larson 1991). Engelmann spruce (*Picea engalmannii*) growth rates and seed production are driven by above-ground temperature (Villalba et al. 1994). Discussed further in Chapter 4, Engelmann spruce are a good proxy record for past temperature regimes since their tree rings record fluctuations in temperature, not water stress as seen in other tree species (Wilson and Luckman 2003). According to Begon et al. “There is a clear relationship between the above-ground NPP and mean annual temperature” (1996:722). In turn, the type and availability of vegetation, such as forbs and grasses, affects the type and number of herbivores that can be sustained in a given area. Plants are particularly susceptible to temperature change. The number of degree days, (defined as the number of days at a specific temperature) affects seed production and development (Begon et al. 1996:53).

Archaeological concern with temperature within North America has mostly related to climate and culture change at the macro scale. The temperature/frost line and annual precipitation studies have helped to explain culture change on the Great Plains (Wood 1998). Incipient horticulturalists were able to adopt forms of agriculture because of macroenvironmental factors, including temperature (Coe et al. 1964; Wood 1998). How important are microenvironmental factors in contributing to human behavior? Microenvironmental data such, as above-ground temperature, can be gathered and analyzed. Understanding how the localized climate operates is an area of temperature studies that deserves some attention.

Capturing the Thermal Landscape

The first problem faced during this study was deciding how to capture the thermal landscape. Regional weather station data was too coarse for this analysis since most temperature and precipitation are extrapolated across a region but rarely ground truthed. As discussed previously the lack of dependable temperature sensors in many areas across the state has caused difficulties (Curtis and Grimes 2004). Average temperature is complied using two different techniques. If not applied correctly combining the two techniques may produce up to 17.2 °C in error (Curtis and Grimes 2004). Defining a localized temperature gradient for the Greybull River Ecosystem is useful and can contribute to what is known about Wyoming temperature. Applying temperature data from low-elevation weather stations also provides erroneous temperature gradients as the weather stations cannot account for local topographic effects (Bolstad et al. 1998)

Ecologists have met with similar problems when describing how temperature relates to a specific landscape. Lookingbill and Urban (2003:141) recognize a problem with applying conventional sampling techniques when conducting fine-grained environmental studies at landscape scale. For example, elevation has been the most convenient way of explaining vegetation distribution and temperature patterns (Barry 1992). The correlation of elevation and floral species diversity at the landscape level for Lookingbill and Urban, is misleading without fine-grained above-ground temperature data. In one sense, the issue is scalar; coarse grained proxy temperature models have been applied to specific controlled fine-grained ecological studies. This suggests that the role of temperature in species diversity and distribution is secondary to other factors such as soil moisture and slope. The same discrepancy in the application of environmental data to specific locales affects archaeologists.

In their study of temperature lapse rates per elevation within an old-growth watershed, Lookingbill and Urban placed HOBO temperature loggers, similar to those used in this study (described further below), at a height of 1.3 m above-ground surface in closed canopy old growth *Pseudotsuga menziesii* (Douglass fir) forests (2003). The study sought to test the traditional elevation lapse rate of 6° C /km presented by Barry (1992) and the effect of temperature in the regeneration/recruitment rate of various floral communities. The data loggers were distributed similar to those in this study, at elevation gradients all within similar site settings. Lookingbill and Urban demonstrated that elevation is the best explanation for differences in mean temperature among each location (2003:146). The classic lapse rate of 6° C /km in this case was supported by their findings.

In order to understand temperature change per elevation for this study, HOBO temperature gauges made by the Onset Corporation were employed. The gauges have been used by forestry sciences in the past to measure temperature within timber stands, most recently by Lookingbill and Urban in the Pacific Northwest (2003). Each gauge contains a computerized recording device that can collect up to six months of temperature data at specific locations.

In order to determine criteria for gauge placement across the landscape, three tests were performed. The first test was conducted to establish height above ground for the gauges. Four HOBO units (Figure 2.2) were placed at 20 cm intervals at above ground level on plastic gardening stakes. The gauges at ground level received too much condensation to accurately record temperature and were not considered. By comparing temperature readings of the gauges with a hand held Brunton Sherpa™ atmospheric weather station, it was decided that the gauge height of 20 cm would be optimal, as it was closest to the Sherpa readings and reflected the least amount of variation through out the day.

The second prefield test determined the direction the gauge would face. Four gauges were placed facing the cardinal directions at 20 cm above ground for three days. Gauges facing east and west would peak out at extremely high temperatures (in excess of 48.8 °C) during sunrise and sunset respectively. McCuthan and Fox demonstrated that in the northern hemisphere north-facing slopes receive less radiation than southern facing slopes (1986). During summer months solar radiation due to axial orientation of the earth would be less pronounced at southern exposures than during winter months. North was chosen because there was least variation when compared with the Sherpa.

Figure 2.2. HOBO™ temperature gauge

In order to protect the gauges from the elements a 2 inch by 2 inch plastic artifact bag was fitted around each HOBO. At first there was concern that the bag would negatively affect temperature recordation but after comparing the readings of a bagged vs. un-bagged HOBO units, there was little variation between the two (~ .03 degrees). Lookingbill and Urban affixed similar protective devices to their gauges and found that temperature readings were minimally affected (2003).

In order to capture the thermal landscape for each drainage, two placement strategies were implemented. Thirty-two gauges were set across both drainages. At the time this study was first established, the Colorado State University field school was conducting archaeological investigations in the Jack Creek drainage. During a ten day field session more than a dozen large prehistoric sites consisting of lithic debitage and diagnostic tools had been located. I first wanted to collect temperature data for only that drainage, due to the amount of cultural material and the distribution of artifacts. This explains why the majority of gauges, 22 total, were deployed in Jack Creek. Three major north-south trending transects of five gauges each were deployed on the eastern slope above Jack Creek. Gauges were also placed within large lithic scatter identified as 48PA2774, at an identified Late Prehistoric hearth and on the ridge line above 3100 m. The Greybull study area, located in the adjacent drainage west of Jack Creek was chosen for comparison due to similarities in archaeological site distribution. The Greybull study area was also established. In order to reflect the changes in topography and archaeology, gauges were placed 100 m apart on a north-south axis with each transect 40 m apart in elevation.

The Greybull drainage reflects more topographic relief than Jack Creek. Therefore the drainage could be used as a comparison, only one transect of ten gauges was deployed. Each gauge was placed roughly on the same northing location 100 m apart in elevation. Two gauges were set within known areas of high lithic density recorded as 48PA2751 and 48PA2744 (Figure 2.3).

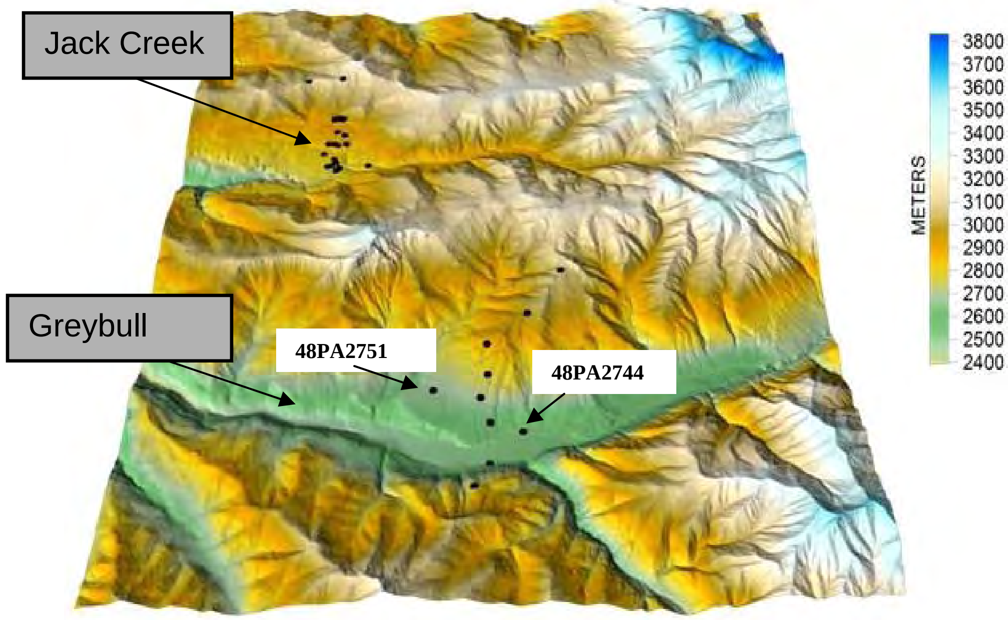

Figure 2.2. 10 m relief DEM map showing both study sites with temperature gauge locations plotted as black dots. View looking east.

Since most of the archaeology identified by the GRSLE project is situated on the open sagebrush/grassland slopes of both drainages, it was decided that the gauges should be placed on the same western aspects and within similar site settings as the cultural resources. The prehistoric sites recorded in each study area were open sites with no or very little tree cover. All sites contained surficial artifact assemblages, ranging from small lithic scatters to more complex lithic scatters containing thermal features, tools, and diagnostic artifacts. In order to record temperature in locations similar to the archaeological sites, the gauges were all set in similar settings of open, non-forested and minimally vegetated areas. Gauges were also placed in open off-site areas to simulate similar geophysical conditions of the prehistoric sites (Figure 2.4). This method was employed because it would produce less variation in temperature between gauges due to microenvironmental factors. Those gauges that may receive some shade from neighboring tree clusters were noted.

Figure 2.3. Typical site location for temperature gauges. Photo facing south, in the Greybull study area. Photo by L. Todd.

Gauge Deployment and Recovery

Major surface weather stations outside of Cheyenne, Casper, Sheridan and Lander collect data every 15 minutes in order to determine daily and annual averages. The temperature gauges in the Greybull and Jack Creek drainages were set to record at the same interval. All of the computerized gauges were time synchronized before they were set across the drainages. Each gauge was set to begin recording simultaneously. A temperature reading was then recorded every 15 minutes for two months.

After two months of in-field recording the temperature information was then downloaded from the gauges. Of the 32 HOBOs, only 25 were recovered intact. Three were destroyed by either livestock or carnivores, two were stolen and five exhibited some sort of malfunction that did not allow for data inclusion into this study. Unfortunately, the two stolen HOBO units were those that were located in shaded forested areas at known prehistoric sites and were the only gauges equipped with relative humidity sensors.

The temperature readings were downloaded in the field using a HOBO Shuttle. The device can store a large number of data and allow the HOBO loggers to stay in place and continue recording. Over 159,000 lines of individual temperature data were entered into a database created specifically for this study. The BoxPro program provided by the Onset Corporation for the HOBO data loggers was too simplistic for the questions posed by this research. The program only allowed for visual representation of the temperatures. In order to query the data more effectively, they were compiled into a relational database using Microsoft Access. Raw temperature data were then placed into individual tables and queried dependent on the questions of analysis. The Access program allowed for comparison of individual HOBOs by temperature or elevation. It also allowed for the comparison of study area temperatures to those provided by the NOAA weather stations (Appendix A). In order to determine the mean temperature for a given day the minimum and maximum recorded readings are averaged (www.noaa.gov 2004). This method was applied in determining average night temperature, day temperature, and overall temperature.

Defining Night and Day

Night temperatures at high altitude can be markedly colder than during the day (Bolstad et al. 1998). It was for this reason, that night temperature was thought to be the most limiting factor in site choice at both study areas. Night temperatures were defined as those hours between sunset and sunrise for each day. Sunrise and sunset times were gathered from the NOAA website (www.noaa.gov) for Cody, Wyoming between July 30 through

September 26, 2003. Sunrise and sunset at individual HOBO site locations were determined to differ less than one minute per location.

The total hours of darkness varied from the beginning of the study at nine hours and 15 minutes to 12 hours and one minute (Appendix A). Overall night temperature per elevation were determined by averaging the minimum and maximum readings during darkness. To account for increased hours of darkness, a mean average temperature was also calculated by adding all individual temperature recorded each night for individual HOBO unit and then was divided by the number of total readings.

Daylight hours were defined using the same method as described above. During the study the number of total hours of daylight ranged from 14 hours 44 minutes to 11 hours 59 minutes. An overall average was also determined for the changes in total hours of daylight as well, by including all gauges and dividing by the number of readings (Appendix B). A weather station in Cody, Wyoming north of the study area was chosen for temperature comparison. Few stations exist in northwest Wyoming that exhibit similar environments to that of the Upper Greybull. Although the Cody station is not necessarily the most ideal at an elevation of 1553 masl, it provided a complete background dataset to compare against the thermal landscape. Another station, to the south of the study area in Dubois, Wyoming, did not have complete data for the days in question and therefore was not considered for this study. The comparative data from the Cody weather station did not distinguish between night and day time temperatures. Only an overall 24 hour period of the study area temperatures can be adequately compared with the Cody information (Appendix A).

Both drainages, as stated, exhibit similar but not identical vegetation and topography. When the above-ground temperature of equal elevations are compared there is pattern. Temperatures are with in two to three degrees of one another. Analysis of day temperatures posed many problems in this study. One limitation of the data loggers was recognized when analyzing the temperature data. Since the gauges were in direct sunlight they did not always accurately record information. Maximum temperatures are more sensitive to solar radiation differences (Bolstad et al. 1998). In determining the average daytime temperature, some of the extreme temperatures (those above 44 °C) were not considered. Looking at the minimum recorded day time temperature proved more useful in comparing archaeological sites with areas without archaeological evidence.

ANALYSIS AND RESULTS

The first tested hypothesis is the analysis of nighttime temperatures. It was initially thought that night temperatures would prove to be the most limiting factor in site placement in the study area. Since humans are more subject to physiological stress due to cold in high altitude locations (Grover 1974), it seemed that temperatures during darkness would affect prehistoric hunter-gatherers. Since the chipped stone material and technology are essentially an in situ palimpsest surface record, it is difficult to identify specific temporal patterns. Paul Burnett has been working at answering some of these questions using temporally diagnostic projectile points and cluster analysis For further discussion see Burnett (2005).

Some assumptions then underlie my research questions. The first is that the montane environment of the Upper Greybull ecosystem was seasonally utilized by hunter-gatherers from late Paleoindian through Late Prehistoric times. This concept stems from the idea that high altitude montane ecosystems would be too harsh of environments during the winter and early spring. Accurate temperature data, rather than extrapolated climate conditions may show that this argument is not necessarily valid. As stated before several archaeologists believe montane areas were exploited during warm, summer months (Bender and Wright 1988, Metcalf and Black 1997). The second assumption is that many of the large lithic scatters were base camp or secondary camp locations. These areas were likely occupied over night and those living there would be subjected to cold temperatures and would chose to inhabit warmer locals.

Elevation (M)	Day Temperature (ºC)	Night Temperature (ºC)	Total Mean Temperature (ºC)	Associated Site
2547	19.54	5.53	13.18	48PA2744
2600	20.62	5.05	13.59	48PA2744
2680	20.37	4.56	13.22	48PA2751
2791	18.82	5.36	12.68	
2796	19.67	4.85	12.98	
2800	18.58	7.44	13.47	
2828	14.73	5.67	10.54	
2836	23.17	8.10	16.76	48PA2772
2846	23.76	6.57	16.35	48PA2772
2868	17.88	4.64	11.82	48PA2773
2870	19.78	3.73	12.48	48PA2773
2875	21.99	3.99	13.85	
2906	19.23	4.09	12.35	
2912	18.74	5.34	12.63	
2953	16.17	5.52	11.26	
2956	17.43	6.53	12.41	
3000	15.50	5.74	11.00	
3100	16.90	4.14	11.07	
3126	14.87	3.96	9.81	
3165	14.16	4.90	9.86	

Table 2.1. Summarizes temperature data from both drainages by elevation. Highlighted rows represent gauges that were located within lithic scatters.

Average night temperatures were complied and compared first by elevation. In the Greybull study area the lowest temperatures recorded were not at ridgeline (3100 m) but instead at the drainage floor (Table 2.1). Proximity to the Greybull River and unaccounted for inversions may help explain this. Temperatures were then compared with archaeological material density. The dense palimpsest scatter (48PA2773) was actually the coldest during the night than elsewhere in the Greybull drainage. Areas with dense lithic material recorded the coldest temperature readings.

Similar to the Greybull study site, night temperatures were lowest in locations with dense lithic material (48PA2744, 48PA2751). The study site is higher in overall elevation than Greybull, which may play a role in the readings. The inversion that may be present in Greybull due to the riparian ecotone, would not have an effect on the Jack Creek prehistoric sites. This comparison supports the idea that night temperatures do not appear limiting to site placement. However, as demonstrated in Table 2.1, there are colder locations on the landscape that do not contain lithic material. Based on this data site choice does not appear to be linked to above-ground night temperatures in either study area. Both drainages exhibit the same pattern of cold valley bottoms and do not appear site placement. It is counter intuitive that the areas with densest lithic material were actually the coldest.

Technological adaptations may also play a role in the distribution of sites in cold locations. The construction of shelters to increase thermal efficiency is associated with both sedentary or semi-sedentary activities (Binford 1980; Kang 2002). Although there was no evidence of structures at the archaeological sites it can be assumed that people were spending more than a 24 hour period at some locales. This may explain the colder temperatures at the site locations. If groups were using those places over night they may have constructed temporary shelters that are not preserved in the archaeological record.

Clothing and building fires are also cultural behaviors that can mediate cold temperatures and/or harsh environments (Frison 1991; Kang 2002). Although there are few recorded hearths or thermal features (n=2) were located during survey of both Jack Creek and Greybull study areas, prehistoric people used fire and clothing for warmth. According to Frison surviving the harsh winters of the Northwest Plains would have required “fairly sophisticated clothing” (1991:345). Some preserved moccasins and other foot gear have been found in cave sites in Wyoming. At Mummy Cave, a mummified Late Archaic individual was found in tailored clothes (Frison 1991; Husted and Edgar 2002).

Since the difference in temperature between 2547 masl and 3165 masl is less than one full degree Celsius, it is difficult to discuss the role, if any, night temperatures play in site placement. Since no direct correlation between warm night temperatures and lithic distribution were recognized, the archaeological data were then compared to daytime temperatures (Table 2.1)

APPLYING THE THERMAL LANDSCAPE

In order to create the thermal landscape from the data provided by the gauges, each study site was analyzed by elevation gradients. The Greybull study area was broken down into 100 m elevation gradients, while the Jack Creek study area (due to the original gauge placement) was given 50 m gradient intervals. An overall average was determined per 100 m gradients to construct the thermal landscape.

Elevation	Thermal Landscape	-.0.65 per 100 m Rolland (2003)	Baker (1944)
2500	13.18	13.18	13.18
2600	13.59	13.15	12.57
2700	13.1	12.5	11.9
2800	13.47	11.85	11.3
2900	12.51	11.2	10.77
3000	11.07	10.55	10.16
3100	9.86	9.9	9.5

Table 2.2. Existing thermal landscape for both the Greybull and Jack Creek drainages compared with the temperatures gradients suggested by Rolland (2003) and Baker (1944).

Table 2.2 demonstrates the constructed thermal landscape across both the Greybull and Jack Creek study areas compared with the thermal gradient lapse rates of Rolland (2003) and Baker (1944). The Baker lapse rate was included to test the accuracy the original lapse rate for northwest Wyoming and is compared with newer data from the Rolland study. The lapse rates are very similar to the actual above-ground temperature recorded by the sensors. The constructed thermal landscape does not however, exhibit a measurable lapse rate such as the -.065 °C per 100 m proposed by Rolland (2003). Instead there is a noticeable synchronicity of temperatures at mid-elevation across both drainages and a marked decrease in temperatures approaching ridgeline (between 2900 – 3100 masl). The previous coarse grained temperature gradients are applicable to montane study areas as they accurately predicted the lowest and highest elevation temperatures. It is the mid-slope temperatures that are not as accurate and it is also at the drainage bottoms and mid-slope that most of the lithic scatters are found.

The correlation between lithic material and higher day temperatures is more apparent when both day and night temperatures are graphed against lithic count and elevation (Figure 2.5). The number of lithic material were complied for 100 m elevation gradients. The highest number of artifacts (n=10,000) are located between 2500 – 2599 masl.

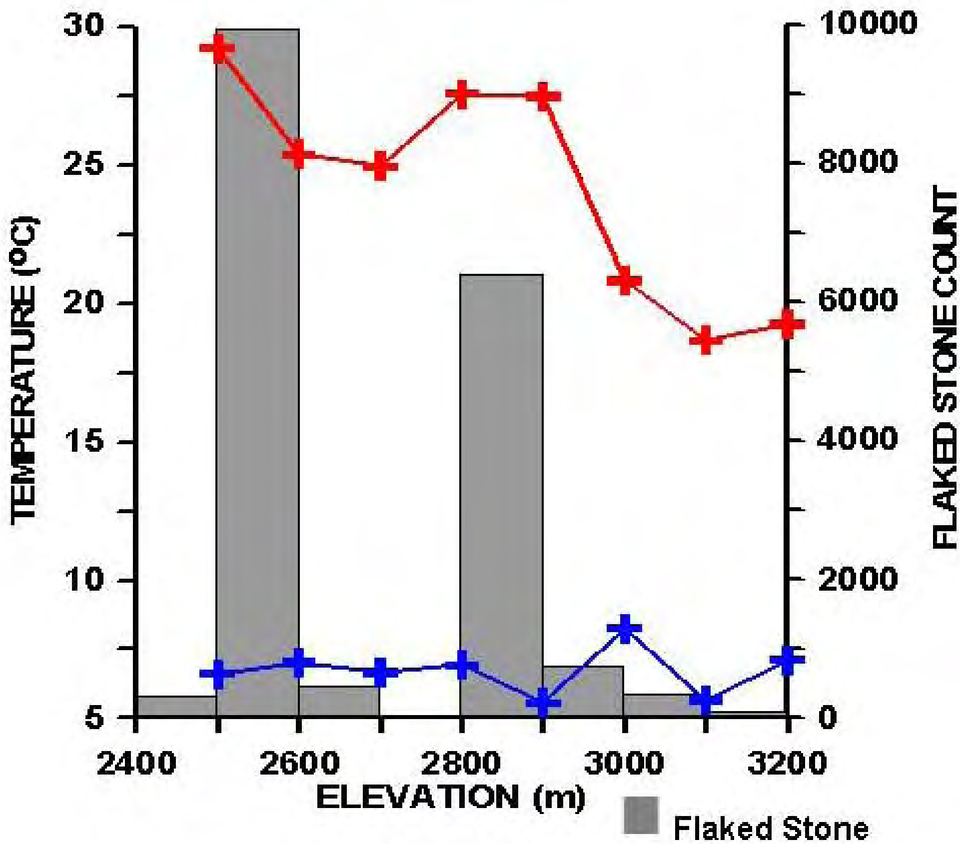

Figure 2.4. Combined temperature for both study sites graphed against elevation and identified lithic (flaked stone) material. The red line equals mean day temperatures. The blue represents mean night temperatures.

The second greatest occurrence of lithic material (n=6,000) occurs between 2800 – 2899 masl. Both of those elevations also had the high daytime temperature readings (between 20 – 29° C). In Figure 2.5, the red graphed line defines day temperatures and as can be seen peaks in temperature and the flaked stone count are concordant. Night temperatures reveal the opposite. Areas with the highest number of lithic material also recorded some of the colder average night temperatures. As discussed above, variation in night temperatures over 800 m in elevation gain are not substantial enough to demonstrate a clear choice for warm or cold night locations.

Graphed daytime and nighttime temperatures demonstrate the diurnal fluctuation in temperature that has been noted by many for montane environments (Begon et al. 1996; Frison 1992; Knight 1994; Villalba et al. 1994, Winter 1983). In Wyoming diurnal temperature change is greater at high altitude than in the lower basins (Curtis and Grimes 2004; Knight 1994). Remember, Figure 2.5 represents summer temperature gradients. Both of elevation gradients with the highest lithic density exhibit the greatest discrepancy in diurnal temperature; a 40 degree difference at 2700 m and 35 degree shift at 2800 m. The range in diurnal temperature during the winter months is usually not as apparent as during the summer. This is because daylight is shorter and temperatures do not fluctuate due to snow cover and northern wind patterns. More study on the variation in daily temperature and lithic distribution would help explain this pattern.

It is plausible that the Greybull and Jack Creek drainages were inhabited and exploited during times other than summer and that the warm daytime temperatures were more important during colder months. If it is assumed that the temperature gradients and warmer mid-slope temperatures hold true year-round, use of the warmer mid-slope locations during the fall or winter make be likely.

The thermal landscape defined by this study may allow for further analysis of high altitude prehistoric sites in Wyoming and the Rocky Mountains. Mark Stiger (2004) has been conducting similar studies in the Gunnison Basin of Colorado. He has yet to publish his data regarding temperature and site placement, but informed me that his HOBO temperature gauges have produced results similar to those presented here. Coldest locations are usually sites with archaeological materials.

According to Stiger, what is particularly interesting about the Gunnison Basin study is that the valley has a high occurrence of inversions during the winter compared to the summer. The present day city of Gunnison is located on the valley floor. There is as much as a 5 to 10 degree °C change only 10 m upslope off of the valley floor. Stiger believes that prehistoric peoples were aware of the local thermal landscape and took advantage of warmer locations even at high elevations. Many sites in the Gunnison Basin are located at tree line, a location that is warmer than the valley floor during the winter. All of the recorded Paleoindian and Early Archaic sites are located in areas with warmer winter temperatures. Stiger has also looked at the distribution of pack rat middens and pack rat species. The colder adapted species were found at the lowest elevations. There appears to be a correlation with the temperature and pack rat distribution as well.

This analysis and that conducted by Stiger demonstrates the need for further research regarding thermal landscapes. Although the Absarokas have been regarded as having a harsh winter climate throughout the prehistoric and recent past, the prehistoric site distribution may be representing a pattern similar to that of the Gunnison Basin. Unfortunately, seasonality of sites is difficult to determine. As yet there has been no animal bone found at sites and since no stratified deposits have been established, palynological data are also lacking. Several sites in the Jack Creek study area may have been optimal winter campsites. Understanding temperature during winter months is the next step in understanding site placement. This was not undertaken for this study.

CHAPTER 3: GIS AND SITE PLACEMENT

The use of computers to attempt to model human behavior is not new to archaeology. Prehistoric location analysis studies have used computer modeling to determine archaeological patterning as various scales ranging from intersite to landscape or even global analysis (Sebastian and Judge 1988; Zimmerman 1977) The accuracy and/or relevance of early attempts at computer modeling has been debated (Ebert 2000; Wescott and Brandon 2000). Geographic Information System (GIS) analysis is a less complicated approach to computer modeling than previous methods and continues to be increasingly applied to archaeological studies.

A GIS is a computer program that allows a user to collect, manage and analyze large volumes of data and display them spatially. A GIS also allows for the display of various forms of data, defined as layers, for visual contrasts and comparison. The use of GIS has been especially useful in land-use and city planning in order to display and analyze information at the landscape level (Wheatley and Gillings 2002;Witcher 1999). In archaeology, GIS are constructed for similar purposes by allowing archaeologists to map and compare human activities and natural resources such as hydrology, vegetation communities, and habitats. GIS also can tie large amounts of data to a specific site or recorded point. Cost-surface analysis studies have utilized GIS to assign specific values to locations and understand the energy cost of traveling over different landscapes (Westcott and Brandon 2000; Whitley 2000).

Site placement studies have implemented GIS models for two primary reasons. First is the ability to combine a large datasets and visualize those data as a comprehensive map. The second, and more popular, use of a GIS is to predict the location of archaeological resources on a given landscape (see Westcott and Brandon 2000). By defining specific attributes such as aspect, soil type, distance to water or slope, that will produce an optimal conditions for archaeological sites, areas of high cultural resource probability can be identified. This method has been used for many regions of the United States (Westcott and Brandon 2000; Wheatley and Gillings 2002). State and government officials have used this form of site prediction in the management of state and federal lands (Clement et al. 2005; Hansen 2005). The accuracy of predicting archaeological sites across a landscape has been debated, however it does provide useful and comparable spatial information for geographers, land managers and archaeologists alike. Some argue that accuracy of results are based on the query parameters (Hansen 2005). Much like any data manipulation technique, if one does not ask the right questions, the data may not accurately reflect what is really present.

Several studies in the Rocky Mountains and on the High Plains have looked at site prediction and placement on the landscape (Carmichael 1990; Davies 2001). In northwest Wyoming a GIS study was constructed by geographer Whitley (2000; 2001) to predict prehistoric and historic settlement patterns within the Greater Yellowstone region. His dissertation combined five factors or attributes: geophysical constraints, time and place, individual preference, cultural bias, and resource effort constraints to present landscape scale use of the Greater Yellowstone region. Working with a larger area than that presented in this paper, Whitley was able to demonstrate the correlation between all of these factors and site choice. His research suggests that exploitation of resources at mid and high elevations in the Greater Yellowstone Ecosystem are more common than previously thought. The geophysical constraints are also linked to cultural and individual preference, although I am still unclear as to how prehistoric cognition can be predicted in a GIS. What is important in this study is that the archaeological data and the site prediction model suggest that seasonal upland occupation and exploitation of floral and faunal resources were likely a part of annual settlement patterns. This is true not only for the proto-historic, such as evidence of the Nez Perce and Sheep-Eaters occupying high altitude locales but also during the Archaic and Late Prehistoric (Janetski 2002; Whitley 2001).

Since the major GIS constructed by Whitley used archaeological data collected prior to 2000, those sites outside the park boundary and those identified by the GRSLE study were not included. Many high altitude areas were not addressed in his model due to the lack of data from northwest Wyoming. Further research and the inclusion of the sites recorded by Colorado State University could provide a different interpretation of the geophysical constraints of prehistoric land use in northwest Wyoming or likely it would support the idea of high altitude resource exploitation. The use of GIS for studying site placement in the Greybull and Jack Creek study areas for the purpose of this chapter was used to demonstrate correlation between one geophysical constraint, aspect and site placement. Eventually, the thermal landscape could also be presented as a GIS layer that could be readily applied to similar montane ecosystems. If the correlation between day temperature and site placement is correct the thermal landscape could be considered as another geophysical constraint, such as soil type or vegetation type, in the prediction of where sites are most likely to be located across a given region. This form of analysis is also helpful in planning cost-effective archaeological projects by targeting high probability locations during survey.

GIS ANALYSIS

In order to evaluate the role of two geophysical constraints (aspect and elevation) on lithic distribution in the Greybull and Jack Creek study areas, GIS analysis was performed. The GIS presented here was derived from a digital elevation model (DEM) of Wyoming obtained from the Wyoming Geographic Information Advisory Council website (www.wgiac2.state.wy.us). The GIS was then constructed out of several different layers in ArcGIS 9.0™ (ESRI 2004) including a shaded relief 10 m DEM, archaeological data points with UTM coordinates and a 10 m raster grid containing aspect for the study areas. The archaeological data consists of prehistoric lithic materials, projectile points and some hearth features that were recorded within Greybull and Jack Creek study area boundaries between the 2001 and 2004 field seasons. In total 19,823 lines of artifact data were analyzed.

The DEM and collected archaeological data points were then merged in Arc GIS™ 9.0 (ESRI 2004) to determine the aspect for archaeological materials in both study areas. Two main coverages were constructed from these data. One presents site location in reference to elevation (Figures 3.1 and 3.2) and the other presenting aspect and site location (Figures 3.3 and 3.4). The purpose of the GIS is to visualize site placement across the landscape. All maps were created in the NAD 83 projection.

Cell Value	Aspect
-1	Flat Terrain (no aspect)
316-45 °	North
46-135°	East
136-225°	South
226-315°	West

Table 3.1. Cell values and determined direction of aspect.

Aspect was determined by assigning specific ordinate values to the raster cells. The directions were broken into five groups. Originally, those cells designated as -1 are without aspect and are considered flat. In most aspect analyses, values were broken into the usual nine categories of N, NE, E, SE, S, SW, W, and NW. This resolution however, provided too coarse of information in regards lithic location and was difficult to produce an image that was visually comprehensible. Instead the cells were separated into the four cardinal directions and color coded on the maps accordingly (Table 3.1).

Aspect correlates highly with temperature as was shown with the HOBOs temperature change during sunrise and sunset in Chapter 2. Figures 3.1 and 3.2 demonstrate aspect per study site. In the Greybull, nearly all of the large lithic scatters occur on west facing slopes. Western facing sites would receive the most daylight and would remain warmer longer than those on the forested east facing aspects. Both study locations have a high number of west facing localities. Jack Creek is more variable however, with many of the high density scatters located on topography that exhibits both west and northern aspects.

Study Area	North	East	South	West	Flat	Total No. Artifacts
Greybull	518	833	527	9285	57	11,220
Jack Creek	849	673	381	6457	243	8,603
						19, 823

Table 3.2. Total number of lithic material per aspect in each study area.

In both study areas western aspects were the most dominate location for lithic material (Table 3.2). This is partially a factor of survey methodology since the east slopes of the drainages were the most heavily inventoried. Also the western aspects held less closed canopy vegetation providing more optimal conditions for discovery. The western aspects make up the bulk of total percentage of artifact location. Both study areas exhibit similar artifact distributions. Areas with no aspect, or flat, contained the fewest lithic material. Both drainages contain few areas with no aspect. Distribution of artifacts on north, east and southern aspects in the Greybull study area are similar. In Jack Creek, northern aspects were second in artifact location. The topographic relief in the Jack Creek drainage does provide more northern aspects than Greybull (Figures 3.4 and 3.5).

Survey methodology and percentage of vegetation cover aside; the GIS aspect maps demonstrate the increased use in areas with western aspects (Figure 3.3 and Figure 3.4). There are several reasons why western aspects in this area of Wyoming may be more optimal for site placement. McCutchan and Fox (1986) demonstrated that aspect can be more important than elevation in controlling temperature due to the amount of solar radiation and vegetation cover. Dependent on the time of year when the sites were occupied, western facing aspects will generally receive more daylight that the east or north. These areas warm faster in the morning and are afforded more light in the late afternoon and evening.

In the Greybull drainage, western aspects often provide long, unobstructed viewsheds of the river drainage and ridge slopes. This may have aided in tracking game or providing protection. In the Jack Creek drainage western aspects are associated with areas containing seasonal water sources. Both elevation maps (Figures 3.1 and 3.2) are straight forward. The study sites are located in a montane, sub-alpine environment. The majority of the lithic material is found in the lowest elevation in the Greybull drainage. Greybull lithic distribution, in particular, correlates with the river flood plain and proximity of the Greybull River. The Jack Creek lithic distribution differs from the Greybull. Most of the lithic material is located above and away from Jack Creek, which also like the Greybull River, is a year round water source. The Jack Creek study area contains seasonal ponds, springs and hummocks. No sediment cores or other analysis of the ponds has taken place, but watersources are well established and were likely present during the Late Prehistoric or earlier. The areas of highest artifact density, 48PA2744, 48PA2772, and 48PA2751, in this drainage appear to correlate with seasonal ponds. Both of the sites consists of large, linear lithic scatters that are on the edge of the seasonal ponds. Diagnostic Late Prehistoric projectile points have been found in association with lithic debris at both location.

These preliminary GIS studies can prove useful in explaining montane prehistoric exploitation in the Central Absarokas. Using GIS to understand site placement in northwest Wyoming, especially in those areas surveyed by the GRSLE project, may provide helpful landscape level interpretations of prehistoric human behavior. Comparison of these data and the information about site placement complied by Whitely (2001) in Yellowstone could definitely contribute to that goal. The preliminary findings presented in this chapter are meant to show that there is relevance to including GIS, along with other factors, when determining site choice strategies.

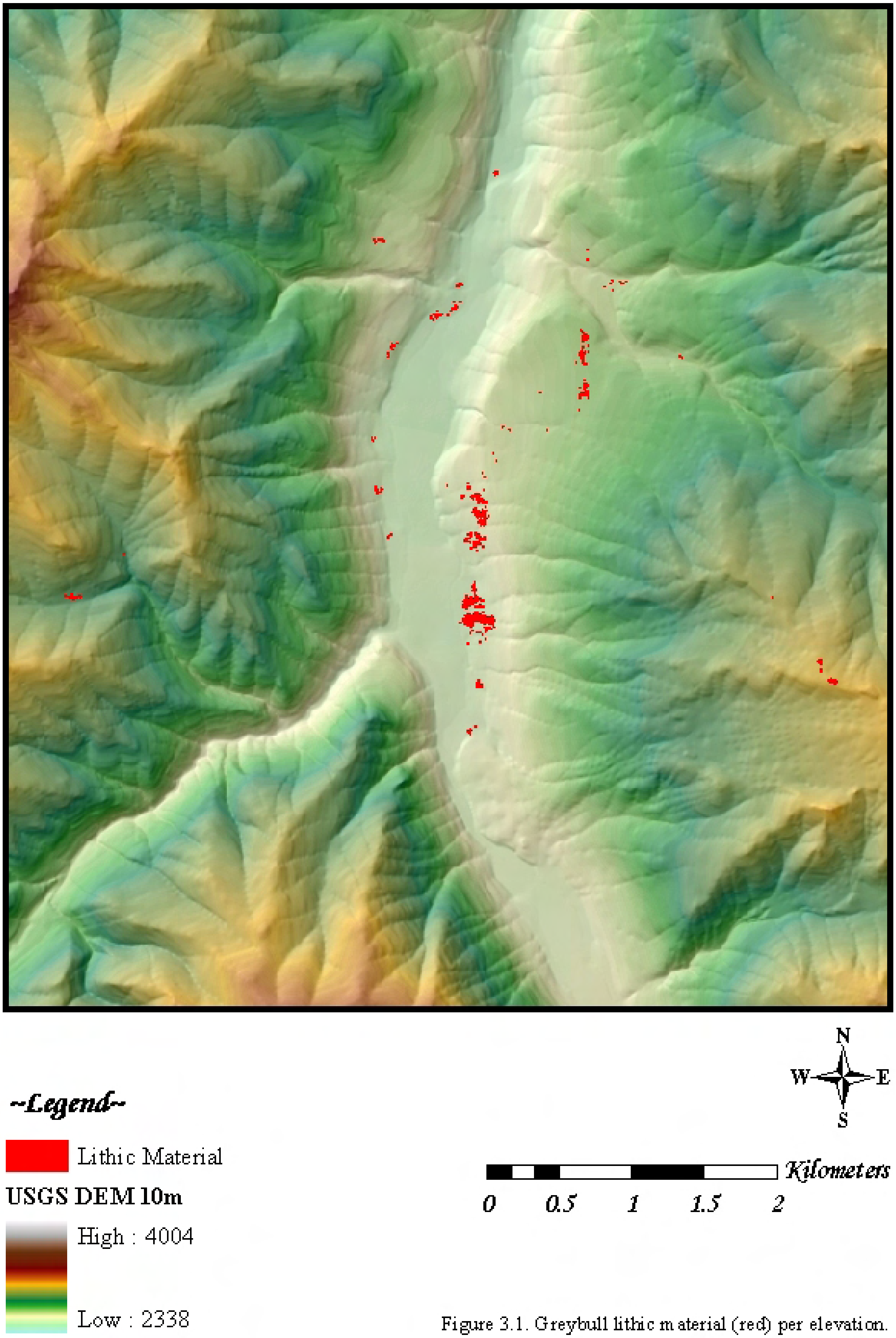

Figure 3.1. Greybull lithic material (red) per elevation.

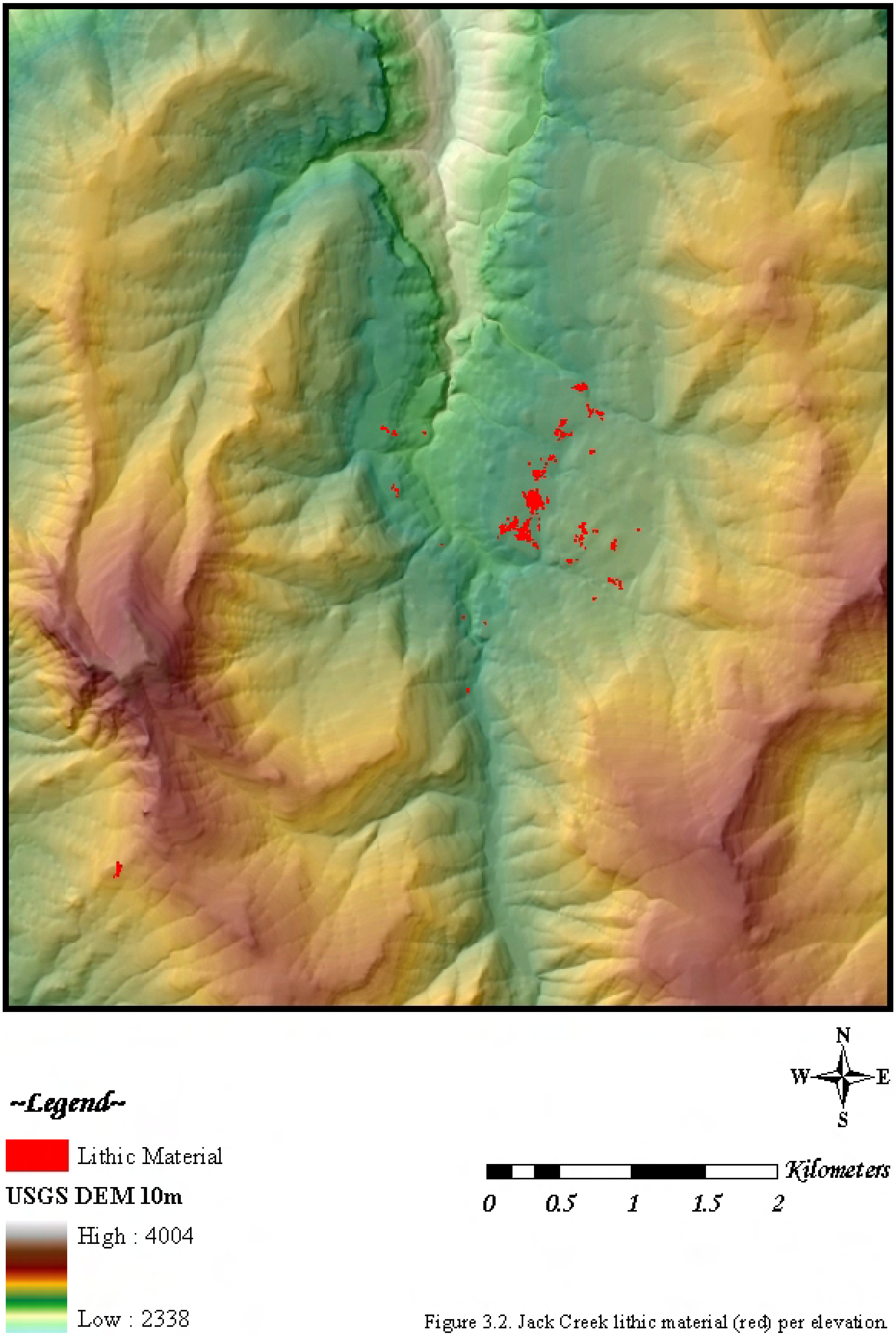

Figure 3.2. Jack Creek lithic material (red) per elevation.

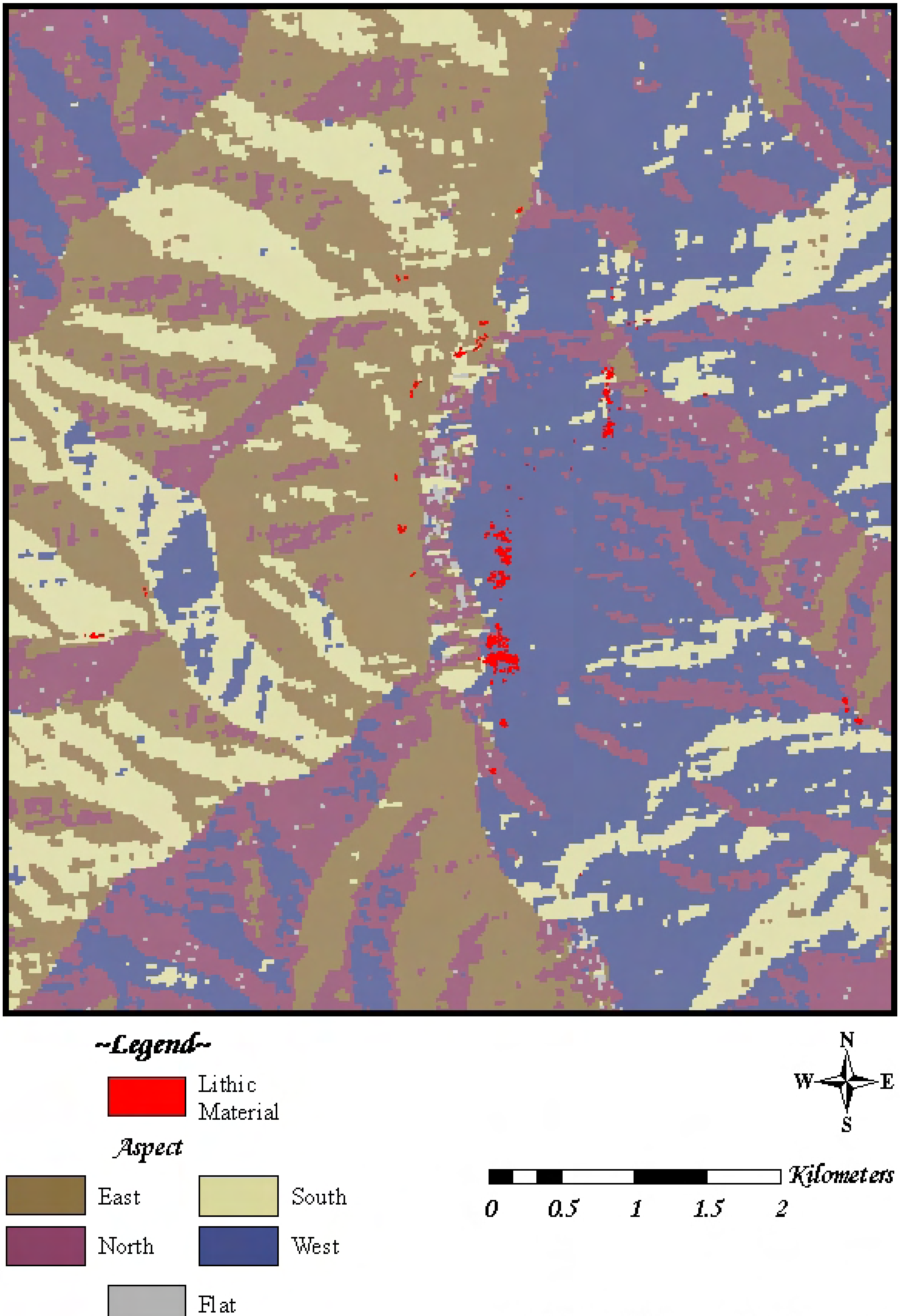

Figure 3.3. Greybull lithic material (red) per aspect.

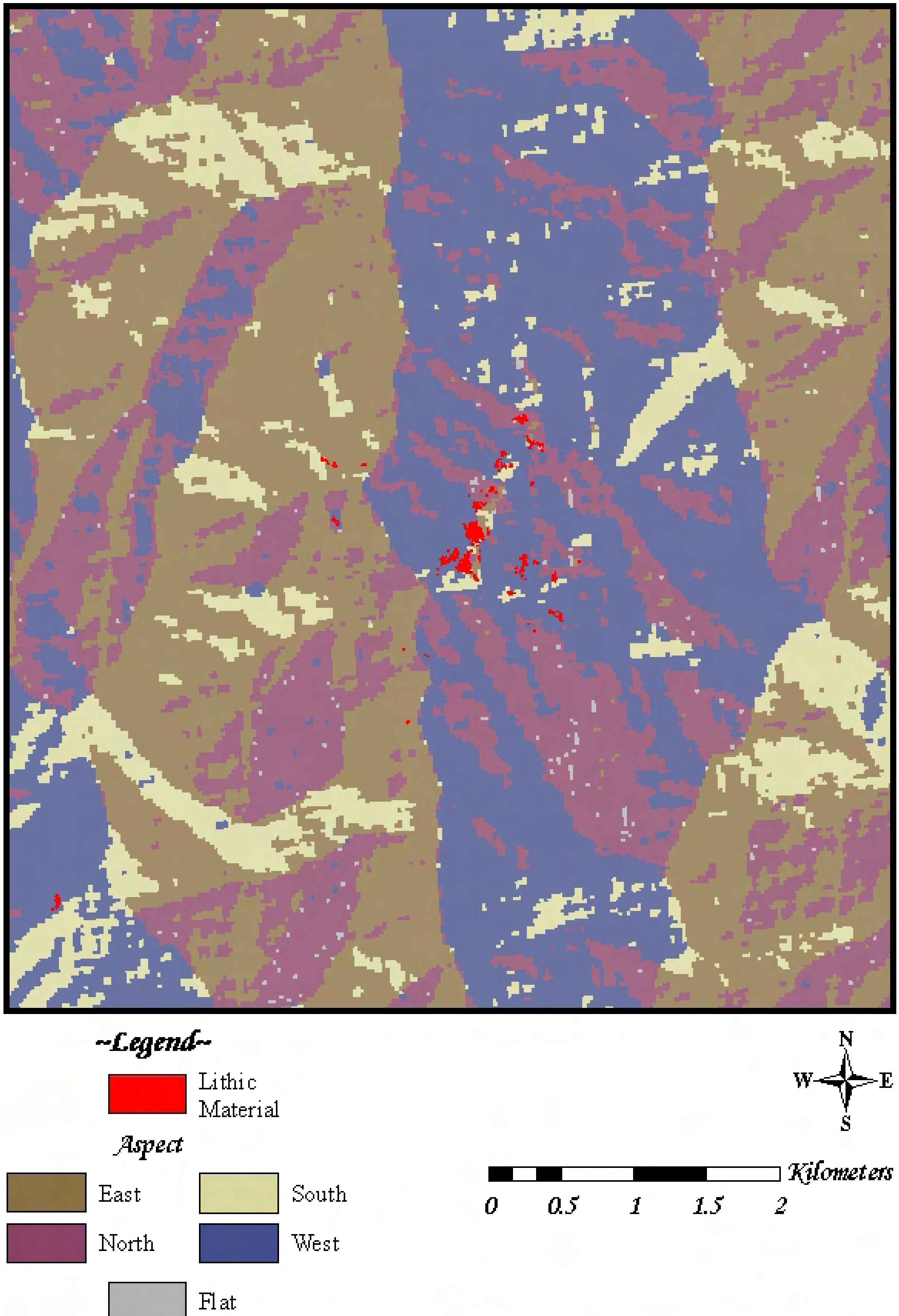

Figure 3.4. Jack Creek lithic material (red) per aspect.

CHAPTER 4: FURTHER RESEARCH AND CONCLUSIONS

Temperature as a factor in site choice is only one of many variables that can and should be addressed when interpreting prehistoric landscape use. Data from sediment cores, dendrochronological analysis and pollen studies may change our understanding prehistoric subsistence and behavior in northwest Wyoming. These new avenues of research can provide data that are easier to retrieve, since proxy environmental data for the recent past are present and there is evidence of increased use of the watersheds during this period. As with any research plan, there are always more questions and areas that need further study and attention. The ideas for further and more streamlined interpretation of the thermal landscape are provided in this chapter.

Dendroanalysis and Site Placement

Preliminary dendrosanalysis of forested areas commenced during my research. A curious dead stand of Engelmann spruce (*Picea engelmannii*) with some boles still standing was observed while recording sites in the Jack Creek study area. Many of the trees exhibited burning or charcoal. It appears that the stand perished in a single fire event and was then subject to a blow down, in which most of the trees that had been standing post fire had fallen in wind events.

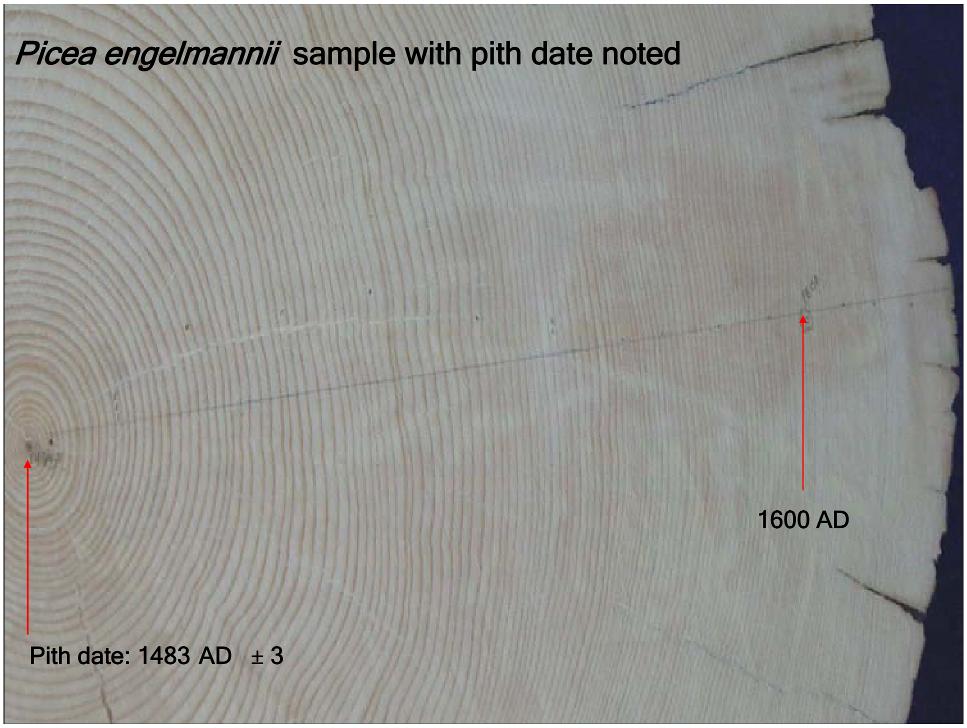

Figure 4.1. Close up of *Picea* sample from burned stand. Photo by K. Derr.

A single tree stump cross-section was sampled from the stand for dendrological analysis. With the assistance of Dr. Peter Brown of Colorado State University, a tree ring chronology of the sample was established. Once created, the chronology was then compared to other *Picea* chronologies in the region. The specimen correlated with three chronologies from the surrounding region including, one from within Yellowstone National Park and two from the Wind River Range (Briffa and Schweingruber 1983a., 1983b), south of the project area. The sample produced a pre-Colombian pith date of 1483 +/- 3 years AD. The tree ring widths decreased toward the outside of the sample and were too tight to measure accurately. The last known date that could be correlated with other chronologies was 1616 AD. Projecting these numbers to the outside of the sample, the tree likely expired in a fire event during the early 1800s. Since the climate in the study area is relatively dry the trees have not decayed greatly and are well preserved. A charcoal sample was extracted from the outer surface of one of the still standing burned trees. A radiocarbon date from that sample placed the burning of the tree to between 1480 to 1640 AD (470-310 cal yr BP). This correlated with the dendrochronological analysis of a tree within the same stand. The ability to provide paleoenvironmental data for the Late Prehistoric in the study area is available.

Tree line research in the early 20th century suggested that the limits of human occupation corresponded with the limits of tree line (Holtmeier 2003). Heat deficiency at altitude was thought to be the main limiting factor in both human and tree expansion (Holtmeier 2003). As demonstrated the temperature study, each archaeological locality is influenced by different microenvironmental variables, the scenario also applies to floral studies. *Picea engelmannii*, in particular, is affected by variations in temperature and solar radiation. With this particular species, germination rate decreases with altitude as does the amount and quality of fertile seeds produced. Cold, high altitude temperatures lead to krumholtz, often clonal, *P. engelmannii* stands. The layering of branches near ground level creates a warmer protective barrier for seedlings (Holtmeier 2003). The effects of wind and windscapes are also a factor that causes stunted growth at altitude. Interestingly, the effects of cold winter temperatures are not as crucial as ephemeral temperature events in the success or failure of a stand. A single cold snap in September of 1980 wiped out an entire clonal stand of *P. engelmannii* in the Colorado Rockies (Benedict 1984). These characteristics of *P. engelmannii* make the species a good candidate for comparison to the prehistoric climate. Since there are similarities between tree distribution and prehistoric distribution at altitude, there may be much to be learned about the history of tree movement in the Upper Greybull ecosystem.

It cannot be assumed that the environment that is seen today was the same of the past. Because the archaeological record in the study area is primarily composed of a surface record it may be easier to make this mistake than it would if we were confronted with stratified sites.

The minimal information pertaining to the prehistoric environment that was collected during this study suggests that the open air sites that are present on the surface today may have in fact been forested or at the edge of forested areas in the recent past.

In the Jack Creek study area lithic scatters are located near the dead spruce stand. Preliminary studies by Colorado State have mapped the stand in reference to temporally diagnostic Late Prehistoric arrow points. Plotted as found with the tree stumps and boles it appear that the Late Prehistoric sites are at the edge of former forested areas (Parks and Reiser 2005). If the relative date for the stand is correct, it is possible that Late Prehistoric peoples were inhabiting or at least utilizing locations that were at the forest edge (Parks and Reiser 2005). It is also unclear what the average decay rate is for spruce in northwest Wyoming. It is plausible that lithic scatters were within even older spruce stands, but the trees have decayed too much to determine this. Forested locations will also change our understanding of the thermal landscape. This evidence suggests that intensive survey of forested areas and reconstruction of paleoenvironments could assist in the understanding of hunter-gatherer land-use in the Upper Greybull watershed.

Forested locations, especially dense, mature closed canopy stands, are often avoided during pedestrian survey because of decreased ground visibility and difficulties with orientation (Schiffer 1987). Often these areas are simply left out of human landscape use analyses, providing a skewed interpretation of human behavior. While large sites, such as historic homesteads or outcrops containing rock art, are more visible, in these environments small surficial lithic scatters and features are hidden. Post wildfire studies of burned forested locals have revealed prehistoric cultural materials in areas previously undocumented in the Greater Yellowstone Ecosystem (Finley et al. 2004). Fire in montane areas is a major taphonomic agent causing the exposure of sites, organic deflation, chemical sediment change, damage and redistribution of artifacts. Intense fires, especially canopy fires, can remove important root structure and lead to erosion of sites and artifacts. After wildfire removed the layer of duff and tree debris from the forest floor near some documented games drives Late Prehistoric and Protohistoric sites were revealed providing temporal information. Since forested areas were not surveyed in the Upper Greybull drainage due to poor ground visibility (0-20%) there is a need to sample these locations to produce an accurate picture of landscape use throughout the prehistoric. Prescription understory fires have also provided a new look at the prehistoric landscape use and have been used to protect sites from catastrophic wildfires that would cause damage to artifacts (Buenger 2004; Smith 1999).

After fires spread through Mesa Verde National Park in 1996, 372 previously unrecorded sites were located after post-fire cultural resource inventories after pinyon-juniper duff and other forest debris were removed. (Mesa Verde National Park 2000). Post fire surveys in the Upper Greybull, if fires occur, would aid in the understanding of site placement and may change our understanding of settlement-and subsistence in the Greater Yellowstone Ecosystem and on the High Plains.

When mapping artifact locations across the region it is also important to delineate those areas that did not receive survey or had too high of ground cover to be inventoried (Burger 2002). The lithic distribution maps for the Jack Creek and Greybull are a good example of this concern. It appears that specific areas were not optimal for site selection but artifacts may be covered by detritus or were within densely forested areas.

Fire Ecology and Historic Fire Frequencies

The extent to which Native Americans applied fire to the forests of Northwest Wyoming and the Northern Rocky Mountains has been debated by fire ecologists. Most studies that have dealt with human influenced fire regimes have taken place within Yellowstone National Park, but most studies only refer to the presence of Native Americans in the recent past with little or no application of archaeological evidence (Romme and Despain 1989; Vale 2002). Oral histories have played a crucial role in the interpretation of fire application in the Northwest, Southwest and California (Andersen 1999; Blackburn and Anderson 1993). Human population increase, defined in the archaeological record as an increase in prehistoric sites, compared with the overall climate during a specific time period has allowed researchers to begin to interpret changes in fire frequency (Vale 2002). In Yosemite for example, increase charcoal layers in several lake sediment cores (interpreted as increased fire frequency) during a cool, less lightning prone climate period and the increase of archaeological sites during the Late Prehistoric suggest an increase in human fire application to the landscape (Parker 2002).

Fire ecology studies would contribute in determining the level that the Upper Greybull landscape has been modified by humans. The use of fire by hunter-gatherers in other parts of the world has been attributed to causing change in species distribution. It even has been suggested that repeated application of fire to specific species over millennia has cause fire-tolerance in some plants and trees (Pyne 1997). Archaeological evidence of human migration to Australia nearly 40,000 years BP coincides with increase fire frequency. Over the next 40,000 years *Eucalyptus* increases in predominance as a major tree species, as does *Banksia ericifolia*, a perennial shrub. Both species favors post –fire recruitment (Pyne 1991; Whalen 1995; Yirbarbuck et al. 2001). The role climate change has played in realignment of fire regimes is also of importance. Russell suggests:

> It is unlikely that humans at the hunter-gather stage modified vegetation from fire-resistant to fire-prone without a concomitant change to a climate more favorable to pyrophytic vegetation. On the other hand, humans must have hastened and expanded changes that were stimulated by climate change (1997:79-80).

There is no evidence in North America that suggests humans have had an influential role in selecting for pyrophytic vegetation or fire tolerant species (Pyne 1997). This is partly because the history of human occupation of the continent may not be long enough to influence such changes to vegetation (Vale 2002). However, the role of ancient hunter-gatherers in contributing to environmental change and species diversity, especially in the GYE, has been played down by many ecologists. In the GYE, prehistoric fire frequencies are attributed to lightning and climatic change (Romme and Despain 1989), although oral histories of native groups in the surrounding region demonstrate an acute knowledge of fire application in clearing areas for grazing and hunting (Griffin 2002:88), as well as selecting for preferred basketry materials or medicinal plants (Baker 2002:58).

There is a need to understand the level to which prehistoric hunter-gatherers influenced the environment of the GYE and Upper Greybull in general. The work conducted by Burnett (2005) suggests increased use of the Upper Greybull watershed during the Archaic and Late Prehistoric. It is for these time periods that environmental data should be collected and analyzed. Without the help of fire scarred trees such as in the Greybull ecosystem, to establish a temporal chronology, lake sediment core studies could benefit a range of disciplines including, fire ecology, archaeology, and paleobotany. These studies would aid in the reconstruction of past environments and would contribute to site placement research.

CONCLUSIONS

Temperature in montane ecoystems has been demonstrated to topographically mediate vegetation distribution (Ferreya et al. 2001). Exploitation of montane watersheds in the Central Absarokas by prehistoric hunter-gatherers may have also been mediated by temperature gradients. The thermal landscape constructed in the Greybull and Jack Creek watersheds depicts a correlation between mid-elevation lithic distribution and daytime temperature. .

Upon completion of data collection and analysis, I have identified several concerns with the work presented in this thesis. The first is that the study only accounted for temperatures in direct sunlight. As demonstrated, direct sunlight often led to inaccurate readings of temperature or caused the gauges to peak out at certain times of the day. It would be more helpful in subsequent studies to include data from forested areas or areas that are shaded most of the day. We cannot assume that prehistoric peoples did not try to protect themselves from the heat or direct solar radiation, especially at high altitude. To account for this, small shelters could be built to shade the temperature gauges in open settings. A similar technique was employed by Lookingbill and Urban (2003) without causing disturbance to the temperature readings.

The thermal landscape was developed from data collected during the warmest moths of the year. This too may skew interpretations of the temperature. All months should be included in the next study to demonstrate a more accurate thermal landscape or better yet several years of data should be collected. This includes comparison with temperature readings collected during the winter months, if possible. Winter temperatures were not colleted during this study. Placing gauges in forested areas may provide more protection and information for analysis.

It is also not clear was the effect wind chill and inversions have on temperature in this montane environment. Prehistoric peoples would have wanted protection from wind, especially in the late fall and winter months when wind speeds increase and temperatures fall. Inversions, as noted previously, are very difficult to account for, but these need to be considered when developing a thermal landscape.

Comparison of temperature per elevation needs compared with more site data. Is there a correlation between temporal and spatial distribution of sites and if so does temperature play a role in this pattern? Integration of lithic clusters, that have received temporal analysis by Burnett (2005), coupled with more comprehensive temperature data would enhance the understanding of site placement in the Upper Greybull watershed. This information could also be applied to other sites within the GYE and Rocky Mountains.

The survival and health of the GYE is also connected to the study area. Future management of the ecosystem and wilderness will also affect the cultural resources that are present. The influence of humans as a factor in the prehistoric GYE ecosystem has been overlooked. Understanding the affect of prehistoric humans on herd size or the application of fire to maintain the landscape is important in understanding the ecosystem's history. The more information and analysis of cultural resources within the GYE receive and the increased understanding of how prehistoric peoples adapted and affected the region will also lead to better cultural and natural resource management.

A suite of factors affect site placement on a given landscape. Those factors that are most researched are distance to water and biologic and geologic resources. Cultural biases and social factors also play a role in site choice. As demonstrated by the research presented here, the thermal landscape may also have a role in affecting prehistoric site choice. How crucial is the factor of temperature in site placement? The importance of temperature in deciding site placement is dependent on many variables. Time of year will obviously affect the importance of above-ground temperature. During warm summer months, like those analyzed above, temperature may not be as limiting as other factors, such as distance potable water or to faunal resources. Night temperatures did not seem to play a role in site choice, even though many nights recorded temperatures near or at freezing (Appendix A). There was a strong correlation between day temperature and lithic density however.

Extrapolated averages for temperatures in northwest Wyoming and the lapse rate of temperature per elevation were not reflected in the analysis of the readings collects. There is some danger in applying his temperature lapses to the landscape, especially if one is interpreting high altitude sites. Windscapes and inversions may play more of a role in defining the thermal landscape than was first thought. Wind speeds in mountainous environments are highly variable and thus difficult to predict (Dincauze 2002; Ferreya et al. 2001) due to localized topography, river drainages and differing vegetation communities. Wind speeds are extrapolated statewide from weather stations near major cities and are not necessarily applicable to montane, rural areas.

Wind plays an important role in the rate of evapotransiration as well as the distribution of snow in the winter (Curtis and Grimes 2004). Conversely distribution of snow, in the forms of drifts, effects localized soil moisture and vegetation distribution (Knight 1994; Heimstra et al. 2002). Windscapes in the Absarokas need to be more effectively studied to increase our understanding of winter temperatures and the possibility of snow-free areas that would have allowed for high altitude winter encampments and ungulate foraging. These factors, as well as winter/late fall temperatures need to be accounted for before the use of thermal landscapes is ruled out.

The site choice model, introduced in Chapter 1 (Figure 1.1), provides a heuristic device in understanding the importance of temperature and other climatic variables to site choice. When compared to the temperature data collected in this study, recent meteorological models of temperature lapse gradients (Knight 1994; Rolland 2003) appear to be somewhat accurate. These models do not account for inversions or windchill. The thermal landscape constructed for the Greybull and Jack Creek drainages demonstrates little variability in night temperatures between drainage bottom and ridge top. Mid-slope locations are, as hypothesized, warmer than the ridgeline. The temperature lapse rates that are currently applied to montane regions do not account for the mid-slope anomaly. This is one example of the applicability of localized thermal landscapes. Comparison of the Greybull/Jack Creek thermal landscape with other montane areas is essential if we are to understand the validity of this argument.

As noted there was a correlation between locations on the natural landscape that experienced the greatest diurnal discrepancy in temperature and site placement. Plants, especially seedlings, are dependent on diurnal temperature changes for growth (Berghage 1998; Peteet 2000). Other organisms have the ability to change their location to ameliorate temperature shifts. For example, reptiles can lie in the sun or seek shade, dependent on local climate conditions. Humans can also culturally regulate the influence of temperature by building structures, cooling or heating devices and clothing. Diurnal temperature gradients are also important to vegetation and animal distributions (Begon et al. 1996).

Climate change in the past 50 years has demonstrated a decrease in diurnal temperature gradients (Bradley 1997; Pepin 2000). This change has been documented in the Front Range in Colorado (Pepin 2000). In the study area there was a 35 degree diurnal shift in temperature during the summer. If recent climate change studies are correct then diurnal temperature shifts were even greater during the prehistoric. Diurnal temperature change is usually greatest during the summer, due to decreased cloud cover and increased solar radiation, for most of North America (Forster and Solomon 2003). If prehistoric peoples were occupying the Jack Creek and Greybull study areas during the summer and winter months,, they may have been affected more by diurnal temperature during the summer rather than the winter months. This may change our understanding of exploitation of montane regions of the Absarokas during the prehistoric.

Thermal landscape studies are applicable to other high altitude locations in the Rocky Mountains (Stiger 2004) and therefore may have relevance in the study of other high altitude hunter-gatherer sites in North America. The study of above-ground temperature has become popular in the last two decades (Lookingbill and Urban 2003). Information is currently being gathered by other scientific disciplines that can be applied to archaeological research worldwide. Temperature lapse rates have been determined for the Italian Alps in Europe. In North America, the Colombia River Gorge (Rolland 2000), the Pacific Northwest (Lookinbill and Urban 2003) and the Gunnison Basin (Stiger 2004) have all been the center of various temperature studies.

Multi-disciplinary investigations coupled with multi-scalar approaches to the collection of modern and paleo data could further contribute to the interpretation and preservation of the Greybull River ecosystem and the Greater Yellowstone Ecosystem as a whole. The thermal landscape presented here is not only pertinent to understanding prehistoric hunter-gatherer site placement in northwest Wyoming but information such as this is also applicable to modern climate studies.

APPENDIX A

Combined mean temperatures for each HOBO temperature gauge (July 21 thru Sept, 2003) are provided in the following tables. Calculated sunrise and sunset times and mean daily temperatures from the Cody, Wyoming weather station are also listed.

Appendix A, Hobo Totals

613462 JC-006

Jack Creek 2870

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	52.9	1.2	27.1	30.6	34.0	18.2	16.3	9:16	17.5	1.2	9.3	5.3	-1.4	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	48.5	5.4	26.9	25.9	25.3	17.5	8.2	9:19	12.5	3.7	8.1	6.7	-9.0	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	44.9	0.3	22.6	29.3	26.8	15.5	12.2	9:21	16.0	0.7	8.4	4.8	-2.5	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	50.7	4.6	27.6	29.6	28.3	18.8	11.6	9:23	16.4	3.7	10.1	8.1	-5.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	46.4	9.0	27.7	18.4	19.6	18.3	4.9	9:26	12.9	5.0	9.0	7.8	-9.8	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	38.8	4.6	21.7	20.2	16.4	14.6	3.6	9:28	11.8	3.3	7.5	6.5	-9.3	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	41.5	0.3	20.9	22.5	23.5	14.0	9.1	9:30	13.3	0.7	7.0	4.7	-5.2	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	45.9	2.5	24.2	26.1	25.7	16.6	10.1	9:33	15.2	2.9	9.1	6.2	-5.4	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	51.8	0.3	26.0	29.3	33.7	17.1	15.0	9:35	15.2	1.2	8.2	4.8	-3.7	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	41.1	0.3	20.7	18.3	23.0	13.1	7.3	9:39	10.2	0.7	5.5	4.0	-8.3	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	39.7	2.0	20.9	20.5	19.9	13.7	5.9	9:41	11.4	1.6	6.5	4.5	-8.0	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	38.8	2.9	20.8	16.9	18.1	14.1	5.0	9:43	12.2	2.5	7.3	5.8	-8.1	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	52.4	5.0	28.7	25.5	29.6	19.1	10.5	9:46	14.1	5.0	9.5	8.5	-8.7	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	50.1	3.3	26.7	24.3	29.0	19.1	13.3	9:48	19.0	3.7	11.4	7.9	-2.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	49.0	5.0	27.0	24.9	26.3	18.8	9.4	9:51	15.6	5.4	10.5	7.9	-7.6	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	48.5	4.6	26.5	27.5	26.1	18.4	9.9	9:53	16.0	4.6	10.3	8.0	-6.4	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	47.4	4.6	26.0	27.8	25.1	18.5	10.1	9:57	17.5	4.6	11.0	7.9	-4.8	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	43.9	1.6	22.8	24.6	24.5	15.8	10.2	10:00	15.6	2.0	8.8	6.5	-4.2	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	39.2	-0.2	19.5	17.9	21.6	13.4	7.6	10:02	12.9	1.6	7.3	6.8	-6.4	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	41.5	2.0	21.8	24.6	21.7	15.1	7.2	10:05	13.7	3.3	8.5	5.5	-7.4	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	49.0	0.3	24.7	28.9	31.0	16.0	12.9	10:07	13.7	1.2	7.4	4.2	-5.2	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	49.0	4.6	26.8	26.6	26.7	18.3	12.6	10:11	17.9	1.6	9.8	5.1	-1.5	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	52.4	2.5	27.4	27.5	32.1	18.9	14.7	10:14	17.9	2.9	10.4	7.6	-2.8	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	51.8	9.0	30.4	27.3	25.0	20.2	6.6	10:16	12.9	7.0	10.0	9.7	-11.9	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	44.4	5.8	25.1	26.9	20.8	17.6	8.6	10:19	17.1	2.9	10.0	6.9	-3.5	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	48.0	2.0	25.0	26.2	28.1	16.3	11.6	10:22	14.1	1.2	7.6	4.8	-4.9	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	43.9	0.3	22.1	27.2	25.8	15.7	13.4	10:25	18.7	-0.2	9.3	6.5	1.0	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	49.6	0.3	24.9	30.9	31.5	17.8	16.4	10:28	20.2	1.2	10.7	5.6	1.2	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	44.4	5.0	24.7	24.3	21.6	16.4	7.1	10:31	13.3	2.9	8.1	5.0	-7.4	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	49.0	2.5	25.7	25.1	28.8	16.5	11.2	10:34	12.9	1.6	7.3	4.9	-6.4	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	23.6	-2.0	10.8	9.6	7.8	6.1	-1.7	10:36	4.6	-2.0	1.3	1.2	-11.2	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	7.8	2.9	5.4	4.5	-12.8	4.4	-11.7	10:39	7.0	-0.2	3.4	2.7	-10.6	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	28.3	-2.9	12.7	19.2	13.4	10.9	8.9	10:42	20.2	-2.0	9.1	2.8	4.4	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	34.0	0.3	17.1	22.7	15.9	14.3	10.8	10:46	23.2	-0.2	11.5	4.6	5.6	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	33.2	3.7	18.5	18.0	11.7	12.6	1.2	10:49	11.0	2.5	6.7	5.0	-9.2	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	32.3	1.2	16.8	21.6	13.4	13.4	7.6	10:51	19.8	0.3	10.0	4.5	1.7	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	37.0	7.4	22.2	22.5	11.8	17.2	4.2	10:54	19.4	5.0	12.2	8.2	-3.3	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	29.9	4.6	17.2	16.0	7.6	11.8	-2.5	10:57	9.0	3.7	6.4	6.8	-12.5	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	32.8	5.8	19.3	13.1	9.2	15.4	1.8	11:00	17.5	5.4	11.5	7.4	-5.7	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	29.5	1.2	15.3	15.5	10.6	13.7	6.8	11:04	22.5	1.6	12.0	5.7	3.1	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	24.4	4.6	14.5	10.6	2.1	10.4	-1.3	11:07	12.9	-0.2	6.4	3.6	-4.7	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	21.3	-6.3	7.5	9.9	9.9	6.8	5.5	11:09	15.6	-3.4	6.1	1.3	1.2	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	15.2	-1.1	7.1	6.2	-1.5	4.2	-7.2	11:12	3.7	-1.1	1.3	0.6	-13.0	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	22.1	-1.1	10.5	11.4	5.4	8.0	2.1	11:15	13.7	-2.9	5.4	1.7	-1.2	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	15.2	-0.6	7.3	6.0	-1.9	3.1	-4.2	11:18	4.6	-6.8	-1.1	-0.3	-6.4				
13 Sep 03	5:53	18:31	12:38	15.6	-8.9	3.4	5.0	6.8	-0.2	-1.0	11:22	0.7	-8.4	-3.8	-6.0	-8.7	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	21.7	-5.3	8.2	13.3	9.2	6.1	6.6	11:25	14.9	-6.8	4.0	-0.9	3.9	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	26.0	2.9	14.4	15.8	5.3	9.7	-1.5	11:28	9.8	0.3	5.1	3.4	-8.3	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	21.3	1.2	11.2	12.9	2.4	7.0	-4.3	11:31	6.2	-0.6	2.8	2.8	-11.0	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	9.8	-7.9	1.0	-0.5	-0.1	-2.4	-2.4	11:33	0.7	-12.3	-5.8	-6.3	-4.8	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	21.0	-11.1	4.9	9.2	14.3	2.0	8.5	11:36	9.4	-11.1	-0.9	-5.1	2.8	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	22.1	-5.3	8.4	13.7	9.6	7.2	6.7	11:40	16.8	-4.8	6.0	-0.2	3.8	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	24.4	-2.9	10.7	13.7	9.5	4.9	0.6	11:43	3.7	-5.8	-1.0	-0.9	-8.2	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	22.1	1.2	11.6	14.4	3.2	6.5	1.5	11:46	10.2	-7.3	1.4	-0.9	-0.2	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	26.3	2.5	14.4	18.7	6.1	13.3	4.4	11:49	22.5	2.0	12.3	5.3	2.7	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	25.2	4.6	14.9	18.2	2.8	13.9	0.5	11:52	21.0	5.0	13.0	7.2	-1.8	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	26.7	-3.9	11.4	17.6	12.8	10.8	8.7	11:55	21.3	-1.1	10.1	3.5	4.6	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	27.9	6.6	17.3	19.7	3.5	15.2	0.6	11:58	21.0	5.4	13.2	8.1	-2.2	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	25.2	4.2	14.7	13.2	3.2	10.7	-5.0	12:01	9.0	4.6	6.8	6.9	-13.3	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615202 I

Jack Creek 2912

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.9	5.4	21.6	25.4	14.7	16.8	5.5	9:16	19.0	5.0	12.0	9.1	-3.7	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	33.6	10.6	22.1	22.7	5.2	17.5	-0.5	9:19	18.7	7.0	12.8	11.4	-6.1	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	34.9	3.7	19.3	25.1	13.3	16.1	6.6	9:21	21.7	4.2	12.9	9.0	-0.2	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	37.4	10.6	24.0	26.0	9.1	18.2	0.7	9:23	17.5	7.4	12.5	12.2	-7.7	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	32.8	9.4	21.1	16.3	5.6	16.0	-3.0	9:26	14.1	7.8	11.0	11.1	-11.5	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	27.5	7.0	17.3	17.1	2.7	14.5	-2.1	9:28	17.1	6.2	11.7	9.1	-6.9	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	32.8	2.9	17.8	19.9	12.1	13.7	3.5	9:30	16.0	3.3	9.7	6.9	-5.1	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	32.3	4.2	18.3	22.5	10.4	15.1	3.3	9:33	19.0	5.0	12.0	9.1	-3.7	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	35.7	6.2	21.0	24.2	11.7	16.5	3.2	9:35	18.3	5.8	12.0	9.7	-5.3	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	30.7	5.8	18.3	17.3	7.1	13.2	-2.5	9:39	11.0	5.4	8.2	8.4	-12.2	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	31.5	8.2	19.9	18.8	5.5	14.7	-2.0	9:41	13.7	5.4	9.6	8.0	-9.5	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	28.3	9.0	18.7	16.9	1.5	14.5	-4.4	9:43	14.1	6.6	10.4	9.9	-10.3	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	37.0	11.0	24.0	22.8	8.2	18.5	-2.1	9:46	15.6	10.2	12.9	12.4	-12.4	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	35.3	9.4	22.3	23.3	8.1	18.4	1.7	9:48	21.0	7.8	14.4	11.6	-4.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	42.5	11.4	26.9	24.2	13.3	21.2	3.5	9:51	21.3	9.8	15.6	12.5	-6.3	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	46.9	6.6	26.8	27.4	22.5	19.1	6.9	9:53	16.0	7.0	11.5	10.9	-8.8	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	46.9	6.2	26.6	28.3	22.9	19.8	11.9	9:57	22.5	3.7	13.1	9.4	1.0	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	47.4	3.7	25.6	24.2	25.9	16.9	10.7	10:00	14.9	1.6	8.2	6.6	-4.5	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	38.8	-0.6	19.1	16.6	21.6	13.4	9.8	10:02	15.6	-0.2	7.7	6.7	-2.0	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	45.9	0.3	23.1	25.7	27.8	16.8	13.1	10:05	18.7	2.5	10.6	5.3	-1.6	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	48.0	0.7	24.3	28.2	29.5	16.3	12.9	10:07	15.2	1.2	8.2	4.3	-3.7	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	46.9	5.8	26.4	25.0	23.3	19.0	11.4	10:11	20.2	2.9	11.5	6.1	-0.5	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	49.6	2.9	26.2	27.2	28.9	19.0	14.4	10:14	20.6	2.9	11.7	8.3	-0.1	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	48.0	9.4	28.7	25.5	20.8	19.1	4.8	10:16	12.9	6.2	9.6	9.3	-11.1	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	42.9	6.2	24.6	25.5	18.9	18.0	8.6	10:19	19.4	3.3	11.4	7.2	-1.7	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	46.9	2.9	24.9	24.7	26.3	17.4	13.0	10:22	18.7	1.2	9.9	5.4	-0.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	45.4	0.7	23.1	27.6	26.9	16.5	13.3	10:25	18.7	1.2	9.9	7.6	-0.3	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	45.9	3.3	24.6	29.8	24.8	19.2	14.5	10:28	24.8	2.9	13.8	8.2	4.1	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	35.3	6.6	20.9	22.6	10.9	17.0	3.7	10:31	20.2	5.8	13.0	8.0	-3.4	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	42.9	4.2	23.5	22.4	21.0	16.1	7.0	10:34	14.1	3.3	8.7	6.4	-7.0	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	24.4	-2.0	11.2	11.7	8.6	7.2	0.1	10:36	7.8	-1.5	3.2	2.9	-8.4	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	12.2	5.0	8.6	7.6	-10.6	6.6	-11.1	10:39	7.8	1.6	4.7	4.8	-11.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	33.2	-2.0	15.6	19.7	17.4	12.7	10.6	10:42	20.6	-1.1	9.8	3.7	3.8	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	37.4	0.3	18.9	21.8	19.4	15.5	12.2	10:46	23.6	0.7	12.2	5.4	5.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	35.3	3.7	19.5	18.0	13.8	13.8	2.8	10:49	12.9	3.3	8.1	5.8	-8.2	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	38.8	1.6	20.2	22.7	19.4	15.7	10.5	10:51	21.0	1.6	11.3	5.3	1.6	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	41.5	4.6	23.0	22.0	19.2	17.4	7.5	10:54	18.7	5.0	11.8	7.4	-4.1	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	30.7	3.7	17.2	17.2	9.2	12.4	-0.5	10:57	11.4	3.7	7.6	7.4	-10.1	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	36.1	6.6	21.4	15.3	11.7	17.3	4.0	11:00	20.2	6.2	13.2	8.8	-3.8	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	26.3	2.5	14.4	15.0	6.1	12.6	2.0	11:04	18.7	2.9	10.8	5.9	-2.0	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	25.2	3.3	14.2	10.9	4.1	9.0	-0.7	11:07	9.8	-2.4	3.7	1.4	-5.5	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	27.9	-6.3	10.8	11.0	16.4	7.7	9.2	11:09	14.5	-5.3	4.6	0.1	2.0	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.6	1.2	1.4	1.3	-17.3	1.8	-16.5	11:12	3.3	1.2	2.2	1.6	-15.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	19.4	1.2	10.3	7.0	0.5	8.4	-3.3	11:15	11.8	1.2	6.5	2.3	-7.2	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	16.8	0.7	8.7	6.3	-1.7	4.3	-6.0	11:18	3.7	-3.9	-0.1	-0.4	-10.2				
13 Sep 03	5:53	18:31	12:38	20.2	-5.3	7.4	5.6	7.7	3.0	-1.6	11:22	2.0	-4.8	-1.4	-3.5	-10.9	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	24.4	-4.8	9.8	12.3	11.4	7.5	6.4	11:25	14.9	-4.3	5.3	-1.3	1.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	28.3	-1.5	13.4	14.7	12.0	8.6	3.5	11:28	10.2	-2.4	3.9	1.5	-5.1	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	24.0	-1.1	11.5	12.3	7.3	7.3	-1.0	11:31	7.4	-1.1	3.2	1.6	-9.3	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	7.0	-4.3	1.3	1.5	-6.4	-0.3	-9.8	11:33	0.3	-4.3	-2.0	-1.9	-13.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	22.9	-3.9	9.5	6.0	8.9	5.9	1.8	11:36	8.6	-3.9	2.4	-2.0	-5.3	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	25.2	-4.8	10.2	12.0	12.2	7.1	6.1	11:40	12.9	-4.8	4.1	-1.6	0.0	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	26.3	-3.9	11.2	13.3	12.4	6.0	1.9	11:43	5.4	-3.9	0.8	-1.7	-8.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	27.1	-2.4	12.3	14.4	11.8	8.0	4.4	11:46	11.0	-3.9	3.6	-1.7	-2.9	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	29.5	-1.1	14.2	17.5	12.8	11.3	7.0	11:49	17.9	-1.1	8.4	2.3	1.2	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	30.7	1.2	15.9	18.3	11.8	12.8	5.0	11:52	17.5	1.6	9.6	4.1	-1.9	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	31.5	-4.3	13.6	18.5	18.1	11.0	11.5	11:55	19.8	-2.9	8.5	2.2	4.9	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	31.1	2.9	17.0	19.3	10.5	13.7	5.1	11:58	19.0	1.6	10.3	5.3	-0.3	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	22.1	1.2	11.6	9.2	3.2	7.9	-5.6	12:01	5.8	2.5	4.1	4.0	-14.4	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615203

Jack Creek 2796

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	40.6	1.2	20.9	24.9	21.6	15.5	10.5	9:16	18.7	1.6	10.1	6.5	-0.7	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	36.1	8.2	22.2	22.1	10.1	16.2	1.5	9:19	15.6	5.0	10.3	8.6	-7.1	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	37.4	1.6	19.5	24.1	18.1	14.7	9.3	9:21	19.0	0.7	9.9	5.6	0.5	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	37.4	5.8	21.6	24.4	13.9	16.5	4.9	9:23	18.3	4.6	11.4	9.4	-4.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	29.1	9.4	19.3	16.0	1.9	13.8	-5.7	9:26	10.6	6.2	8.4	8.9	-13.4	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	32.8	6.2	19.5	18.4	8.8	14.0	-0.1	9:28	12.9	4.2	8.5	7.0	-9.0	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	33.2	-0.2	16.5	18.2	15.6	12.0	5.6	9:30	14.1	0.7	7.4	4.6	-4.4	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	37.9	2.5	20.2	21.8	17.6	15.6	7.2	9:33	18.3	3.7	11.0	7.6	-3.2	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	39.2	1.6	20.4	23.6	19.8	14.9	8.8	9:35	17.1	1.6	9.4	7.0	-2.2	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	33.6	2.5	18.0	15.7	13.4	12.3	1.0	9:39	9.8	3.3	6.6	5.7	-11.3	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	34.0	3.3	18.7	18.4	12.9	12.6	2.0	9:41	11.0	2.0	6.5	5.3	-8.8	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	29.1	5.0	17.0	15.3	6.3	12.8	-0.9	9:43	13.3	3.7	8.5	7.4	-8.2	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	37.4	6.2	21.8	21.8	13.4	16.4	1.0	9:46	14.1	7.8	11.0	10.4	-11.5	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	35.7	4.2	19.9	22.0	13.8	16.2	5.8	9:48	20.2	4.6	12.4	8.9	-2.2	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	37.4	6.2	21.8	22.2	13.4	16.7	3.1	9:51	16.8	6.2	11.5	10.0	-7.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	37.0	5.8	21.4	23.3	13.4	16.4	3.1	9:53	16.8	6.2	11.5	10.3	-7.2	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	37.0	5.0	21.0	24.4	14.2	16.6	5.5	9:57	19.4	5.0	12.2	10.1	-3.3	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	38.3	6.6	22.5	22.4	13.9	15.9	5.0	10:00	16.4	2.5	9.4	7.1	-3.9	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	26.0	0.7	13.3	13.0	7.4	9.8	-0.5	10:02	11.0	1.6	6.3	7.2	-8.4	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	30.3	2.0	16.2	20.0	10.5	12.1	1.0	10:05	12.5	3.3	7.9	5.4	-8.6	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	39.7	1.6	20.6	24.5	20.3	14.4	7.5	10:07	14.5	2.0	8.3	5.4	-5.3	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	37.9	5.4	21.6	23.7	14.7	15.9	5.8	10:11	17.5	2.9	10.2	6.6	-3.1	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	38.8	3.7	21.3	24.1	17.3	15.8	7.2	10:14	17.9	2.9	10.4	8.5	-2.8	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	38.3	12.2	25.2	23.0	8.4	18.5	-1.2	10:16	15.2	8.2	11.7	10.9	-10.8	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	37.4	9.4	23.4	23.5	10.2	17.0	3.1	10:19	17.5	3.7	10.6	8.9	-4.0	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	38.8	2.9	20.8	21.3	18.1	14.7	7.2	10:22	15.6	1.6	8.6	6.1	-3.8	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	35.3	1.2	18.2	23.3	16.3	14.3	8.0	10:25	19.0	1.6	10.3	7.3	-0.3	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	41.1	2.0	21.5	26.6	21.2	16.2	11.4	10:28	20.6	1.2	10.9	6.8	1.6	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	31.5	5.8	18.7	20.5	7.9	13.0	-0.9	10:31	11.4	3.3	7.4	6.7	-9.7	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	33.6	5.4	19.5	20.8	10.4	14.0	3.1	10:34	15.2	1.6	8.4	7.2	-4.1	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	29.1	-2.4	13.3	12.5	13.8	8.1	3.3	10:36	8.2	-2.4	2.9	2.4	-7.1	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	10.6	5.0	7.8	7.2	-12.2	5.8	-11.8	10:39	7.0	0.7	3.9	4.5	-11.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	45.4	-1.1	22.2	23.3	28.7	14.5	13.0	10:42	14.5	-0.6	6.9	3.4	-2.7	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	55.4	1.2	28.3	28.1	36.4	18.5	16.5	10:46	16.0	1.6	8.8	5.3	-3.4	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	45.9	2.9	24.4	17.8	25.2	16.0	9.0	10:49	12.9	2.5	7.7	5.4	-7.3	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	49.6	1.6	25.6	25.3	30.2	16.7	13.3	10:51	14.9	0.7	7.8	4.1	-3.7	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	56.0	2.9	29.4	24.7	35.3	20.0	16.5	10:54	18.3	2.9	10.6	6.2	-2.4	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	31.5	2.0	16.8	16.8	11.7	11.6	1.4	10:57	11.0	2.0	6.5	5.9	-8.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	34.9	7.0	20.9	14.8	10.0	15.8	-0.1	11:00	14.5	7.0	10.7	8.6	-10.3	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	30.7	2.0	16.4	16.1	10.9	12.0	1.4	11:04	12.5	2.9	7.7	5.9	-8.1	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	30.3	2.0	16.2	12.1	10.5	9.3	0.2	11:07	6.2	-1.5	2.4	1.5	-10.1	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	42.0	-5.3	18.3	15.3	29.5	10.0	12.4	11:09	8.2	-4.8	1.7	0.9	-4.7	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.6	1.2	1.4	1.4	-17.3	2.1	-15.9	11:12	4.6	1.2	2.9	2.1	-14.4	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	39.2	0.7	20.0	13.5	20.7	12.1	5.0	11:15	7.8	0.7	4.3	2.8	-10.7	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	18.3	2.0	10.2	7.8	-1.5	5.4	-5.7	11:18	4.6	-3.4	0.6	0.9	-9.8				
13 Sep 03	5:53	18:31	12:38	32.8	-5.3	13.7	8.2	20.3	6.5	5.8	11:22	3.7	-5.3	-0.8	-3.2	-8.7	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	45.9	-6.3	19.8	21.6	34.4	11.2	17.2	11:25	11.4	-6.3	2.5	-1.5	-0.1	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	49.0	-1.5	23.8	22.3	32.8	14.4	15.4	11:28	12.9	-2.9	5.0	2.0	-1.9	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	38.3	-1.1	18.6	16.7	21.6	11.4	7.6	11:31	9.8	-1.5	4.2	2.6	-6.5	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	6.2	-4.3	0.9	1.6	-7.2	0.0	-10.5	11:33	1.2	-2.9	-0.9	-0.5	-13.7	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	38.3	-2.9	17.7	13.6	23.5	10.7	9.4	11:36	10.2	-2.9	3.7	-1.1	-4.7	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	40.1	-4.8	17.7	18.4	27.2	9.7	11.2	11:40	8.2	-4.8	1.7	-1.4	-4.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	47.4	-4.8	21.3	20.7	34.5	11.6	14.0	11:43	7.4	-3.9	1.8	-1.5	-6.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	48.5	-2.4	23.0	24.1	33.1	12.1	12.7	11:46	6.2	-3.9	1.2	-1.9	-7.7	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	51.8	-0.6	25.6	29.3	34.6	16.2	16.4	11:49	14.9	-1.1	6.9	2.7	-1.9	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	54.7	0.3	27.5	29.4	36.7	17.6	15.9	11:52	14.1	1.2	7.6	3.8	-4.9	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	50.1	-4.8	22.6	26.7	37.2	13.5	17.5	11:55	12.2	-3.4	4.4	1.0	-2.2	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	54.7	2.9	28.8	30.1	34.1	18.4	15.0	11:58	14.9	1.2	8.0	5.1	-4.1	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	8.6	-0.6	4.0	1.6	-8.5	3.8	-10.2	12:01	6.6	0.7	3.7	3.4	-11.9	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615205

Jack Creek 2875

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.4	5.0	21.2	26.5	14.7	15.8	5.2	9:16	17.1	3.7	10.4	7.7	-4.4	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	50.7	9.4	30.0	27.2	23.5	19.4	7.4	9:19	13.3	4.2	8.7	8.7	-8.6	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	56.0	1.2	28.6	33.6	37.0	18.1	16.9	9:21	14.9	0.3	7.6	4.8	-3.2	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	53.5	5.4	29.5	30.9	30.4	19.9	12.0	9:23	16.0	4.6	10.3	9.9	-6.4	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	52.4	9.4	30.9	18.1	25.2	19.5	6.5	9:26	11.0	5.4	8.2	8.4	-12.2	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	41.1	5.4	23.2	19.7	17.9	15.2	3.5	9:28	10.6	3.7	7.2	6.8	-10.9	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	50.1	0.3	25.2	25.8	32.0	16.0	13.2	9:30	12.9	0.7	6.8	4.8	-5.6	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	46.9	2.9	24.9	25.5	26.3	17.5	10.6	9:33	16.4	3.7	10.1	7.1	-5.1	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	56.6	1.2	28.9	31.0	37.7	18.9	16.7	9:35	15.6	2.0	8.8	6.2	-4.2	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	45.4	1.6	23.5	19.6	26.0	14.9	8.4	9:39	10.6	2.0	6.3	5.2	-9.2	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	53.5	4.2	28.8	23.0	31.6	17.9	11.0	9:41	11.0	2.9	6.9	5.2	-9.7	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	45.4	5.8	25.6	17.4	21.8	17.2	6.6	9:43	13.3	4.2	8.7	7.2	-8.6	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	57.2	7.0	32.1	27.7	32.4	21.2	10.7	9:46	13.7	7.0	10.4	9.7	-11.1	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	56.6	4.2	30.4	25.8	34.7	21.0	15.1	9:48	18.3	5.0	11.6	9.1	-4.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	58.5	6.6	32.6	26.9	34.1	22.1	12.3	9:51	15.6	7.4	11.5	9.5	-9.6	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	62.0	5.0	33.5	33.0	39.3	22.2	16.2	9:53	16.4	5.4	10.9	9.0	-6.8	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	63.5	5.4	34.4	33.4	40.3	22.3	16.0	9:57	14.9	5.4	10.1	8.9	-8.3	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	51.8	2.9	27.3	27.2	31.1	18.3	13.0	10:00	15.6	2.9	9.3	7.3	-5.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	50.1	1.6	25.9	21.2	30.7	16.6	11.7	10:02	12.5	2.0	7.3	7.4	-7.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	59.2	2.0	30.6	32.1	39.4	19.1	15.0	10:05	11.8	3.3	7.5	5.9	-9.3	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	62.0	0.7	31.4	34.9	43.5	19.6	19.1	10:07	14.1	1.6	7.8	5.0	-5.3	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	59.9	7.4	33.7	31.1	34.7	21.7	15.2	10:11	16.4	2.9	9.6	6.0	-4.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	58.5	4.2	31.4	29.7	36.6	20.6	15.9	10:14	16.4	3.3	9.8	8.4	-4.7	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	62.0	9.8	35.9	30.1	34.4	23.2	10.7	10:16	12.9	8.2	10.6	10.2	-13.1	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	52.9	6.6	29.8	30.8	28.5	20.4	11.9	10:19	17.5	4.6	11.0	7.9	-4.8	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	55.4	4.2	29.8	29.9	33.4	18.8	14.1	10:22	14.1	1.6	7.8	6.2	-5.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	62.0	2.0	32.0	36.7	42.2	21.1	20.7	10:25	18.7	1.6	10.1	7.6	-0.7	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	61.3	2.5	31.9	38.3	41.1	21.2	21.0	10:28	19.8	1.2	10.5	6.4	0.9	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	55.4	6.2	30.8	27.9	31.4	19.0	10.2	10:31	10.6	3.7	7.2	6.2	-10.9	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	57.9	4.2	31.0	26.9	36.0	19.2	14.9	10:34	13.3	1.6	7.5	5.5	-6.1	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	32.8	-2.9	14.9	14.1	17.9	8.7	5.4	10:36	7.8	-2.9	2.5	1.7	-7.0	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.8	4.2	8.0	6.5	-10.2	5.5	-10.4	10:39	6.6	-0.6	3.0	3.8	-10.6	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	42.0	-2.0	20.0	20.9	26.2	11.5	9.1	10:42	7.8	-2.0	2.9	1.6	-8.0	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	50.1	-0.2	25.0	25.0	32.5	15.2	12.9	10:46	11.0	-0.2	5.4	2.9	-6.6	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	42.9	3.3	23.1	19.3	21.8	14.3	6.4	10:49	9.8	1.2	5.5	4.0	-9.1	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	46.9	-0.6	23.2	25.4	29.7	14.5	12.4	10:51	12.2	-0.6	5.8	3.0	-5.0	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	54.1	5.0	29.6	25.8	31.4	19.8	12.7	10:54	16.0	4.2	10.1	6.5	-5.9	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	33.2	2.0	17.6	17.1	13.4	11.5	2.1	10:57	9.8	1.2	5.5	5.3	-9.1	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	34.9	6.2	20.5	14.5	10.9	14.9	-0.1	11:00	12.5	5.8	9.2	7.5	-11.0	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	31.5	1.2	16.3	14.9	12.6	10.8	1.1	11:04	9.0	1.6	5.3	4.3	-10.4	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	28.3	2.9	15.6	11.3	7.6	8.4	-1.8	11:07	4.6	-2.0	1.3	1.4	-11.2	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	34.9	-7.3	13.8	12.6	24.4	6.9	9.1	11:09	5.8	-5.8	0.0	-0.2	-6.2	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.2	0.7	0.9	0.9	-17.3	1.5	-16.3	11:12	3.3	0.7	2.0	1.2	-15.2	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	31.1	0.7	15.9	7.7	12.6	9.4	-0.5	11:15	5.0	0.7	2.9	1.6	-13.5	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	16.0	0.3	8.1	7.6	-2.1	3.7	-6.3	11:18	2.9	-4.3	-0.7	-0.3	-10.6				
13 Sep 03	5:53	18:31	12:38	29.9	-7.9	11.0	9.0	20.0	4.2	6.3	11:22	2.5	-7.9	-2.7	-4.7	-7.5	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	40.6	-6.8	16.9	17.7	29.6	8.0	11.8	11:25	5.0	-6.8	-0.9	-2.8	-6.0	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	42.5	-1.1	20.7	20.4	25.7	12.5	10.7	11:28	11.0	-2.4	4.3	1.5	-4.4	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	30.3	-2.4	13.9	13.9	15.0	7.7	3.8	11:31	6.6	-3.9	1.4	0.3	-7.3	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	10.2	-8.9	0.6	1.0	1.4	-1.2	-5.4	11:33	-0.2	-5.8	-3.0	-3.4	-12.1	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	30.3	-5.8	12.3	7.6	18.3	6.7	8.2	11:36	9.0	-6.8	1.1	-4.1	-1.9	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	32.8	-8.4	12.2	14.8	23.4	6.8	12.7	11:40	11.4	-8.4	1.5	-3.8	2.0	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	36.1	-5.8	15.2	16.3	24.2	6.2	8.4	11:43	2.5	-7.9	-2.7	-4.0	-7.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	33.6	-2.4	15.6	16.9	18.2	7.6	8.1	11:46	7.4	-8.4	-0.5	-4.1	-2.0	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	33.2	-2.0	15.6	19.5	17.4	11.3	9.2	11:49	16.4	-2.4	7.0	1.4	1.0	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	34.9	0.3	17.6	19.8	16.8	12.9	6.5	11:52	15.2	1.2	8.2	3.6	-3.7	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	34.9	-9.5	12.7	19.6	26.5	8.3	15.0	11:55	14.5	-6.8	3.8	-0.9	3.5	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	34.0	2.0	18.0	20.7	14.2	13.1	5.2	11:58	15.2	1.2	8.2	4.4	-3.7	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	21.7	0.3	11.0	8.1	3.6	7.0	-5.2	12:01	5.0	1.2	3.1	3.0	-14.0	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615207 Ridge
Jack Creek 3165

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.0	5.4	21.2	20.9	13.8	16.9	4.8	9:16	19.4	5.8	12.6	8.8	-4.2	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	28.3	7.8	18.1	18.5	2.7	15.6	-1.3	9:19	19.4	7.0	13.2	10.9	-5.4	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	34.0	4.2	19.1	22.5	12.1	16.6	7.5	9:21	24.4	3.7	14.1	8.5	2.9	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	35.3	9.8	22.5	22.2	7.7	17.1	-1.6	9:23	15.2	8.2	11.7	11.7	-10.8	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	24.0	7.4	15.7	13.8	-1.2	13.0	-5.8	9:26	14.1	6.6	10.4	10.2	-10.3	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	26.3	5.4	15.9	14.7	3.2	14.6	0.7	9:28	21.3	5.4	13.4	7.7	-1.9	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	29.5	2.9	16.2	17.3	8.8	12.8	2.1	9:30	16.0	2.9	9.4	5.9	-4.7	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	31.9	4.2	18.0	20.1	10.0	15.2	3.1	9:33	19.4	5.4	12.4	9.2	-3.8	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	32.3	7.8	20.1	20.6	6.7	16.0	-0.7	9:35	16.8	7.0	11.9	10.0	-8.0	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	26.0	7.0	16.5	14.5	1.1	12.3	-6.1	9:39	10.2	5.8	8.0	8.7	-13.4	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	29.1	7.0	18.1	16.5	4.3	14.2	-1.4	9:41	15.6	5.0	10.3	8.5	-7.1	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	26.0	8.6	17.3	14.6	-0.5	13.8	-6.2	9:43	13.3	7.4	10.4	10.1	-11.9	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	30.3	9.0	19.7	19.5	3.5	15.9	-4.8	9:46	14.5	9.8	12.1	11.2	-13.1	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	29.9	10.2	20.1	20.5	1.9	17.2	-1.4	9:48	21.0	7.8	14.4	11.3	-4.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	29.1	9.8	19.5	20.1	1.5	18.8	-0.3	9:51	26.0	10.2	18.1	12.7	-2.0	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	31.5	10.2	20.9	21.8	3.5	16.7	-5.6	9:53	14.1	11.0	12.5	11.8	-14.7	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	33.2	7.8	20.5	23.1	7.6	19.3	4.7	9:57	27.9	8.2	18.1	11.7	1.9	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	30.7	8.2	19.5	19.5	4.7	14.8	-3.4	10:00	13.3	7.0	10.2	8.7	-11.5	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	22.5	5.0	13.7	12.7	-0.3	11.1	-1.8	10:02	15.6	1.2	8.4	6.8	-3.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	31.1	1.6	16.4	18.4	11.7	14.9	7.1	10:05	23.6	3.3	13.5	6.3	2.5	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	32.8	5.4	19.1	20.7	9.6	15.1	1.2	10:07	16.4	5.8	11.1	8.1	-7.2	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	28.3	9.8	19.1	18.5	0.7	16.3	-2.9	10:11	19.0	7.8	13.4	9.5	-6.6	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	36.6	9.4	23.0	20.8	9.4	19.6	5.9	10:14	26.3	6.2	16.3	11.6	2.3	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	32.3	9.8	21.1	18.1	4.8	15.3	-3.9	10:16	12.2	7.0	9.6	9.2	-12.6	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	30.7	6.6	18.7	16.8	6.3	15.8	1.1	10:19	19.8	6.2	13.0	8.5	-4.2	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	30.3	6.2	18.3	17.2	6.3	15.7	2.0	10:22	21.0	5.4	13.2	8.7	-2.2	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	33.6	6.2	19.9	20.6	9.6	16.8	2.5	10:25	20.2	7.0	13.6	9.8	-4.6	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	39.7	6.6	23.1	22.6	15.3	18.9	8.1	10:28	24.0	5.4	14.7	9.6	0.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	26.3	9.0	17.7	16.5	-0.5	15.2	-2.3	10:31	19.4	5.8	12.6	9.0	-4.2	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	26.7	5.4	16.1	15.0	3.6	11.1	-3.0	10:34	10.2	2.0	6.1	5.1	-9.6	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	18.7	-0.2	9.3	8.5	1.0	5.5	-6.0	10:36	4.2	-0.6	1.8	1.4	-13.0	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	4.6	0.7	2.7	2.3	-13.9	2.1	-13.7	10:39	3.7	-0.6	1.6	1.7	-13.4	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	31.5	-1.1	15.2	16.2	14.8	13.5	11.2	10:42	24.4	-1.1	11.7	3.8	7.7	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	31.5	2.5	17.0	18.1	11.3	15.7	8.7	10:46	26.3	2.5	14.4	6.4	6.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	24.4	4.2	14.3	14.5	2.5	11.0	-3.2	10:49	12.2	3.3	7.7	6.0	-8.9	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	30.3	2.9	16.6	18.7	9.6	14.8	6.5	10:51	23.6	2.5	13.0	5.9	3.4	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	33.2	6.6	19.9	17.3	8.8	17.1	3.2	10:54	22.1	6.6	14.4	8.5	-2.3	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	24.4	6.2	15.3	14.2	0.4	11.6	-6.7	10:57	9.8	5.8	7.8	7.6	-13.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	22.1	4.6	13.3	10.3	-0.3	12.9	-0.6	11:00	21.0	4.2	12.6	6.3	-1.0	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	26.3	1.6	14.0	11.5	7.0	12.9	4.4	11:04	21.7	2.0	11.9	5.9	1.9	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	16.8	2.0	9.4	7.3	-3.1	5.6	-5.2	11:07	7.0	-3.4	1.8	2.7	-7.4	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	26.3	-6.3	10.0	9.8	14.9	7.0	8.3	11:09	13.7	-5.8	3.9	-1.7	1.7	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	-0.2	-2.0	-1.1	-0.4	-16.0	-0.7	-15.3	11:12	1.2	-2.0	-0.4	-0.6	-14.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	-0.2	-0.6	-0.4	-0.2	-17.3	-0.3	-17.6	11:15	-0.2	-0.2	-0.2	-0.2	-17.8	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	10.6	-1.5	4.5	1.0	-5.7	0.9	-9.1	11:18	-0.2	-5.3	-2.7	-2.0	-12.6				
13 Sep 03	5:53	18:31	12:38	1.6	-5.3	-1.9	-1.4	-10.9	-2.5	-12.2	11:22	-1.1	-5.3	-3.2	-4.3	-13.5	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	18.7	-6.3	6.2	5.4	7.2	3.8	2.4	11:25	9.0	-6.3	1.4	-2.8	-2.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	26.3	-1.1	12.6	13.1	9.6	7.4	0.9	11:28	7.0	-2.9	2.1	0.2	-7.8	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	22.5	-0.6	10.9	9.8	5.3	5.6	-2.7	11:31	3.7	-3.4	0.2	-0.2	-10.7	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	6.2	-10.0	-1.9	-2.6	-1.6	-4.1	-5.4	11:33	-2.0	-10.6	-6.3	-4.6	-9.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	-0.2	-5.3	-2.7	-2.5	-12.6	-2.7	-12.6	11:36	-0.2	-5.3	-2.7	-3.6	-12.6	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	13.3	-2.9	5.2	2.1	-1.6	3.2	-4.6	11:40	6.2	-3.9	1.2	-2.2	-7.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	28.3	-5.3	11.5	9.3	15.8	4.4	2.6	11:43	0.7	-6.3	-2.8	-3.6	-10.7	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	25.6	-2.9	11.3	10.7	10.7	5.1	1.2	11:46	3.7	-5.8	-1.0	-2.9	-8.2	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	26.0	-0.6	12.7	14.0	8.8	9.0	2.8	11:49	12.5	-2.0	5.3	1.4	-3.3	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	26.3	0.7	13.5	14.1	7.8	9.9	0.1	11:52	11.4	1.2	6.3	3.2	-7.6	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	29.9	-3.4	13.3	14.8	15.5	9.3	5.3	11:55	11.8	-1.1	5.4	1.5	-5.0	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	26.7	2.5	14.6	15.6	6.5	11.0	-0.2	11:58	12.9	2.0	7.5	4.3	-6.9	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	26.0	0.7	13.3	14.8	7.4	9.8	1.8	12:01	13.3	-0.6	6.4	3.3	-3.9	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	30.3	-3.4	13.5	14.7	15.9	7.6	7.1	12:04	9.8	-6.3	1.8	-2.1	-1.7	17.8	3.9	11.1	-3.9
28 Sep 03	6:10	18:03	11:53	21.0	-6.8	7.1	1.5	10.0	0.9	-2.4	12:07	-3.9	-6.8	-5.3	-4.9	-14.8	12.8	5.0	8.9	-10.0
28 Sep 03	6:10	18:03	11:53	21.0	-6.8	7.1	1.5	10.0	0.9	-2.4	12:07	-3.9	-6.8	-5.3	-4.9	-14.8	-17.2			

Appendix A, Hobo Totals

615208 Ridge
Jack Creek 3126

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	33.2	3.7	18.5	22.4	11.7	13.8	2.3	9:16	14.5	3.7	9.1	7.3	-7.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	36.6	7.8	22.2	21.8	11.0	15.8	-0.6	9:19	12.2	6.6	9.4	9.2	-12.2	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	30.7	3.7	17.2	21.5	9.2	12.9	0.9	9:21	13.7	3.3	8.5	8.2	-7.4	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	34.9	8.2	21.5	23.9	8.8	16.2	-0.2	9:23	15.2	6.6	10.9	10.7	-9.2	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	27.9	8.2	18.1	14.8	1.9	13.9	-4.4	9:26	13.3	6.2	9.8	10.0	-10.7	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	27.9	4.6	16.2	17.2	5.6	12.0	-2.9	9:28	11.0	4.6	7.8	6.6	-11.4	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	24.8	2.0	13.4	17.6	5.0	9.6	-2.3	9:30	9.8	1.6	5.7	5.2	-9.6	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	34.0	3.7	18.9	23.3	12.5	14.4	3.1	9:33	15.6	4.2	9.9	8.5	-6.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	37.0	5.8	21.4	25.3	13.4	16.1	2.7	9:35	15.6	5.8	10.7	8.8	-8.0	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	32.8	5.8	19.3	18.0	9.2	13.2	-1.3	9:39	10.2	4.2	7.2	7.4	-11.7	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	32.8	5.4	19.1	18.1	9.6	12.8	-1.7	9:41	9.0	4.2	6.6	6.6	-12.9	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	25.6	6.6	16.1	16.4	1.2	12.5	-5.1	9:43	12.2	5.8	9.0	8.6	-11.4	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	39.2	9.0	24.1	21.8	12.4	17.6	-0.1	9:46	13.7	8.6	11.2	10.6	-12.7	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	37.9	7.8	22.9	24.5	12.3	17.7	2.3	9:48	17.5	7.4	12.5	10.7	-7.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	37.4	7.4	22.4	22.7	12.2	17.5	0.7	9:51	16.0	9.0	12.5	11.0	-10.8	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	26.7	9.8	18.3	22.1	-0.9	15.3	-6.8	9:53	14.9	9.8	12.3	11.4	-12.7	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	27.1	9.4	18.3	22.0	-0.1	15.5	-4.9	9:57	16.8	8.6	12.7	11.6	-9.6	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	33.6	7.0	20.3	23.4	8.8	15.0	-0.2	10:00	14.1	5.4	9.7	8.4	-9.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	22.5	3.7	13.1	13.2	1.0	9.4	-4.3	10:02	9.8	1.6	5.7	6.4	-9.6	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	19.4	2.9	11.2	15.0	-1.2	8.8	-6.9	10:05	9.0	3.7	6.4	5.0	-12.5	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	35.3	3.7	19.5	24.6	13.8	14.4	3.1	10:07	14.5	4.2	9.3	6.9	-7.5	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	35.3	7.8	21.6	21.4	9.7	15.9	-0.1	10:11	14.1	6.2	10.2	8.2	-9.9	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	34.4	7.8	21.1	23.2	8.8	15.5	0.1	10:14	14.5	5.4	9.9	9.9	-8.7	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	33.6	9.8	21.7	21.4	6.0	15.8	-3.5	10:16	12.2	7.4	9.8	9.1	-13.1	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	27.9	6.6	17.3	18.5	3.5	13.7	-2.8	10:19	14.5	5.8	10.1	7.6	-9.1	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	32.3	4.6	18.5	21.7	10.0	13.4	1.1	10:22	13.3	3.3	8.3	7.2	-7.8	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	29.5	4.6	17.0	20.5	7.2	13.5	-0.4	10:25	14.9	5.0	9.9	8.6	-7.9	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	33.2	5.0	19.1	25.2	10.4	14.8	2.2	10:28	16.4	4.6	10.5	8.8	-6.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	27.5	7.8	17.7	17.3	1.9	12.6	-5.3	10:31	10.2	5.0	7.6	7.6	-12.6	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	30.3	4.6	17.4	18.6	8.0	11.5	-1.4	10:34	9.0	2.0	5.5	4.8	-10.8	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	17.1	-0.6	8.3	8.1	0.0	4.7	-6.3	10:36	3.7	-1.5	1.1	1.3	-12.5	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	5.8	0.3	3.1	2.7	-12.3	2.7	-12.9	10:39	4.6	0.3	2.4	2.1	-13.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	23.2	-2.9	10.2	14.6	8.4	6.4	0.9	10:42	8.2	-2.9	2.7	1.6	-6.6	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	29.1	1.2	15.1	19.3	10.2	10.6	1.1	10:46	11.0	1.2	6.1	4.3	-8.0	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	21.3	6.6	14.0	14.8	-3.1	10.1	-7.6	10:49	9.0	3.3	6.2	5.5	-12.1	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	24.0	2.0	13.0	16.6	4.2	9.6	-1.9	10:51	11.0	1.2	6.1	4.5	-8.0	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	31.9	5.0	18.5	19.6	9.2	13.8	-0.1	10:54	13.3	5.0	9.2	6.9	-9.4	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	23.2	4.6	13.9	15.2	0.9	10.9	-5.4	10:57	11.0	5.0	8.0	7.2	-11.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	19.8	5.0	12.4	9.8	-3.0	9.7	-7.9	11:00	9.4	4.6	7.0	5.8	-12.9	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	22.5	1.6	12.0	13.2	3.1	8.9	-3.2	11:04	9.8	1.6	5.7	4.2	-9.6	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	22.5	2.9	12.7	8.6	1.8	6.5	-4.7	11:07	3.7	-2.9	0.4	1.5	-11.1	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	21.3	-5.3	8.0	8.2	8.9	4.0	-0.2	11:09	4.2	-4.3	-0.1	-1.0	-9.3	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	17.1	-2.0	7.6	4.6	1.3	3.8	-5.8	11:12	2.5	-2.4	0.0	-0.7	-12.9	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	-0.2	-4.3	-2.2	-1.8	-13.6	-2.4	-13.4	11:15	-0.2	-4.8	-2.5	-1.8	-13.1	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	5.4	-0.2	2.6	1.5	-12.2	1.1	-14.8	11:18	-0.2	-0.6	-0.4	-0.3	-17.3				
13 Sep 03	5:53	18:31	12:38	3.3	-2.9	0.2	0.6	-11.6	-1.3	-12.6	11:22	-0.6	-4.8	-2.7	-2.3	-13.6	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	7.4	-6.3	0.6	2.7	-4.0	-0.9	-7.0	11:25	1.6	-6.3	-2.4	-3.7	-9.9	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	17.5	-3.4	7.1	9.7	3.1	3.2	-3.3	11:28	3.3	-4.8	-0.8	-1.5	-9.6	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	16.0	-1.5	7.2	8.2	-0.3	3.3	-5.9	11:31	2.5	-3.9	-0.7	-0.9	-11.5	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	5.4	-8.9	-1.8	-1.2	-3.5	-3.5	-7.9	11:33	-2.4	-7.9	-5.1	-5.4	-12.4	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	-0.6	-4.3	-2.5	-1.8	-14.1	-2.7	-13.6	11:36	-0.6	-5.3	-3.0	-3.1	-13.1	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	-0.2	-2.0	-1.1	-0.8	-16.0	-1.1	-16.0	11:40	-0.2	-2.0	-1.1	-1.3	-16.0	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	7.8	-3.9	2.0	1.6	-6.1	-0.2	-9.6	11:43	-0.2	-4.8	-2.5	-2.5	-13.1	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	10.2	-3.4	3.4	4.0	-4.2	-0.6	-9.3	11:46	-2.9	-6.3	-4.6	-4.1	-14.4	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	15.6	-2.4	6.6	9.5	0.3	3.5	-4.5	11:49	4.6	-3.9	0.4	-1.0	-9.4	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	21.0	-0.6	10.2	12.8	3.8	6.1	-4.4	11:52	4.6	-0.6	2.0	0.6	-12.6	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	25.6	-4.3	10.6	14.6	12.1	4.5	0.4	11:55	1.6	-4.8	-1.6	-1.6	-11.4	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	25.2	-0.2	12.5	14.8	7.6	7.7	-2.1	11:58	5.8	-0.2	2.8	1.7	-11.8	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	25.6	-1.1	12.3	15.5	8.8	6.9	-0.1	12:01	5.8	-2.9	1.5	0.4	-9.1	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	23.6	-5.8	8.9	12.2	11.7	3.2	0.2	12:04	0.7	-5.8	-2.5	-4.1	-11.2	17.8	3.9	11.1	-3.9
28 Sep 03	6:10	18:03	11:53	20.6	-6.3	7.1	6.2	9.1	0.7	-3.3	12:07	-4.8	-6.8	-5.8	-5.7	-15.8	12.8	5.0	8.9	-10.0
28 Sep 03	6:10	18:03	11:53	20.6	-6.3	7.1	6.2	9.1	0.7	-3.3	12:07	-4.8	-6.8	-5.8	-5.7	-15.8	-17.2			

Appendix A, Hobo Totals

615209

Jack Creek 2953

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	36.1	6.6	21.4	22.4	11.7	17.2	4.2	9:16	20.2	5.8	13.0	9.4	-3.4	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	30.7	9.4	20.1	19.9	3.5	16.7	-0.7	9:19	19.8	7.0	13.4	11.5	-5.0	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	32.3	5.0	18.7	22.8	9.6	16.7	5.6	9:21	24.4	5.0	14.7	9.3	1.6	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	35.7	11.0	23.3	23.6	6.9	18.2	-1.4	9:23	17.1	9.0	13.1	12.2	-9.7	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	29.1	9.0	19.1	15.8	2.3	15.6	-3.5	9:26	16.4	7.8	12.1	11.5	-9.2	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	26.7	6.2	16.5	16.3	2.7	14.2	-1.9	9:28	17.5	6.2	11.9	8.7	-6.5	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	30.3	4.2	17.2	17.9	8.4	14.3	2.6	9:30	18.7	4.2	11.4	7.3	-3.3	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	32.8	5.8	19.3	21.8	9.2	16.3	3.3	9:33	21.0	5.8	13.4	9.6	-2.6	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	33.6	7.8	20.7	22.6	8.0	16.5	0.0	9:35	17.1	7.4	12.3	10.4	-8.1	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	28.7	7.8	18.3	15.8	3.1	13.3	-5.2	9:39	10.6	6.2	8.4	9.1	-13.4	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	29.1	7.8	18.5	17.8	3.5	14.8	-2.3	9:41	16.0	6.2	11.1	8.8	-8.0	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	27.5	9.4	18.5	16.3	0.3	14.8	-5.8	9:43	14.1	8.2	11.2	10.7	-11.9	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	34.9	11.0	22.9	21.6	6.1	18.1	-3.5	9:46	15.6	11.0	13.3	12.4	-13.2	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	34.9	10.2	22.5	21.8	6.9	19.4	1.1	9:48	22.9	9.8	16.3	12.3	-4.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	31.1	9.8	20.5	21.5	3.5	19.9	1.9	9:51	28.3	10.2	19.3	13.8	0.3	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	34.9	12.2	23.5	23.0	4.9	18.8	-4.9	9:53	15.6	12.5	14.1	13.4	-14.7	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	34.4	10.6	22.5	24.0	6.1	20.7	3.6	9:57	28.3	9.4	18.9	12.6	1.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	32.3	10.2	21.3	21.1	4.4	16.3	-3.2	10:00	14.9	7.8	11.3	10.1	-10.8	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	25.2	5.4	15.3	13.3	2.0	11.9	-1.5	10:02	14.9	2.0	8.4	8.0	-5.0	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	28.3	2.9	15.6	18.1	7.6	14.2	3.1	10:05	21.0	4.6	12.8	6.9	-1.4	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	31.9	6.2	19.1	21.5	7.9	15.3	0.4	10:07	16.8	6.2	11.5	8.8	-7.2	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	32.3	9.8	21.1	20.6	4.8	18.0	0.2	10:11	21.7	8.2	15.0	10.9	-4.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	35.3	8.2	21.8	22.5	9.3	18.6	3.3	10:14	22.9	7.8	15.3	12.1	-2.8	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	31.1	11.0	21.1	20.2	2.3	15.9	-5.2	10:16	13.3	8.2	10.8	10.2	-12.7	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	30.3	7.8	19.1	19.4	4.7	16.8	0.6	10:19	21.7	7.4	14.6	9.6	-3.5	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	31.9	6.6	19.3	19.2	7.5	16.8	3.4	10:22	22.9	5.8	14.3	9.5	-0.7	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	31.1	6.6	18.9	21.4	6.7	16.0	0.5	10:25	19.0	7.0	13.0	10.5	-5.8	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	34.0	7.8	20.9	23.6	8.4	18.3	4.0	10:28	24.4	7.0	15.7	10.9	-0.4	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	24.8	9.0	16.9	18.1	-2.0	15.5	-2.4	10:31	21.7	6.6	14.2	10.2	-2.7	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	29.1	6.2	17.7	17.8	5.1	12.4	-1.7	10:34	11.8	2.5	7.1	6.4	-8.5	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	21.3	-0.6	10.4	9.1	4.2	6.1	-4.0	10:36	4.6	-1.1	1.8	1.8	-12.2	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	9.8	2.5	6.1	4.7	-10.4	4.9	-11.2	10:39	6.6	0.7	3.7	2.8	-11.9	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	33.6	-2.9	15.3	17.4	18.7	13.0	12.7	10:42	22.9	-1.5	10.7	3.2	6.6	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	40.6	0.7	20.7	20.5	22.1	16.5	13.4	10:46	23.6	1.2	12.4	4.9	4.7	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	35.3	4.6	19.9	16.1	12.9	14.1	3.4	10:49	14.1	2.5	8.3	5.6	-6.2	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	38.8	2.9	20.8	21.6	18.1	16.3	10.4	10:51	22.1	1.6	11.8	5.0	2.7	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	39.7	4.2	21.9	19.3	17.7	16.4	6.3	10:54	17.1	4.6	10.9	6.8	-5.2	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	30.7	5.0	17.8	16.9	8.0	12.5	-2.7	10:57	9.4	5.0	7.2	6.9	-13.3	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	36.1	5.8	21.0	14.2	12.5	16.9	4.4	11:00	19.8	5.8	12.8	7.8	-3.8	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	29.1	1.6	15.4	13.8	9.7	13.0	4.1	11:04	18.7	2.5	10.6	5.3	-1.6	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	24.0	3.3	13.7	10.7	2.9	8.4	-1.5	11:07	9.0	-2.9	3.1	1.3	-5.8	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	29.5	-7.3	11.1	10.3	19.1	7.3	10.0	11:09	12.9	-5.8	3.6	-1.4	1.0	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.2	1.2	1.2	1.2	-17.8	0.7	-16.9	11:12	1.2	-0.6	0.3	0.6	-16.0	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	11.8	0.7	6.3	3.2	-6.7	5.8	-7.3	11:15	10.2	0.3	5.3	1.5	-7.9	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	15.2	-0.2	7.5	5.0	-2.4	3.4	-6.9	11:18	2.5	-3.9	-0.7	-0.6	-11.5				
13 Sep 03	5:53	18:31	12:38	22.5	-4.8	8.8	3.3	9.5	3.3	-1.1	11:22	0.7	-5.3	-2.3	-3.9	-11.7	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	27.5	-5.8	10.9	12.0	15.5	8.4	10.1	11:25	17.1	-5.3	5.9	-1.7	4.7	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	33.2	-2.4	15.4	13.9	17.8	9.3	6.6	11:28	9.8	-3.4	3.2	0.6	-4.6	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	26.0	-1.1	12.4	10.9	9.2	8.0	0.8	11:31	8.6	-1.5	3.6	1.0	-7.6	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	6.6	-5.8	0.4	0.1	-5.4	-1.1	-8.8	11:33	0.3	-5.3	-2.5	-2.5	-12.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	15.6	-3.4	6.1	2.0	1.2	4.5	-1.0	11:36	10.2	-4.3	2.9	-2.3	-3.2	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	26.7	-4.8	11.0	11.2	13.8	8.0	7.8	11:40	14.9	-4.8	5.0	-1.8	1.9	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	29.9	-4.8	12.5	11.5	16.9	6.4	4.2	11:43	5.0	-4.3	0.3	-2.3	-8.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	27.5	-2.9	12.3	13.1	12.6	8.0	5.5	11:46	11.8	-4.3	3.7	-2.1	-1.7	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	31.1	-2.0	14.6	16.2	15.3	11.6	9.5	11:49	19.4	-2.0	8.7	1.7	3.6	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	31.5	-0.2	15.7	16.3	13.9	12.4	6.9	11:52	17.9	0.3	9.1	3.0	-0.2	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	33.2	-4.8	14.2	16.1	20.2	11.4	13.6	11:55	21.0	-3.9	8.6	1.5	7.0	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	31.5	1.6	16.6	18.1	12.1	13.4	7.1	11:58	20.2	0.3	10.2	4.1	2.1	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	31.5	-0.2	15.7	17.2	13.9	12.8	9.1	12:01	21.0	-1.1	9.9	3.1	4.2	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	31.9	-3.9	14.0	15.4	18.0	10.0	10.5	12:04	16.4	-4.3	6.0	-0.9	2.9	17.8	3.9	11.1	-3.9
28 Sep 03	6:10	18:03	11:53	5.8	-4.8	0.5	-2.4	-7.2	-1.7	-11.5	12:07	-2.9	-4.8	-3.9	-3.9	-15.9	12.8	5.0	8.9	-10.0
28 Sep 03	6:10	18:03	11:53	5.8	-4.8	0.5	-2.4	-7.2	-1.7	-11.5	12:07	-2.9	-4.8	-3.9	-3.9	-15.9	-17.2			

Appendix A, Hobo Totals

615210 II

Jack Creek 2956

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	36.6	6.6	21.6	22.6	12.2	17.4	3.4	9:16	19.4	7.0	13.2	10.3	-5.4	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	31.1	9.8	20.5	19.9	3.5	16.8	-2.3	9:19	17.9	8.2	13.1	12.0	-8.1	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	34.0	5.4	19.7	22.8	10.8	16.9	4.9	9:21	22.5	5.8	14.1	9.7	-1.1	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	37.0	11.8	24.4	23.9	7.5	19.0	-0.9	9:23	17.9	9.4	13.7	12.8	-9.3	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	28.7	9.4	19.1	16.1	1.5	15.1	-5.2	9:26	14.1	8.2	11.2	11.6	-11.9	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	26.3	6.2	16.3	15.8	2.3	13.7	-3.2	9:28	15.6	6.6	11.1	9.0	-8.8	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	31.9	4.6	18.3	17.9	9.6	14.0	1.0	9:30	14.9	4.6	9.7	7.5	-7.5	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	31.1	5.4	18.3	21.1	7.9	15.3	1.3	9:33	18.7	6.2	12.4	10.0	-5.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	33.2	8.2	20.7	22.1	7.2	16.8	0.1	9:35	18.3	7.4	12.9	11.1	-6.9	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	28.3	8.2	18.3	15.6	2.3	13.5	-5.2	9:39	11.4	6.2	8.8	9.4	-12.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	30.3	8.2	19.3	17.5	4.3	14.7	-2.8	9:41	14.1	6.2	10.2	8.9	-9.9	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	27.1	9.8	18.5	16.5	-0.5	14.9	-6.4	9:43	14.1	8.6	11.4	11.0	-12.3	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	34.9	11.4	23.1	21.4	5.7	18.5	-3.5	9:46	16.4	11.4	13.9	12.7	-12.8	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	32.3	9.8	21.1	21.1	4.8	18.3	-0.8	9:48	21.3	9.8	15.6	12.5	-6.3	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	30.3	10.6	20.5	21.2	1.9	18.8	-1.8	9:51	23.2	11.0	17.1	14.0	-5.5	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	36.1	12.2	24.1	23.2	6.2	19.3	-3.9	9:53	16.4	12.5	14.5	13.6	-13.9	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	34.9	10.2	22.5	23.9	6.9	20.0	2.2	9:57	25.2	9.8	17.5	12.9	-2.4	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	33.2	10.6	21.9	20.9	4.8	16.9	-3.2	10:00	15.2	8.6	11.9	10.5	-11.2	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	25.2	6.2	15.7	13.6	1.2	11.7	-3.1	10:02	12.9	2.5	7.7	8.3	-7.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	29.1	2.9	16.0	18.3	8.4	14.2	2.7	10:05	19.8	5.0	12.4	7.7	-3.0	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	32.8	7.0	19.9	21.4	8.0	15.9	0.3	10:07	17.1	6.6	11.9	9.5	-7.3	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	31.9	10.2	21.1	20.2	3.9	17.8	-1.3	10:11	20.2	9.0	14.6	11.2	-6.6	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	34.4	9.0	21.7	22.2	7.6	18.4	2.2	10:14	22.5	7.8	15.2	12.7	-3.1	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	31.5	11.4	21.5	19.9	2.4	16.3	-5.2	10:16	13.7	8.6	11.2	10.6	-12.7	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	29.5	8.2	18.9	19.0	3.5	16.1	-1.3	10:19	19.0	7.4	13.2	9.9	-6.2	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	31.1	6.6	18.9	18.9	6.7	15.6	1.1	10:22	19.0	5.8	12.4	9.9	-4.5	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	33.6	7.0	20.3	21.7	8.8	17.1	1.9	10:25	20.2	7.4	13.8	11.1	-5.0	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	34.0	7.8	20.9	23.4	8.4	18.5	3.2	10:28	24.0	8.2	16.1	11.5	-2.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	23.2	9.8	16.5	17.6	-4.4	14.5	-5.6	10:31	17.9	7.0	12.5	10.4	-6.9	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	27.9	5.8	16.9	17.0	4.3	12.4	-1.7	10:34	12.9	2.9	7.9	6.7	-7.7	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	17.1	-0.2	8.5	8.7	-0.5	5.3	-6.3	10:36	5.0	-0.6	2.2	2.2	-12.2	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	6.6	2.5	4.5	4.2	-13.6	4.0	-13.4	10:39	5.8	1.2	3.5	3.0	-13.1	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	26.3	0.3	13.3	16.0	8.3	11.7	5.0	10:42	19.8	0.3	10.0	5.1	1.7	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	31.1	4.2	17.6	19.0	9.2	15.9	5.6	10:46	24.0	4.2	14.1	8.1	2.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	27.5	6.6	17.1	16.3	3.1	12.9	-3.6	10:49	12.5	5.0	8.8	7.8	-10.2	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	30.7	5.4	18.1	20.1	7.5	15.7	3.6	10:51	22.1	4.6	13.3	7.8	-0.3	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	30.3	8.2	19.3	19.4	4.3	16.5	-0.8	10:54	19.8	7.8	13.8	10.0	-5.8	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	27.1	8.2	17.7	16.4	1.1	13.4	-6.6	10:57	11.0	7.4	9.2	9.3	-14.2	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	34.9	5.8	20.3	13.4	11.3	16.2	3.4	11:00	18.7	5.4	12.0	7.7	-4.5	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	27.5	2.5	15.0	13.1	7.3	13.4	3.6	11:04	20.6	2.9	11.7	6.3	-0.1	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	21.0	4.6	12.8	9.8	-1.4	8.3	-3.7	11:07	9.8	-2.0	3.9	3.0	-6.0	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	26.3	-5.3	10.5	9.6	13.9	8.7	8.7	11:09	17.5	-3.9	6.8	0.8	3.6	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	0.7	-0.2	0.3	0.7	-16.9	0.9	-15.6	11:12	3.3	-0.2	1.6	0.9	-14.3	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	19.8	-0.6	9.6	5.6	2.6	7.7	-1.6	11:15	11.8	-0.2	5.8	1.7	-5.9	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	13.7	0.3	7.0	4.5	-4.4	3.2	-6.8	11:18	3.7	-4.8	-0.5	-0.3	-9.2				
13 Sep 03	5:53	18:31	12:38	24.8	-5.8	9.5	3.4	12.8	3.6	1.0	11:22	1.2	-5.8	-2.3	-4.1	-10.8	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	31.5	-6.3	12.6	13.0	20.1	9.8	13.9	11:25	19.8	-5.8	7.0	-0.9	7.8	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	37.0	-1.1	18.0	14.6	20.3	11.2	7.7	11:28	11.0	-2.0	4.5	1.9	-4.8	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	26.3	0.3	13.3	11.2	8.3	8.9	0.3	11:31	9.4	-0.6	4.4	2.1	-7.8	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	6.2	-5.3	0.5	0.5	-6.3	-0.6	-9.3	11:33	1.2	-4.3	-1.6	-1.4	-12.3	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	24.8	-2.0	11.4	4.3	9.0	7.7	3.4	11:36	11.8	-3.9	4.0	-1.1	-2.2	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	27.9	-4.3	11.8	11.7	14.5	9.5	9.4	11:40	18.3	-3.9	7.2	-0.5	4.4	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	32.3	-3.4	14.5	13.1	17.9	8.5	5.5	11:43	7.8	-2.9	2.5	-0.7	-7.0	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	36.1	-2.0	17.1	16.2	20.3	12.6	12.3	11:46	19.0	-2.9	8.1	-0.1	4.2	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	35.7	-0.2	17.8	18.5	18.1	14.9	12.4	11:49	24.4	-0.2	12.1	3.8	6.8	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	37.4	2.0	19.7	19.3	17.6	16.1	9.5	11:52	22.1	2.9	12.5	5.4	1.4	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	40.6	-2.4	19.1	19.6	25.2	16.4	18.4	11:55	28.3	-1.1	13.6	4.6	11.6	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	37.9	4.2	21.0	21.0	15.9	17.6	10.4	11:58	25.6	2.9	14.2	6.7	4.9	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	37.4	2.0	19.7	20.6	17.6	17.1	12.9	12:01	27.5	1.6	14.6	6.1	8.1	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	40.1	-2.0	19.1	19.1	24.3	15.3	16.8	12:04	25.2	-2.0	11.6	1.8	9.4	17.8	3.9	11.1	-3.9
28 Sep 03	6:10	18:03	11:53	1.6	-3.9	-1.1	-2.0	-12.3	-1.8	-14.1	12:07	-1.5	-3.4	-2.4	-2.4	-15.9	-17.2			
28 Sep 03	6:10	18:03	11:53	1.6	-3.9	-1.1	-2.0	-12.3	-1.8	-14.1	12:07	-1.5	-3.4	-2.4	-2.4	-15.9	12.8	5.0	8.9	-10.0

Appendix A, Hobo Totals

615218 II

Jack Creek 2870

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	54.7	1.6	28.2	30.3	35.4	18.9	17.3	9:16	18.3	1.2	9.7	5.3	-0.7	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	47.4	3.7	25.6	23.3	25.9	16.8	8.7	9:19	12.5	3.3	7.9	6.2	-8.6	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	50.1	0.7	25.4	29.8	31.6	17.0	15.2	9:21	16.8	0.3	8.5	4.7	-1.3	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	54.1	2.9	28.5	27.6	33.5	19.0	14.0	9:23	15.6	3.3	9.5	7.7	-5.5	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	45.9	7.8	26.9	18.2	20.3	18.0	5.8	9:26	13.7	4.6	9.1	8.0	-8.7	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	40.1	5.0	22.6	19.2	17.4	15.1	3.6	9:28	11.4	3.7	7.6	7.0	-10.1	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	44.4	0.3	22.3	20.1	26.3	14.8	10.4	9:30	13.3	1.2	7.2	5.1	-5.6	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	46.9	2.9	24.9	24.5	26.3	17.2	10.4	9:33	15.6	3.3	9.5	6.6	-5.5	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	50.7	1.2	25.9	26.3	31.7	17.3	14.0	9:35	15.6	1.6	8.6	5.1	-3.8	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	35.7	0.7	18.2	14.9	17.2	12.0	4.2	9:39	10.2	1.2	5.7	4.2	-8.7	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	42.5	2.9	22.7	18.7	21.8	15.0	6.9	9:41	12.2	2.5	7.3	5.2	-8.1	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	37.9	2.9	20.4	15.2	17.2	14.2	4.3	9:43	12.5	3.3	7.9	6.6	-8.6	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	49.0	4.6	26.8	22.8	26.7	18.1	9.2	9:46	14.1	4.6	9.3	8.7	-8.3	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	45.9	4.2	25.0	20.8	24.0	17.9	9.4	9:48	17.1	4.6	10.9	8.2	-5.2	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	44.4	4.2	24.3	21.2	22.5	17.2	7.9	9:51	15.6	4.6	10.1	7.9	-6.7	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	49.6	4.6	27.1	24.6	27.2	18.6	9.8	9:53	15.2	5.0	10.1	8.2	-7.5	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	49.6	4.6	27.1	26.1	27.2	18.4	10.3	9:57	15.2	4.2	9.7	7.6	-6.7	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	45.9	1.6	23.7	21.3	26.5	16.1	10.8	10:00	14.9	2.0	8.4	6.5	-5.0	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	39.2	0.7	20.0	15.6	20.7	13.6	6.7	10:02	12.5	2.0	7.3	7.1	-7.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	44.9	2.0	23.5	24.3	25.1	15.8	8.9	10:05	13.3	2.9	8.1	5.7	-7.4	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	49.6	0.3	24.9	27.0	31.5	16.3	13.3	10:07	14.1	1.2	7.6	4.4	-4.9	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	50.7	3.7	27.2	23.8	29.2	18.5	13.4	10:11	17.5	2.0	9.8	4.9	-2.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	50.7	2.9	26.8	25.6	30.0	18.5	13.8	10:14	17.9	2.5	10.2	7.4	-2.3	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	51.8	8.2	30.0	25.5	25.8	19.9	7.2	10:16	12.9	6.6	9.8	9.5	-11.5	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	46.4	5.8	26.1	25.9	22.8	18.4	9.4	10:19	17.5	3.7	10.6	7.4	-4.0	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	49.0	2.0	25.5	22.8	29.2	16.7	12.0	10:22	14.1	1.6	7.8	5.0	-5.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	48.0	-0.6	23.7	26.3	30.8	16.8	16.7	10:25	20.2	-0.2	10.0	6.2	2.6	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	50.1	1.2	25.6	29.1	31.2	18.4	17.6	10:28	22.1	0.3	11.2	5.9	4.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	50.1	5.8	28.0	25.4	26.5	17.1	8.2	10:31	10.2	2.5	6.3	5.0	-10.0	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	53.5	2.0	27.8	26.0	33.7	17.1	13.7	10:34	12.2	0.7	6.4	4.1	-6.3	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	37.0	-3.4	16.8	13.7	22.6	9.1	7.6	10:36	6.6	-3.9	1.4	1.1	-7.3	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.8	3.7	7.8	6.5	-9.7	5.3	-9.5	10:39	7.0	-1.5	2.8	3.2	-9.2	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	42.5	-5.3	18.6	24.4	30.0	11.3	14.5	10:42	12.5	-4.3	4.1	0.7	-0.9	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	45.9	-1.1	22.4	25.7	29.2	14.4	13.1	10:46	13.7	-1.1	6.3	2.4	-3.0	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	42.0	1.2	21.6	19.3	23.0	13.4	7.6	10:49	10.2	0.3	5.3	3.3	-7.9	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	45.9	-0.6	22.6	24.4	28.7	14.4	12.7	10:51	13.3	-1.1	6.1	2.4	-3.4	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	54.7	1.2	28.0	24.0	35.8	18.2	15.8	10:54	15.2	1.6	8.4	4.6	-4.1	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	34.4	1.2	17.8	16.9	15.5	11.3	3.8	10:57	9.8	-0.2	4.8	4.8	-7.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	45.4	5.8	25.6	15.4	21.8	17.9	6.3	11:00	14.5	5.8	10.1	7.3	-9.1	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	38.3	-0.2	19.1	16.4	20.7	12.9	8.0	11:04	13.3	0.3	6.8	3.6	-4.8	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	34.9	1.6	18.2	11.9	15.5	9.1	3.5	11:07	4.6	-4.8	-0.1	-0.5	-8.4	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	34.0	-10.0	12.0	13.4	26.2	6.1	12.3	11:09	8.2	-7.9	0.2	-1.6	-1.7	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	0.3	-0.2	0.1	-0.1	-17.3	0.7	-16.0	11:12	2.9	-0.2	1.4	0.4	-14.7	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	27.1	-0.2	13.5	6.8	9.5	9.0	0.5	11:15	9.0	-0.2	4.4	1.2	-8.6	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	21.3	-0.2	10.6	7.0	3.7	4.1	-1.7	11:18	2.9	-7.9	-2.5	-2.1	-7.0				
13 Sep 03	5:53	18:31	12:38	29.5	-8.9	10.3	8.1	20.6	3.2	6.5	11:22	1.2	-8.9	-3.9	-6.6	-7.7	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	33.6	-8.4	12.6	16.9	24.2	7.2	12.8	11:25	11.4	-7.9	1.8	-4.0	1.5	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	37.9	-2.0	18.0	19.2	22.1	10.0	9.5	11:28	9.4	-5.3	2.1	0.1	-3.0	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	32.8	-2.9	14.9	14.5	17.9	8.2	4.8	11:31	6.2	-3.4	1.4	-0.1	-8.2	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	8.2	-7.9	0.2	0.4	-1.7	-1.3	-7.2	11:33	-0.2	-5.3	-2.7	-3.3	-12.6	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	31.5	-4.8	13.4	7.1	18.6	7.5	8.3	11:36	9.4	-6.3	1.6	-3.7	-2.0	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	34.0	-7.3	13.3	15.4	23.6	7.4	11.7	11:40	10.2	-7.3	1.4	-4.1	-0.2	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	42.5	-6.8	17.8	17.6	31.5	7.9	11.7	11:43	2.9	-6.8	-2.0	-3.8	-8.1	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	39.2	-3.9	17.7	18.8	25.3	8.6	10.5	11:46	6.2	-7.3	-0.6	-4.2	-4.2	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	39.7	-3.4	18.2	22.7	25.3	12.1	13.2	11:49	15.6	-3.4	6.1	0.6	1.2	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	41.1	-1.1	20.0	23.0	24.3	13.9	10.3	11:52	14.9	0.7	7.8	2.6	-3.7	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	43.9	-7.3	18.3	23.7	33.5	11.5	18.8	11:55	15.6	-6.3	4.7	-1.0	4.2	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	41.5	0.7	21.1	23.9	23.0	14.9	10.6	11:58	16.8	0.7	8.7	3.9	-1.7	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	30.3	-1.5	14.4	8.9	14.0	8.3	0.5	12:01	4.6	-0.2	2.2	1.7	-13.1	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615220 II

Jack Creek 2791

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	41.5	1.6	21.6	26.6	22.1	15.9	10.3	9:16	18.3	2.0	10.2	7.0	-1.5	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	39.7	7.4	23.6	23.6	14.5	16.6	2.7	9:19	14.1	5.4	9.7	8.7	-9.1	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	39.7	2.0	20.9	25.8	19.9	15.1	8.0	9:21	16.4	2.5	9.4	6.5	-3.9	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	40.1	6.6	23.4	25.8	15.7	17.2	5.1	9:23	17.1	5.0	11.1	9.4	-5.6	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	29.9	9.8	19.9	16.3	2.3	14.4	-5.4	9:26	11.4	6.6	9.0	9.2	-13.0	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	31.9	6.6	19.3	18.3	7.5	13.8	-2.1	9:28	11.4	5.4	8.4	7.4	-11.8	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	35.3	1.2	18.2	20.8	16.3	12.9	5.3	9:30	13.7	1.6	7.7	5.4	-5.7	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	36.6	2.9	19.7	23.3	15.9	15.4	6.3	9:33	18.3	3.7	11.0	8.0	-3.2	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	38.8	3.3	21.0	25.7	17.7	15.8	5.9	9:35	16.4	4.6	10.5	8.4	-6.0	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	39.7	3.7	21.7	17.6	18.2	14.3	3.4	9:39	10.2	3.7	7.0	6.6	-11.3	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	37.9	3.7	20.8	19.9	16.4	13.8	3.2	9:41	10.6	2.9	6.7	5.7	-10.1	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	29.1	5.0	17.0	15.7	6.3	13.1	-1.2	9:43	13.7	4.6	9.1	7.8	-8.7	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	38.8	6.2	22.5	23.6	14.8	16.5	2.0	9:46	14.1	7.0	10.6	10.7	-10.7	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	39.7	5.0	22.3	23.8	16.9	17.4	6.2	9:48	19.0	5.8	12.4	9.5	-4.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	40.6	6.2	23.4	23.8	16.6	17.6	3.7	9:51	16.0	7.4	11.7	10.3	-9.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	40.1	6.6	23.4	25.4	15.7	17.6	3.8	9:53	16.8	7.0	11.9	10.6	-8.0	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	40.1	6.2	23.2	25.9	16.1	17.5	5.6	9:57	18.3	5.4	11.8	10.0	-4.9	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	39.7	6.2	22.9	23.5	15.7	16.4	5.1	10:00	16.0	3.7	9.9	8.0	-5.5	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	32.3	1.6	17.0	14.9	13.0	11.9	2.1	10:02	11.4	2.5	6.9	7.7	-8.9	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	33.2	2.5	17.8	21.4	12.9	12.9	1.0	10:05	11.4	4.6	8.0	5.8	-11.0	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	38.3	2.5	20.4	25.8	18.1	14.4	5.8	10:07	14.1	2.9	8.5	6.2	-6.6	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	40.1	5.4	22.8	24.9	17.0	16.4	5.9	10:11	16.4	3.7	10.1	6.9	-5.1	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	39.7	5.0	22.3	24.7	16.9	16.3	5.7	10:14	16.4	4.2	10.3	9.0	-5.6	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	37.9	12.2	25.0	23.8	7.9	18.4	-1.8	10:16	14.9	8.6	11.7	11.0	-11.6	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	35.7	9.0	22.4	24.6	8.9	16.8	1.8	10:19	17.5	5.0	11.3	9.3	-5.2	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	37.9	3.7	20.8	22.8	16.4	14.6	5.7	10:22	14.9	2.0	8.4	6.5	-5.0	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	38.8	0.7	19.8	24.8	20.3	15.2	8.9	10:25	18.3	2.9	10.6	7.6	-2.4	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	39.7	2.9	21.3	27.3	19.0	16.2	8.9	10:28	19.4	2.9	11.2	7.5	-1.2	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	35.3	6.2	20.7	20.9	11.3	14.2	-0.2	10:31	10.6	4.6	7.6	7.0	-11.8	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	36.6	5.8	21.2	23.0	13.0	14.8	3.6	10:34	14.5	2.5	8.5	7.5	-5.8	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	27.9	-1.1	13.4	13.2	11.2	8.8	1.5	10:36	9.0	-0.6	4.2	3.7	-8.1	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.4	6.2	8.8	8.0	-12.6	7.0	-12.5	10:39	7.8	2.5	5.1	5.6	-12.4	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	40.6	-1.1	19.8	20.1	23.9	12.9	9.2	10:42	12.2	-0.2	6.0	4.0	-5.5	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	43.9	1.6	22.8	22.5	24.5	15.2	9.0	10:46	13.3	2.0	7.7	5.7	-6.5	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	37.4	4.2	20.8	15.9	15.5	14.1	2.5	10:49	11.0	3.7	7.4	6.1	-10.5	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	42.5	2.5	22.5	21.3	22.2	15.2	7.2	10:51	12.9	2.9	7.9	5.2	-7.7	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	43.9	3.7	23.8	20.7	22.4	16.7	8.3	10:54	15.6	3.7	9.7	6.6	-5.9	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	28.7	3.3	16.0	16.0	7.6	11.8	-0.9	10:57	11.8	3.3	7.5	7.0	-9.3	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	33.6	7.4	20.5	14.5	8.4	15.7	-1.6	11:00	14.1	7.8	11.0	9.2	-11.5	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	27.1	3.3	15.2	15.0	6.0	11.1	-2.6	11:04	10.2	3.7	7.0	6.3	-11.3	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	24.8	2.9	13.8	11.4	4.1	8.2	-3.2	11:07	6.2	-1.1	2.6	2.2	-10.5	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	31.5	-4.3	13.6	12.4	18.1	7.5	5.4	11:09	6.6	-3.9	1.4	1.1	-7.3	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	2.5	1.6	2.0	2.1	-16.9	2.6	-15.9	11:12	4.6	1.6	3.1	2.7	-14.8	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	31.1	1.2	16.1	9.8	12.2	10.3	0.1	11:15	7.4	1.6	4.5	3.1	-11.9	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	14.9	2.0	8.4	7.2	-5.0	4.6	-7.6	11:18	4.6	-2.9	0.8	1.1	-10.3				
13 Sep 03	5:53	18:31	12:38	28.3	-4.8	11.7	6.5	15.3	5.7	3.3	11:22	4.2	-4.8	-0.3	-2.8	-8.8	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	35.3	-6.3	14.5	14.9	23.8	7.4	9.7	11:25	7.0	-6.3	0.4	-1.5	-4.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	38.3	-1.5	18.4	16.8	22.1	11.6	9.4	11:28	12.2	-2.4	4.9	2.4	-3.2	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	27.9	-0.2	13.9	13.2	10.3	9.2	0.8	11:31	9.0	-0.2	4.4	3.0	-8.6	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	6.2	-2.4	1.9	2.0	-9.1	1.0	-11.5	11:33	2.0	-2.0	0.0	0.4	-13.8	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	30.7	-2.0	14.4	9.4	14.9	8.8	3.7	11:36	8.2	-2.0	3.1	-0.4	-7.6	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	29.1	-3.9	12.6	13.0	15.2	6.9	3.3	11:40	5.8	-3.4	1.2	-0.9	-8.6	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	33.2	-3.9	14.7	14.6	19.2	8.4	5.3	11:43	6.6	-2.4	2.1	-0.5	-8.7	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	34.4	-2.0	16.2	16.9	18.6	8.9	4.3	11:46	5.4	-2.4	1.5	-0.6	-9.9	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	38.8	-0.2	19.3	20.2	21.2	12.2	6.9	11:49	10.2	-0.2	5.0	2.7	-7.4	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	39.7	0.7	20.2	21.0	21.2	13.2	5.8	11:52	10.2	2.0	6.1	3.9	-9.6	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	38.3	-3.4	17.5	18.7	23.9	10.1	7.8	11:55	7.4	-2.0	2.7	1.7	-8.4	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	40.6	2.9	21.7	22.2	19.9	14.2	5.3	11:58	11.0	2.5	6.7	5.2	-9.2	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	5.8	-0.6	2.6	1.7	-11.4	3.2	-11.8	12:01	6.6	1.2	3.9	3.6	-12.3	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615221 II

Jack Creek 2906

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.0	5.0	21.0	24.9	14.2	16.1	4.5	9:16	17.5	5.0	11.3	8.7	-5.2	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	34.0	10.2	22.1	22.6	6.0	17.0	-1.0	9:19	16.8	7.0	11.9	11.0	-8.0	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	44.4	3.7	24.1	26.4	22.9	17.7	10.2	9:21	19.0	3.7	11.4	8.1	-2.5	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	48.0	7.4	27.7	28.3	22.7	19.6	7.8	9:23	16.8	6.2	11.5	10.7	-7.2	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	48.5	9.8	29.2	18.0	20.9	19.3	4.7	9:26	12.5	6.2	9.4	9.6	-11.5	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	37.0	5.4	21.2	18.8	13.8	15.3	2.8	9:28	14.1	4.6	9.3	7.4	-8.3	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	41.1	0.3	20.7	22.2	23.0	14.0	9.3	9:30	14.1	0.7	7.4	5.0	-4.4	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	42.0	2.5	22.2	24.2	21.8	16.1	8.7	9:33	16.8	3.3	10.0	7.4	-4.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	46.9	2.5	24.7	27.3	26.7	17.2	11.8	9:35	17.1	2.5	9.8	6.9	-3.1	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	38.8	2.0	20.4	18.2	19.0	13.6	4.0	9:39	10.2	3.3	6.8	5.7	-10.9	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	42.5	5.0	23.7	20.1	19.7	14.7	4.2	9:41	9.0	2.5	5.7	4.9	-11.2	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	34.9	5.0	19.9	16.7	12.1	13.8	1.2	9:43	11.8	3.7	7.8	7.0	-9.7	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	50.1	7.8	29.0	25.7	24.5	19.6	5.7	9:46	12.5	7.8	10.2	9.9	-13.1	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	49.0	4.6	26.8	25.0	26.7	19.2	11.5	9:48	18.7	4.6	11.6	8.8	-3.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	51.8	7.4	29.6	25.1	26.6	20.9	9.6	9:51	17.5	7.0	12.3	10.0	-7.3	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	46.4	4.6	25.5	28.3	24.1	17.8	8.3	9:53	15.2	5.0	10.1	9.5	-7.5	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	46.4	5.4	25.9	28.5	23.2	18.9	9.6	9:57	18.7	5.0	11.8	9.4	-4.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	43.4	4.2	23.8	25.7	21.5	16.3	8.2	10:00	15.2	2.5	8.8	7.3	-5.0	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	36.6	2.0	19.3	17.4	16.8	12.6	4.2	10:02	10.6	1.2	5.9	6.6	-8.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	42.0	1.2	21.6	25.3	23.0	15.0	7.8	10:05	13.7	3.3	8.5	5.6	-7.4	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	49.0	2.0	25.5	30.0	29.2	16.9	11.9	10:07	14.5	2.0	8.3	5.5	-5.3	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	45.4	7.8	26.6	26.1	19.8	18.5	7.7	10:11	17.1	3.7	10.4	7.4	-4.4	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	47.4	2.9	25.2	26.8	26.8	18.1	11.4	10:14	17.9	4.2	11.0	9.3	-4.0	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	48.5	10.2	29.4	25.3	20.5	19.9	4.3	10:16	13.3	7.4	10.4	9.8	-11.9	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	39.7	7.0	23.4	25.0	14.9	17.0	4.2	10:19	16.4	5.0	10.7	7.7	-6.4	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	43.9	4.2	24.0	25.5	22.0	16.2	9.3	10:22	15.6	1.2	8.4	6.4	-3.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	46.4	2.5	24.4	28.8	26.2	17.4	11.3	10:25	17.5	3.3	10.4	8.1	-3.6	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	47.4	2.5	24.9	31.6	27.2	17.9	13.6	10:28	19.8	2.0	10.9	7.0	0.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	39.2	5.8	22.5	22.2	15.6	15.8	4.3	10:31	14.5	3.7	9.1	6.9	-7.0	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	43.9	3.7	23.8	23.6	22.4	15.3	7.0	10:34	11.4	2.0	6.7	5.1	-8.4	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	29.5	-3.9	12.8	11.2	15.6	6.8	3.5	10:36	5.4	-3.9	0.8	1.0	-8.5	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	9.8	2.9	6.4	5.7	-10.9	4.4	-10.5	10:39	6.2	-1.5	2.4	2.9	-10.1	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	33.6	-4.3	14.6	20.2	20.1	9.7	10.2	10:42	13.7	-4.3	4.7	0.9	0.3	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	39.2	-2.0	18.6	23.2	23.4	13.1	11.5	10:46	16.4	-1.1	7.7	2.8	-0.3	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	35.3	2.0	18.7	18.1	15.5	11.9	3.6	10:49	9.8	0.3	5.1	3.9	-8.3	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	35.7	-1.1	17.3	21.6	19.0	11.9	8.2	10:51	14.1	-1.1	6.5	2.7	-2.6	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	42.0	4.2	23.1	22.4	20.1	16.0	7.5	10:54	15.2	2.5	8.8	5.7	-5.0	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	32.3	2.0	17.2	16.4	12.5	11.3	1.1	10:57	9.0	1.6	5.3	5.7	-10.4	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	37.4	5.8	21.6	13.8	13.9	15.6	2.2	11:00	13.7	5.4	9.6	7.0	-9.5	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	30.7	-0.2	15.3	15.2	13.1	11.2	4.0	11:04	13.3	0.7	7.0	3.6	-5.2	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	28.7	3.3	16.0	10.7	7.6	8.6	0.0	11:07	6.2	-3.9	1.2	0.6	-7.7	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	27.9	-9.5	9.2	11.1	19.6	5.0	8.0	11:09	7.8	-6.3	0.8	-1.0	-3.6	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	-0.2	-0.2	-0.2	-0.2	-17.8	0.5	-16.0	11:12	2.9	-0.6	1.1	0.4	-14.3	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	18.3	-0.2	9.1	4.5	0.7	6.3	-5.0	11:15	7.0	-0.2	3.4	1.2	-10.6	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	20.2	0.3	10.2	6.5	2.1	4.1	-2.0	11:18	3.7	-7.9	-2.1	-1.9	-6.2				
13 Sep 03	5:53	18:31	12:38	24.4	-10.0	7.2	6.4	16.6	1.4	4.0	11:22	0.3	-8.9	-4.3	-7.1	-8.6	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	25.6	-8.4	8.6	14.1	16.2	4.5	8.6	11:25	9.8	-8.9	0.5	-3.7	1.0	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	30.3	-0.6	14.9	16.8	13.1	8.7	3.7	11:28	8.6	-3.4	2.6	0.9	-5.8	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	26.3	-1.5	12.4	13.3	10.1	7.2	0.5	11:31	6.2	-2.4	1.9	0.8	-9.1	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	10.2	-8.9	0.6	-0.3	1.4	-1.6	-5.3	11:33	-1.1	-6.8	-3.9	-4.5	-12.0	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	18.7	-7.3	5.7	3.6	8.2	2.4	1.1	11:36	5.0	-6.8	-0.9	-4.8	-6.0	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	26.7	-7.3	9.7	13.6	16.3	5.2	6.8	11:40	8.2	-6.8	0.7	-3.1	-2.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	29.5	-5.3	12.1	14.5	17.0	5.0	4.3	11:43	2.5	-6.8	-2.2	-3.1	-8.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	25.6	-1.5	12.0	13.5	9.3	4.9	1.8	11:46	3.7	-8.4	-2.3	-3.4	-5.7	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	27.9	-1.1	13.4	17.9	11.2	9.7	4.1	11:49	13.3	-1.5	5.9	2.2	-3.0	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	29.9	1.6	15.8	18.2	10.5	11.6	1.8	11:52	12.9	2.0	7.5	4.2	-6.9	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	30.3	-6.3	12.0	18.2	18.8	7.9	7.7	11:55	11.0	-3.4	3.8	0.6	-3.4	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	29.5	3.3	16.4	18.5	8.4	12.1	1.1	11:58	13.7	2.0	7.9	5.4	-6.1	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	24.0	1.2	12.6	11.2	5.1	8.2	-4.0	12:01	6.2	1.6	3.9	3.9	-13.2	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

615225 JC-005

Jack Creek 2846

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	56.0	0.7	28.3	33.6	37.5	18.8	19.3	9:16	18.7	-0.2	9.3	4.6	1.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	52.9	6.6	29.8	29.1	28.5	19.1	11.8	9:19	14.9	2.0	8.4	6.9	-5.0	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	51.8	-1.1	25.4	32.3	35.1	17.1	18.5	9:21	18.7	-1.1	8.8	4.1	1.9	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	56.0	6.2	31.1	32.2	32.0	20.4	14.8	9:23	17.5	2.0	9.8	8.6	-2.3	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	42.5	9.4	25.9	18.5	15.3	17.6	1.7	9:26	12.2	6.2	9.2	8.6	-11.8	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	34.0	5.0	19.5	18.6	11.2	13.5	1.4	9:28	12.2	2.9	7.5	6.5	-8.5	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	41.5	-0.6	20.5	22.7	24.3	13.5	10.0	9:30	13.3	-0.2	6.6	4.3	-4.3	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	42.5	1.2	21.8	25.0	23.5	15.4	9.4	9:33	15.6	2.5	9.0	5.8	-4.6	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	52.4	-1.1	25.7	30.5	35.6	16.6	17.0	9:35	15.6	-0.6	7.5	3.7	-1.6	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	48.5	-0.6	23.9	20.3	31.3	14.5	12.0	9:39	10.2	-0.2	5.0	3.0	-7.4	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	43.4	2.9	23.2	22.7	22.8	14.8	7.4	9:41	11.4	1.6	6.5	4.0	-8.0	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	38.3	3.7	21.0	16.8	16.8	13.9	4.6	9:43	11.8	1.6	6.7	5.5	-7.6	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	54.1	5.8	30.0	28.4	30.5	20.1	10.7	9:46	14.5	5.8	10.1	9.0	-9.1	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	48.0	2.9	25.4	24.3	27.3	18.1	12.2	9:48	18.3	3.3	10.8	7.5	-2.8	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	54.7	5.4	30.1	27.0	31.6	20.4	12.2	9:51	16.0	5.4	10.7	8.1	-7.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	54.1	3.7	28.9	31.6	32.6	19.8	13.5	9:53	16.8	4.6	10.7	8.9	-5.6	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	53.5	3.7	28.6	31.5	32.0	19.5	15.0	9:57	18.3	2.5	10.4	8.0	-2.0	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	52.9	5.0	29.0	28.5	30.2	18.6	14.7	10:00	16.8	-0.2	8.3	6.5	-0.9	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	44.9	-1.5	21.7	21.0	28.6	14.3	11.5	10:02	12.9	0.7	6.8	7.1	-5.6	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	47.4	1.6	24.5	28.5	28.1	16.4	11.8	10:05	14.9	1.6	8.2	5.1	-4.5	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	54.7	-0.2	27.3	32.3	37.1	17.3	17.2	10:07	14.9	-0.2	7.3	3.3	-2.8	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	52.4	5.4	28.9	29.7	29.2	19.6	14.4	10:11	19.0	1.6	10.3	5.5	-0.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	54.7	3.7	29.2	30.0	33.2	19.4	16.9	10:14	18.7	0.3	9.5	7.3	0.6	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	54.1	10.2	32.2	29.4	26.1	21.6	7.3	10:16	14.1	7.8	11.0	10.3	-11.5	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	44.9	6.2	25.6	27.5	20.9	17.3	10.0	10:19	17.5	0.7	9.1	6.9	-1.0	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	50.1	2.9	26.5	28.5	29.4	16.7	13.8	10:22	14.9	-1.1	6.9	4.6	-1.9	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	52.4	-1.5	25.4	31.5	36.1	17.3	19.4	10:25	19.4	-1.1	9.2	6.6	2.7	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	52.4	-2.0	25.2	33.8	36.6	18.0	21.2	10:28	22.5	-1.1	10.7	4.8	5.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	46.9	5.0	26.0	25.0	24.2	16.7	9.5	10:31	13.7	1.2	7.4	4.9	-5.2	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	49.6	3.7	26.6	27.4	28.1	16.9	11.2	10:34	13.3	1.2	7.2	4.9	-5.6	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	37.9	-4.8	16.5	15.5	24.9	9.1	10.1	10:36	8.2	-4.8	1.7	1.0	-4.7	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	12.2	4.6	8.4	7.5	-10.2	5.9	-10.4	10:39	7.0	-0.2	3.4	4.0	-10.6	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	33.2	-2.0	15.6	19.5	17.4	10.9	7.6	10:42	14.1	-1.5	6.3	2.1	-2.2	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	40.6	-0.6	20.0	23.9	23.4	13.7	10.9	10:46	15.6	-0.6	7.5	3.2	-1.6	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	40.1	2.0	21.1	19.6	20.3	13.7	6.4	10:49	11.4	1.2	6.3	3.9	-7.6	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	43.4	0.7	22.1	24.5	24.9	14.5	11.5	10:51	14.9	-1.1	6.9	2.5	-1.9	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	13.3	3.3	8.3	6.0	-7.8	5.4	-11.5	10:54	3.7	1.2	2.5	3.2	-15.2	30.6	12.8	21.7	0.0

Appendix A, Hobo Totals

615230 III

Jack Creek 2846

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	41.1	4.2	22.6	25.7	19.1	16.4	7.2	9:16	16.8	3.7	10.2	7.7	-4.8	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	47.4	7.8	27.6	25.6	21.8	18.7	6.0	9:19	13.7	5.8	9.8	9.1	-9.9	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	48.0	1.6	24.8	26.6	28.6	16.9	11.6	9:21	15.2	2.9	9.1	6.8	-5.4	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	46.9	8.2	27.6	27.3	20.9	19.3	7.6	9:23	17.1	5.0	11.1	10.6	-5.6	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	40.1	10.6	25.4	17.6	11.8	17.6	-0.6	9:26	12.2	7.4	9.8	10.2	-13.1	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	34.9	5.8	20.3	16.4	11.3	13.9	-0.8	9:28	9.8	5.0	7.4	7.4	-12.9	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	42.5	2.0	22.2	21.7	22.7	15.1	7.5	9:30	12.9	2.9	7.9	6.0	-7.7	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	42.9	3.7	23.3	22.8	21.4	16.9	7.7	9:33	16.4	4.6	10.5	7.9	-6.0	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	48.5	3.3	25.9	26.6	27.4	17.7	11.0	9:35	15.6	3.3	9.5	7.3	-5.5	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	42.9	2.9	22.9	18.4	22.3	14.9	5.9	9:39	10.6	3.3	7.0	6.2	-10.5	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	41.5	5.4	23.5	19.7	18.3	15.3	3.7	9:41	10.6	3.7	7.2	6.1	-10.9	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	37.4	5.8	21.6	15.3	13.9	15.1	1.6	9:43	12.2	5.0	8.6	7.6	-10.6	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	48.0	7.4	27.7	24.5	22.7	19.1	5.2	9:46	13.3	7.8	10.6	10.5	-12.3	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	46.4	5.8	26.1	23.5	22.8	19.1	8.0	9:48	17.5	6.6	12.1	9.8	-6.9	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	48.0	7.0	27.5	23.8	23.2	19.3	6.4	9:51	14.9	7.4	11.1	10.2	-10.4	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	47.4	8.2	27.8	25.8	21.4	20.2	5.7	9:53	16.4	8.6	12.5	11.2	-10.0	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	34.0	9.4	21.7	23.1	6.8	17.0	0.2	9:57	17.9	6.6	12.3	11.4	-6.5	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	28.7	7.8	18.3	21.2	3.1	14.3	-2.0	10:00	15.6	5.0	10.3	9.2	-7.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	24.4	3.7	14.1	13.7	2.9	10.5	-1.8	10:02	12.5	1.2	6.9	8.2	-6.4	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	24.4	2.0	13.2	15.9	4.6	10.9	-3.0	10:05	12.2	5.0	8.6	6.1	-10.6	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	29.5	3.3	16.4	19.9	8.4	12.9	0.9	10:07	14.9	3.7	9.3	7.2	-6.7	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	29.9	7.8	18.9	20.6	4.3	15.1	-1.7	10:11	16.4	6.2	11.3	8.7	-7.6	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	34.0	7.8	20.9	22.1	8.4	15.9	0.8	10:14	16.4	5.4	10.9	10.3	-6.8	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	30.7	12.2	21.4	20.7	0.8	16.7	-5.6	10:16	14.9	9.0	11.9	11.3	-12.0	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	43.9	8.2	26.1	23.1	17.9	17.4	6.3	10:19	14.9	2.5	8.7	8.1	-5.4	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	48.0	4.2	26.1	26.1	26.0	16.3	11.3	10:22	13.7	-0.6	6.5	5.4	-3.5	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	54.1	1.6	27.9	28.5	34.8	18.7	16.0	10:25	17.1	2.0	9.6	7.6	-2.7	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	53.5	2.0	27.8	30.0	33.7	19.1	15.9	10:28	18.3	2.5	10.4	7.3	-2.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	48.0	6.6	27.3	22.1	23.6	16.9	5.7	10:31	9.4	3.7	6.6	6.4	-12.1	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	50.1	5.0	27.5	26.7	27.4	17.6	10.0	10:34	12.9	2.5	7.7	5.9	-7.3	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	35.3	-2.4	16.4	14.7	19.9	9.8	6.2	10:36	8.2	-2.0	3.1	2.6	-7.6	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.8	5.0	8.4	7.2	-11.0	6.2	-11.5	10:39	7.0	1.2	4.1	4.6	-11.9	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	36.6	-0.2	18.2	17.5	18.9	11.3	4.8	10:42	8.6	0.3	4.5	2.8	-9.4	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	40.6	2.5	21.5	21.5	20.4	14.2	5.7	10:46	11.4	2.5	6.9	5.0	-8.9	28.9	8.9	18.9	2.2

Appendix A, Hobo Totals

633680 III

Jack Creek 2868

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	47.4	4.2	25.8	26.1	25.5	18.1	11.4	9:16	17.9	2.9	10.4	7.4	-2.8	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	43.4	6.6	25.0	23.9	19.0	18.0	6.7	9:19	17.1	5.0	11.1	8.6	-5.6	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	42.9	0.3	21.6	28.0	24.9	15.9	13.1	9:21	19.8	0.7	10.3	6.0	1.3	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	48.0	5.0	26.5	27.7	25.2	18.8	9.8	9:23	17.1	5.0	11.1	9.5	-5.6	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	44.9	10.2	27.6	18.4	16.9	18.7	3.1	9:26	13.3	6.2	9.8	9.0	-10.7	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	39.2	5.0	22.1	20.4	16.5	15.5	4.9	9:28	14.5	3.3	8.9	7.4	-6.6	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	40.6	0.7	20.7	21.2	22.1	14.5	9.4	9:30	15.6	1.2	8.4	5.3	-3.3	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	46.4	2.5	24.4	26.4	26.2	17.2	10.9	9:33	16.8	3.3	10.0	7.2	-4.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	49.6	2.0	25.8	28.8	29.8	17.7	13.5	9:35	17.1	2.0	9.6	6.7	-2.7	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	40.1	2.0	21.1	17.2	20.3	13.8	5.3	9:39	10.6	2.5	6.5	5.1	-9.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	42.5	3.7	23.1	20.3	21.0	15.4	6.8	9:41	12.9	2.5	7.7	5.3	-7.3	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	38.3	4.2	21.2	16.8	16.4	14.9	3.7	9:43	12.9	4.2	8.5	7.1	-9.0	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	50.1	5.8	28.0	25.2	26.5	19.2	8.7	9:46	14.9	6.2	10.5	9.3	-9.1	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	48.5	4.6	26.5	23.8	26.1	19.9	12.5	9:48	21.7	5.0	13.3	9.0	-1.1	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	46.4	4.6	25.5	23.5	24.1	19.1	10.9	9:51	20.6	5.0	12.8	9.1	-2.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	48.5	5.4	26.9	26.7	25.3	18.9	8.9	9:53	16.0	5.8	10.9	9.2	-7.6	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	45.9	5.8	25.9	27.6	22.3	19.5	10.4	9:57	21.3	5.0	13.2	9.1	-1.4	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	44.4	3.3	23.9	23.7	23.3	16.6	9.1	10:00	15.6	2.9	9.3	7.2	-5.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	39.2	1.6	20.4	16.8	19.8	14.4	7.4	10:02	14.9	2.0	8.4	7.4	-5.0	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	39.7	2.0	20.9	24.3	19.9	16.3	8.3	10:05	19.0	4.6	11.8	6.5	-3.3	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	46.4	1.6	24.0	27.9	27.0	16.5	12.0	10:07	16.4	1.6	9.0	5.7	-3.0	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	44.9	5.0	24.9	24.5	22.1	18.4	10.8	10:11	20.6	3.3	11.9	6.6	-0.5	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	50.1	4.2	27.1	27.1	28.2	19.8	14.0	10:14	21.3	3.7	12.5	9.1	-0.2	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	48.5	9.0	28.8	26.5	21.7	19.7	5.1	10:16	13.7	7.4	10.6	10.2	-11.5	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	44.4	5.8	25.1	26.2	20.8	18.5	8.4	10:19	18.7	5.0	11.8	8.0	-4.1	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	45.4	2.5	23.9	24.1	25.2	17.1	11.4	10:22	17.9	2.5	10.2	6.4	-2.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	44.9	0.3	22.6	27.1	26.8	16.3	13.3	10:25	18.7	1.2	9.9	6.9	-0.3	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	45.4	3.7	24.6	29.3	23.9	18.9	14.2	10:28	24.4	2.0	13.2	7.2	4.6	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	33.6	6.2	19.9	21.9	9.6	16.0	3.9	10:31	20.2	4.2	12.2	6.9	-1.8	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	45.4	3.7	24.6	22.7	23.9	16.2	9.3	10:34	14.1	1.6	7.8	5.6	-5.3	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	27.9	-2.0	13.0	12.2	12.1	7.9	2.5	10:36	8.2	-2.4	2.9	2.4	-7.1	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	12.2	5.0	8.6	8.0	-10.6	6.8	-10.7	10:39	8.6	1.6	5.1	5.1	-10.8	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	28.3	-2.0	13.2	15.3	12.5	10.7	7.1	10:42	17.9	-1.5	8.2	3.9	1.6	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	32.3	1.2	16.8	17.5	13.4	13.6	6.7	10:46	19.4	1.6	10.5	5.3	0.0	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	33.2	3.3	18.2	15.1	12.1	13.1	1.8	10:49	12.5	3.3	7.9	5.3	-8.6	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	33.2	0.7	17.0	17.8	14.7	13.4	7.2	10:51	18.7	1.2	9.9	4.9	-0.3	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	35.3	2.9	19.1	18.1	14.6	14.6	5.1	10:54	16.8	3.3	10.0	6.1	-4.3	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	27.1	2.5	14.8	15.3	6.9	11.0	-0.8	10:57	11.8	2.5	7.1	6.2	-8.5	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	29.5	7.0	18.3	13.9	4.7	15.3	-1.3	11:00	17.5	7.0	12.3	9.1	-7.3	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	21.0	2.5	11.7	12.8	0.7	10.3	-2.6	11:04	14.9	2.9	8.9	6.1	-5.8	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	21.0	2.9	11.9	10.2	0.3	7.4	-3.8	11:07	7.8	-2.0	2.9	1.8	-8.0	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	24.0	-5.3	9.4	9.2	11.5	6.4	4.7	11:09	11.4	-4.3	3.5	0.5	-2.1	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.6	1.6	1.6	1.6	-17.8	2.1	-16.7	11:12	3.7	1.6	2.7	2.1	-15.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	12.2	1.2	6.7	4.2	-6.8	6.3	-8.0	11:15	10.2	1.6	5.9	2.5	-9.2	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	13.7	0.7	7.2	5.5	-4.8	3.6	-7.9	11:18	3.3	-3.4	0.0	0.1	-11.1				
13 Sep 03	5:53	18:31	12:38	16.4	-5.3	5.5	3.4	3.9	2.2	-3.3	11:22	2.5	-4.8	-1.2	-3.5	-10.5	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	20.2	-5.8	7.2	8.4	8.2	5.1	3.6	11:25	11.4	-5.3	3.0	-2.0	-1.1	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	25.6	-2.0	11.8	11.5	9.8	7.4	2.4	11:28	9.4	-3.4	3.0	0.9	-5.0	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	22.1	-1.5	10.3	9.9	5.8	6.6	-1.1	11:31	7.8	-2.0	2.9	1.2	-8.0	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	5.4	-4.3	0.5	1.0	-8.0	-0.3	-10.6	11:33	1.2	-3.4	-1.1	-0.9	-13.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	13.3	-2.4	5.4	2.1	-2.0	3.7	-4.5	11:36	7.4	-3.4	2.0	-1.4	-7.0	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	21.3	-4.8	8.3	8.3	8.4	5.3	2.4	11:40	9.4	-4.8	2.3	-2.1	-3.5	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	23.2	-4.3	9.5	9.8	9.8	5.0	0.4	11:43	5.0	-3.9	0.6	-2.0	-8.9	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	23.2	-2.9	10.2	10.6	8.4	6.2	1.8	11:46	8.6	-4.3	2.1	-2.2	-4.8	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	24.8	-2.4	11.2	12.9	9.4	8.5	4.1	11:49	14.1	-2.4	5.8	1.3	-1.3	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	27.1	0.3	13.7	14.2	9.1	10.5	2.1	11:52	13.7	0.7	7.2	3.3	-4.8	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	25.6	-4.8	10.4	12.6	12.6	7.7	6.4	11:55	14.1	-3.9	5.1	0.4	0.2	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	26.3	1.6	14.0	15.9	7.0	11.0	1.8	11:58	15.2	0.7	8.0	4.2	-3.3	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	12.9	0.3	6.6	3.7	-5.1	4.7	-9.8	12:01	4.6	1.2	2.9	2.5	-14.4	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

633697 III

Jack Creek 2828

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	36.6	4.2	20.4	21.7	14.6	15.8	5.5	9:16	18.3	4.2	11.2	8.4	-3.7	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	31.9	8.6	20.3	19.0	5.5	16.1	-1.7	9:19	16.4	7.4	11.9	10.3	-8.8	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	36.1	3.7	19.9	21.9	14.6	16.0	5.8	9:21	19.4	4.6	12.0	8.4	-2.9	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	39.2	7.8	23.5	21.9	13.6	18.0	3.4	9:23	17.9	7.0	12.5	11.2	-6.9	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	26.3	9.8	18.1	15.5	-1.3	13.7	-7.1	9:26	11.8	7.0	9.4	9.7	-13.0	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	27.5	6.2	16.9	16.2	3.5	13.5	-2.8	9:28	14.5	5.8	10.1	8.7	-9.1	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	31.1	2.9	17.0	15.7	10.5	12.9	1.7	9:30	14.1	3.3	8.7	6.2	-7.0	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	34.4	3.7	19.1	19.9	12.9	15.0	4.3	9:33	17.5	4.2	10.8	8.3	-4.4	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	37.0	4.6	20.8	20.8	14.7	16.3	4.9	9:35	18.3	5.4	11.8	9.1	-4.9	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	27.9	5.4	16.7	13.4	4.7	12.0	-3.7	9:39	10.2	4.6	7.4	6.9	-12.1	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	32.8	7.4	20.1	16.6	7.5	14.3	-1.5	9:41	12.2	5.0	8.6	7.0	-10.6	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	30.3	6.2	18.3	15.2	6.3	14.1	-1.6	9:43	14.1	5.8	9.9	8.6	-9.5	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	36.6	8.6	22.6	20.0	10.2	17.0	-1.9	9:46	13.3	9.4	11.4	11.4	-13.9	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	35.3	7.4	21.4	19.9	10.1	18.2	3.3	9:48	22.1	7.8	15.0	11.0	-3.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	32.8	7.8	20.3	18.9	7.1	17.3	0.7	9:51	20.2	8.2	14.2	11.4	-5.8	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	37.4	9.0	23.2	21.5	10.6	18.1	0.3	9:53	16.8	9.0	12.9	11.5	-10.0	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	36.6	9.0	22.8	22.7	9.8	19.5	4.3	9:57	24.4	7.8	16.1	11.6	-1.2	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	31.1	6.6	18.9	18.4	6.7	14.9	-0.8	10:00	15.6	6.2	10.9	9.0	-8.4	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	28.3	3.7	16.0	11.8	6.8	11.9	-0.3	10:02	12.9	2.5	7.7	7.9	-7.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	29.5	2.9	16.2	16.8	8.8	14.0	2.4	10:05	18.7	5.0	11.8	6.6	-4.1	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	34.0	4.6	19.3	19.7	11.7	15.3	3.6	10:07	17.9	4.6	11.2	7.7	-4.5	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	32.8	7.8	20.3	19.6	7.1	16.9	1.7	10:11	20.6	6.6	13.6	8.8	-3.8	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	36.1	6.2	21.2	21.5	12.1	17.4	4.5	10:14	21.0	6.2	13.6	10.2	-3.0	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	33.6	11.4	22.5	20.7	4.4	16.9	-3.9	10:16	14.1	8.6	11.4	10.7	-12.3	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	33.6	8.2	20.9	19.6	7.6	16.3	0.4	10:19	17.1	6.2	11.7	9.7	-6.9	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	34.9	6.6	20.7	18.3	10.5	15.3	2.5	10:22	16.0	3.7	9.9	7.9	-5.5	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	34.9	4.6	19.7	20.7	12.5	15.8	5.0	10:25	19.4	4.2	11.8	9.5	-2.5	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	36.6	4.6	20.6	22.5	14.2	17.3	7.4	10:28	23.2	5.0	14.1	9.1	0.5	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	26.3	8.6	17.5	17.4	-0.1	15.7	-1.6	10:31	21.3	6.6	14.0	8.5	-3.1	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	30.3	5.8	18.1	16.9	6.7	12.7	-1.1	10:34	11.8	2.9	7.3	6.6	-8.9	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	12.5	-1.5	5.5	6.6	-3.7	3.7	-7.3	10:36	5.4	-1.5	1.9	1.8	-10.9	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	7.0	2.9	5.0	4.6	-13.6	3.9	-13.6	10:39	5.0	0.7	2.9	2.9	-13.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	22.9	-2.4	10.2	11.6	7.5	9.7	5.5	10:42	19.8	-1.5	9.1	2.8	3.5	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	27.9	1.6	14.8	16.3	8.5	13.4	5.8	10:46	22.5	1.6	12.0	5.6	3.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	31.1	5.4	18.3	13.7	7.9	13.2	-0.5	10:49	12.5	3.7	8.1	6.1	-9.0	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	30.3	2.5	16.4	16.2	10.1	14.3	5.6	10:51	21.7	2.9	12.3	5.5	1.0	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	31.9	4.6	18.3	17.5	9.6	14.9	2.6	10:54	18.3	5.0	11.6	7.9	-4.5	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	21.7	5.4	13.6	14.3	-1.5	10.2	-7.8	10:57	8.6	5.0	6.8	7.0	-14.1	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	26.3	5.8	16.1	10.9	2.8	13.3	-2.8	11:00	15.2	5.8	10.5	7.1	-8.4	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	21.3	2.5	11.9	11.5	1.1	11.3	-0.1	11:04	19.0	2.5	10.8	5.3	-1.2	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	19.4	4.2	11.8	9.8	-2.5	7.2	-6.9	11:07	5.8	-0.6	2.6	2.6	-11.4	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	21.3	-4.8	8.3	8.4	8.4	7.0	4.0	11:09	14.5	-2.9	5.8	1.2	-0.4	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	11.0	-0.6	5.2	5.0	-6.2	3.6	-9.4	11:12	4.6	-0.6	2.0	0.9	-12.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	17.1	-1.1	8.0	7.6	0.4	6.4	-1.0	11:15	12.5	-2.9	4.8	1.6	-2.3	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	10.6	-1.5	4.5	4.4	-5.7	2.2	-6.1	11:18	5.4	-5.8	-0.2	0.2	-6.6				
13 Sep 03	5:53	18:31	12:38	12.9	-7.9	2.5	0.6	3.0	-0.4	-2.9	11:22	1.2	-7.9	-3.3	-5.4	-8.8	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	18.7	-5.3	6.7	8.9	6.2	5.8	4.9	11:25	15.6	-5.8	4.9	-1.1	3.6	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	24.8	2.0	13.4	12.5	5.0	8.9	-0.5	11:28	10.2	-1.5	4.4	3.3	-6.1	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	21.3	2.0	11.7	10.7	1.5	7.7	-4.3	11:31	7.4	-0.2	3.6	3.0	-10.2	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	1.6	-5.8	-2.1	-1.5	-10.4	-3.6	-8.7	11:33	0.3	-10.6	-5.1	-5.1	-6.9	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	14.9	-8.9	3.0	3.4	6.0	1.1	2.8	11:36	7.8	-9.5	-0.8	-4.0	-0.5	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	19.4	-4.3	7.5	9.1	6.0	5.2	1.4	11:40	10.2	-4.3	2.9	-0.4	-3.2	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	21.0	-1.5	9.7	9.0	4.7	4.9	-2.5	11:43	4.2	-3.9	0.2	-0.7	-9.8	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	21.3	1.2	11.2	10.8	2.4	5.5	-2.6	11:46	5.0	-5.3	-0.2	-0.9	-7.5	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	25.6	1.6	13.6	14.6	6.2	11.7	2.8	11:49	18.3	1.2	9.7	5.1	-0.7	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	26.7	4.2	15.4	15.1	4.8	13.0	-0.6	11:52	16.4	4.6	10.5	7.1	-6.0	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	22.5	-1.5	10.5	10.4	6.2	8.2	0.8	11:55	12.5	-0.6	6.0	3.2	-4.6	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	24.4	5.8	15.1	16.4	0.8	12.7	-3.2	11:58	15.6	5.0	10.3	7.7	-7.1	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	9.4	3.3	6.4	5.7	-11.7	6.5	-13.1	12:01	8.2	5.0	6.6	6.3	-14.5	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

633701 III

Jack Creek 2956

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	40.1	7.0	23.6	25.0	15.3	18.5	5.2	9:16	19.8	7.0	13.4	10.4	-5.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	41.1	9.8	25.4	23.8	13.5	19.7	4.0	9:19	20.2	7.8	14.0	12.1	-5.4	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	48.0	4.2	26.1	29.8	26.0	20.9	15.2	9:21	26.7	4.6	15.7	9.9	4.4	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	49.0	10.2	29.6	28.3	21.0	21.7	6.1	9:23	18.3	9.4	13.9	12.6	-8.9	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	39.7	10.6	25.1	18.0	11.3	17.8	-0.3	9:26	13.3	7.4	10.4	10.9	-11.9	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	35.3	5.0	20.1	18.7	12.5	16.3	3.6	9:28	18.7	6.2	12.4	9.0	-5.3	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	41.5	3.7	22.6	21.5	20.0	16.1	6.5	9:30	14.9	4.2	9.5	7.5	-7.1	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	38.3	4.6	21.4	23.5	16.0	16.6	5.9	9:33	18.7	5.0	11.8	9.4	-4.1	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	44.4	6.2	25.3	26.5	20.4	19.3	8.3	9:35	20.2	6.2	13.2	10.3	-3.8	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	34.9	5.8	20.3	16.4	11.3	14.2	-0.7	9:39	10.6	5.4	8.0	7.9	-12.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	40.1	6.2	23.2	19.5	16.1	16.5	4.1	9:41	14.9	5.0	9.9	7.5	-7.9	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	35.3	6.6	20.9	16.3	10.9	15.4	0.5	9:43	13.7	5.8	9.8	8.9	-9.9	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	45.4	8.6	27.0	23.3	19.0	19.7	3.9	9:46	15.6	9.0	12.3	10.9	-11.2	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	41.1	7.0	24.0	21.5	16.2	19.5	6.8	9:48	22.5	7.4	15.0	10.9	-2.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	39.2	7.8	23.5	22.6	13.6	19.6	4.3	9:51	22.1	9.4	15.8	12.3	-5.1	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	49.0	9.4	29.2	26.9	21.8	21.6	6.3	9:53	18.3	9.8	14.1	12.4	-9.3	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	46.4	9.0	27.7	28.2	19.6	22.8	9.8	9:57	26.7	9.0	17.9	12.4	-0.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	42.9	9.0	26.0	23.0	16.1	19.1	4.0	10:00	17.1	7.4	12.3	10.1	-8.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	36.1	4.6	20.4	17.0	13.8	15.4	4.3	10:02	16.8	4.2	10.5	8.7	-5.2	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	43.4	3.7	23.6	25.6	21.9	19.6	11.5	10:05	25.2	6.2	15.7	9.3	1.2	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	48.0	5.8	26.9	28.0	24.4	19.9	10.5	10:07	20.2	5.8	13.0	9.5	-3.4	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	44.9	8.6	26.8	23.4	18.5	20.9	7.9	10:11	22.5	7.4	15.0	10.8	-2.7	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	42.9	7.4	25.2	25.1	17.7	21.0	9.4	10:14	26.3	7.4	16.9	12.7	1.1	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	43.9	10.6	27.3	24.3	15.5	19.1	1.6	10:16	13.7	8.2	11.0	10.8	-12.3	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	42.0	6.6	24.3	24.3	17.6	18.9	7.7	10:19	21.3	5.8	13.6	9.6	-2.3	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	43.4	5.4	24.4	22.5	20.2	18.5	8.8	10:22	20.2	5.0	12.6	9.5	-2.6	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	46.9	5.4	26.2	27.4	23.7	20.8	12.7	10:25	25.2	5.8	15.5	10.8	1.6	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	49.0	6.6	27.8	29.7	24.6	23.3	15.3	10:28	30.7	7.0	18.9	11.9	5.9	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	35.7	9.4	22.6	23.8	8.5	19.0	3.9	10:31	24.0	7.0	15.5	10.6	-0.8	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	42.9	4.6	23.8	21.7	20.6	17.1	7.7	10:34	16.8	4.2	10.5	7.3	-5.2	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	25.2	0.3	12.7	12.6	7.1	8.7	-1.0	10:36	9.0	0.3	4.7	3.9	-9.0	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	10.6	5.0	7.8	7.2	-12.2	6.3	-12.3	10:39	7.4	2.0	4.7	5.0	-12.4	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	34.9	-1.5	16.7	18.6	18.6	14.2	12.7	10:42	24.0	-0.6	11.7	5.6	6.8	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	38.8	2.9	20.8	20.8	18.1	17.3	11.1	10:46	24.8	2.9	13.8	8.0	4.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	35.7	5.8	20.8	17.0	12.1	15.3	2.1	10:49	14.9	5.0	9.9	7.6	-7.9	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	39.7	3.7	21.7	22.8	18.2	17.9	10.5	10:51	24.4	3.7	14.1	7.7	2.9	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	41.1	6.2	23.6	20.6	17.1	18.5	6.4	10:54	20.2	6.6	13.4	9.4	-4.2	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	29.5	6.6	18.1	17.7	5.1	13.6	-3.8	10:57	11.8	6.6	9.2	8.6	-12.6	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	36.1	6.6	21.4	15.0	11.7	16.9	2.8	11:00	18.3	6.6	12.5	9.0	-6.1	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	26.3	2.9	14.6	14.4	5.7	12.9	1.4	11:04	18.7	3.7	11.2	7.0	-2.9	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	22.9	4.6	13.7	10.6	0.5	8.4	-3.1	11:07	8.6	-2.4	3.1	2.3	-6.7	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	30.7	-4.8	12.9	11.4	17.8	9.1	9.6	11:09	14.9	-4.3	5.3	0.9	1.4	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.2	0.7	0.9	1.1	-17.3	1.7	-15.8	11:12	4.2	0.7	2.4	1.6	-14.4	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	17.5	0.7	9.1	5.5	-1.0	7.4	-4.0	11:15	11.0	0.3	5.6	1.9	-7.1	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	14.1	0.3	7.2	5.2	-4.0	3.4	-7.5	11:18	2.9	-3.9	-0.5	-0.5	-11.0				
13 Sep 03	5:53	18:31	12:38	18.7	-5.8	6.4	4.0	6.7	2.2	-1.8	11:22	1.6	-5.8	-2.1	-3.6	-10.4	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	26.3	-4.8	10.8	11.5	13.4	8.2	8.2	11:25	16.0	-4.8	5.6	-0.5	3.0	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	30.3	-1.5	14.4	13.5	14.0	9.5	4.6	11:28	11.0	-2.0	4.5	2.0	-4.8	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	22.1	0.3	11.2	11.0	4.0	7.7	-2.5	11:31	8.6	-0.2	4.2	2.2	-9.0	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	4.6	-4.3	0.1	0.1	-8.9	-0.8	-11.3	11:33	0.3	-3.9	-1.8	-1.5	-13.6	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	18.3	-2.4	7.9	3.4	2.9	5.7	-1.1	11:36	9.8	-2.9	3.5	-0.6	-5.1	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	24.4	-3.9	10.3	10.8	10.5	8.1	5.7	11:40	15.2	-3.4	5.9	-0.3	0.8	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	27.9	-2.9	12.5	12.2	13.0	7.7	3.0	11:43	8.2	-2.4	2.9	-0.3	-7.1	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	27.9	-2.0	13.0	14.3	12.1	9.7	6.0	11:46	15.2	-2.4	6.4	0.1	-0.1	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	31.1	-0.2	15.5	17.3	13.5	13.1	8.8	11:49	21.7	-0.2	10.8	3.7	4.1	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	33.2	1.6	17.4	18.0	13.8	14.4	6.9	11:52	20.2	2.5	11.3	5.2	-0.1	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	35.7	-2.0	16.9	19.0	19.9	14.6	13.9	11:55	25.2	-0.6	12.3	4.7	8.0	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	34.0	3.7	18.9	19.9	12.5	16.0	7.5	11:58	23.2	2.9	13.1	6.6	2.6	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	34.0	2.0	18.0	19.7	14.2	15.7	9.6	12:01	24.8	2.0	13.4	6.1	5.0	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	34.0	-2.0	16.0	18.0	18.2	13.0	12.2	12:04	22.1	-2.0	10.1	1.9	6.3	17.8	3.9	11.1	-3.9
28 Sep 03	6:10	18:03	11:53	14.1	-3.4	5.4	-0.3	-0.3	1.6	-7.9	12:07	-1.1	-3.4	-2.2	-2.2	-15.5	-17.2			
28 Sep 03	6:10	18:03	11:53	14.1	-3.4	5.4	-0.3	-0.3	1.6	-7.9	12:07	-1.1	-3.4	-2.2	-2.2	-15.5	12.8	5.0	8.9	-10.0

Appendix A, Hobo Totals

649282 JC-003

Jack Creek 2836

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	49.6	2.5	26.0	30.9	29.3	18.8	14.8	9:16	20.6	2.5	11.5	7.5	0.3	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	42.9	7.0	25.0	25.5	18.1	18.7	6.8	9:19	19.0	5.8	12.4	9.1	-4.5	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	51.2	0.3	25.8	31.6	33.2	18.5	18.2	9:21	21.7	0.7	11.2	6.9	3.2	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	50.7	5.4	28.0	29.2	27.5	20.0	11.5	9:23	18.7	5.4	12.0	10.3	-4.5	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	42.0	9.8	25.9	18.4	14.4	18.2	1.1	9:26	13.3	7.8	10.6	9.8	-12.3	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	34.0	6.2	20.1	19.6	10.0	15.3	0.8	9:28	15.2	5.8	10.5	8.6	-8.4	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	41.1	1.6	21.3	21.7	21.7	15.2	8.1	9:30	15.2	2.9	9.1	6.8	-5.4	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	42.0	3.7	22.9	24.4	20.5	17.0	7.8	9:33	17.5	4.6	11.0	8.5	-4.8	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	48.5	2.9	25.7	28.3	27.8	18.3	12.7	9:35	18.7	3.3	11.0	7.8	-2.4	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	37.4	2.9	20.2	17.3	16.8	13.8	3.5	9:39	11.4	3.3	7.4	6.0	-9.7	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	44.4	4.2	24.3	21.0	22.5	16.2	7.2	9:41	12.9	3.3	8.1	6.3	-8.2	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	37.0	4.2	20.6	16.0	15.1	14.7	2.8	9:43	12.9	4.6	8.8	7.5	-9.4	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	46.4	6.2	26.3	24.5	22.4	18.6	6.6	9:46	15.2	6.6	10.9	10.0	-9.2	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	43.4	5.4	24.4	22.4	20.2	18.2	7.5	9:48	18.3	5.8	12.0	9.6	-5.3	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	44.9	5.4	25.1	23.1	21.7	18.3	7.2	9:51	16.8	6.2	11.5	9.3	-7.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	49.6	5.8	27.7	26.4	26.0	19.4	9.0	9:53	16.0	6.2	11.1	9.8	-8.0	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	34.9	5.4	20.1	25.1	11.7	16.4	5.1	9:57	21.0	4.6	12.8	9.9	-1.4	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	32.3	5.4	18.9	23.0	9.2	14.1	1.7	10:00	15.2	3.3	9.3	7.4	-5.9	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	24.0	1.6	12.8	14.7	4.6	9.4	-1.2	10:02	11.4	0.7	6.1	7.5	-7.1	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	26.0	1.2	13.6	19.1	7.0	11.0	0.2	10:05	14.1	2.9	8.5	5.3	-6.6	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	32.3	2.0	17.2	22.6	12.5	12.8	4.2	10:07	15.2	1.6	8.4	5.1	-4.1	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	31.9	7.0	19.5	22.2	7.1	15.1	2.2	10:11	18.3	3.3	10.8	6.8	-2.8	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	40.6	6.2	23.4	25.7	16.6	16.9	6.9	10:14	17.9	2.9	10.4	8.9	-2.8	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	36.6	11.4	24.0	23.1	7.4	17.7	-2.5	10:16	14.1	8.6	11.4	11.5	-12.3	30.6	18.9	24.4	-6.1

Appendix A, Hobo Totals

653279 A

Greybull 2800 East

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.0	6.2	21.6	25.5	13.0	17.3	4.0	9:16	19.4	6.6	13.0	10.5	-5.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	36.6	10.2	23.4	25.6	8.6	18.1	-1.3	9:19	16.0	9.4	12.7	11.9	-11.2	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	35.7	5.4	20.6	26.4	12.5	16.0	3.4	9:21	17.5	5.4	11.5	9.7	-5.7	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	42.9	9.8	26.4	28.4	15.3	20.1	3.6	9:23	18.7	9.0	13.8	12.8	-8.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	30.3	10.6	20.5	17.8	1.9	15.8	-5.8	9:26	13.3	9.0	11.2	11.4	-13.5	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	27.5	7.0	17.3	17.8	2.7	14.2	-3.8	9:28	14.9	7.4	11.1	9.8	-10.4	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	35.3	3.7	19.5	23.1	13.8	13.8	2.4	9:30	12.5	3.7	8.1	7.3	-9.0	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	32.8	4.6	18.7	23.6	10.4	15.5	3.3	9:33	19.4	5.4	12.4	10.3	-3.8	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	35.7	6.6	21.2	25.7	11.3	17.2	2.6	9:35	19.0	7.4	13.2	11.6	-6.2	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	33.2	9.4	21.3	19.0	6.0	15.4	-2.9	9:39	12.5	6.6	9.6	9.6	-11.9	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	31.1	8.2	19.7	20.7	5.1	14.6	-3.8	9:41	12.2	7.0	9.6	8.9	-12.6	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	29.5	8.6	19.1	18.6	3.1	14.9	-3.6	9:43	14.5	7.0	10.7	10.7	-10.3	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	36.6	9.4	23.0	24.6	9.4	18.0	-0.9	9:46	16.4	9.8	13.1	12.6	-11.2	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	35.7	11.0	23.3	24.6	6.9	18.7	0.0	9:48	19.4	8.6	14.0	12.6	-7.0	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	35.3	10.6	22.9	24.7	6.9	19.0	-0.6	9:51	19.8	10.2	15.0	13.2	-8.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	37.0	10.2	23.6	25.3	9.0	18.7	-0.7	9:53	17.5	10.2	13.9	13.1	-10.5	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	37.4	9.0	23.2	25.8	10.6	18.7	1.2	9:57	19.0	9.4	14.2	12.5	-8.2	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	37.4	7.4	22.4	23.9	12.2	17.2	1.7	10:00	16.4	7.4	11.9	10.1	-8.8	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	29.5	5.4	17.5	17.4	6.3	13.1	-1.5	10:02	12.9	4.6	8.8	9.5	-9.4	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	30.3	5.0	17.6	21.1	7.5	13.8	-1.4	10:05	13.7	6.2	10.0	8.1	-10.3	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	34.0	7.4	20.7	24.6	8.8	16.1	0.8	10:07	16.8	6.2	11.5	9.9	-7.2	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	34.0	8.2	21.1	26.1	8.0	17.4	0.1	10:11	18.7	8.6	13.6	11.3	-7.7	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	37.0	9.8	23.4	25.8	9.4	18.2	1.4	10:14	18.7	7.4	13.0	12.1	-6.6	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	32.3	11.4	21.9	22.5	3.2	17.0	-4.6	10:16	14.9	9.4	12.1	11.4	-12.4	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	29.1	7.0	18.1	20.5	4.3	15.3	-1.7	10:19	17.5	7.4	12.5	10.6	-7.7	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	34.0	7.8	20.9	23.1	8.4	16.5	0.0	10:22	16.8	7.4	12.1	11.0	-8.5	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	33.6	6.2	19.9	24.4	9.6	16.4	2.1	10:25	19.0	6.6	12.8	10.9	-5.4	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	32.8	6.2	19.5	25.5	8.8	16.3	2.9	10:28	20.6	5.8	13.2	10.4	-3.0	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	26.0	11.4	18.7	18.7	-3.2	14.1	-8.7	10:31	11.4	7.8	9.6	9.3	-14.2	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	29.1	5.0	17.0	19.6	6.3	12.9	-1.5	10:34	12.9	4.6	8.8	7.2	-9.4	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	22.1	-0.2	11.0	11.4	4.5	7.0	-3.5	10:36	6.2	-0.2	3.0	3.1	-11.4	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	7.8	3.7	5.8	5.1	-13.7	4.7	-13.2	10:39	6.2	1.2	3.7	3.7	-12.7	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	25.2	-2.0	11.6	17.1	9.4	8.5	2.2	10:42	11.8	-1.1	5.4	4.2	-5.0	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	29.5	2.5	16.0	21.6	9.3	12.5	1.9	10:46	15.2	2.9	9.1	7.4	-5.4	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	31.5	6.6	19.1	16.8	7.1	13.4	-2.1	10:49	11.0	4.6	7.8	7.6	-11.4	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	31.9	2.9	17.4	20.6	11.3	12.9	1.7	10:51	13.3	3.3	8.3	6.6	-7.8	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	32.8	7.0	19.9	22.8	8.0	16.1	0.7	10:54	17.9	6.6	12.3	10.2	-6.5	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	26.3	7.0	16.7	17.5	1.5	13.6	-4.2	10:57	14.5	6.6	10.5	9.6	-9.9	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	26.0	6.2	16.1	12.7	2.0	12.1	-5.5	11:00	10.6	5.8	8.2	7.9	-13.0	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	24.4	2.9	13.6	14.9	3.7	10.9	-2.2	11:04	12.9	3.3	8.1	7.3	-8.2	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	22.1	6.2	14.2	11.4	-1.9	8.9	-6.0	11:07	7.4	-0.2	3.6	4.4	-10.2	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	22.1	-3.9	9.1	11.4	8.2	5.6	0.6	11:09	7.4	-3.4	2.0	2.1	-7.0	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	9.4	-0.2	4.6	3.7	-8.2	3.6	-10.6	11:12	5.0	0.3	2.6	1.9	-13.1	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	20.2	0.3	10.2	9.9	2.1	6.6	-4.6	11:15	6.2	-0.2	3.0	2.8	-11.4	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	15.6	-0.6	7.5	6.7	-1.6	3.9	-3.7	11:18	6.2	-5.8	0.2	0.9	-5.8				
13 Sep 03	5:53	18:31	12:38	15.6	-7.9	3.9	7.4	5.7	0.9	-0.2	11:22	3.7	-7.9	-2.1	-4.4	-6.2	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	20.2	-4.3	7.9	12.6	6.7	4.6	0.2	11:25	7.0	-4.3	1.3	0.0	-6.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	23.6	1.2	12.4	16.2	4.7	9.2	0.0	11:28	12.5	-0.6	6.0	4.8	-4.6	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	23.2	2.9	13.1	13.8	2.6	8.6	-4.7	11:31	7.0	1.2	4.1	3.7	-11.9	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	13.3	-3.4	5.0	1.8	-1.1	0.1	-3.1	11:33	1.6	-11.1	-4.8	-4.9	-5.1	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	15.2	-9.5	2.9	7.8	6.9	0.1	1.9	11:36	4.6	-10.0	-2.7	-4.3	-3.2	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	21.7	-4.3	8.7	12.9	8.3	4.7	0.8	11:40	6.2	-4.8	0.7	-0.5	-6.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	21.7	-0.6	10.6	12.9	4.5	6.3	-2.5	11:43	6.2	-2.0	2.1	0.6	-9.6	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	21.0	0.7	10.8	14.0	2.4	5.2	-4.3	11:46	2.9	-3.9	-0.5	0.5	-11.0	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	25.2	2.5	13.8	17.7	4.9	10.3	-2.2	11:49	11.0	2.5	6.7	5.7	-9.2	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	24.0	2.9	13.5	17.6	3.3	10.3	-3.4	11:52	11.0	3.3	7.2	6.5	-10.1	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	26.0	1.6	13.8	17.9	6.6	10.4	-2.4	11:55	10.2	3.7	7.0	6.6	-11.3	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	26.7	7.0	16.9	19.1	1.9	12.4	-4.1	11:58	11.8	4.2	8.0	7.9	-10.2	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	25.6	6.2	15.9	18.9	1.6	10.9	-1.9	12:01	12.2	-0.2	6.0	7.3	-5.5	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	20.6	-2.4	9.1	9.7	5.2	3.9	-5.1	12:04	-0.2	-2.4	-1.3	-1.6	-15.5	17.8	3.9	11.1	-3.9

Appendix A, Hobo Totals

653281 B

Greybull 2600 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	40.6	4.6	22.6	24.5	18.2	17.8	8.6	9:16	21.3	4.6	13.0	10.0	-1.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	41.1	9.4	25.2	24.7	13.9	18.8	3.3	9:19	17.5	7.0	12.3	10.9	-7.3	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	39.2	2.9	21.1	25.2	18.6	17.1	9.8	9:21	22.5	3.7	13.1	9.9	1.0	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	44.9	6.2	25.6	26.7	20.9	18.8	7.4	9:23	17.9	6.2	12.1	11.1	-6.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	36.1	9.0	22.6	17.8	9.3	16.6	-1.9	9:26	12.9	8.2	10.6	10.2	-13.1	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	32.8	6.2	19.5	19.6	8.8	16.2	1.3	9:28	18.7	7.0	12.8	9.9	-6.1	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	38.3	1.6	20.0	22.0	18.9	14.2	6.6	9:30	14.5	2.5	8.5	7.2	-5.8	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	39.2	3.7	21.5	23.8	17.7	17.4	8.3	9:33	21.7	5.0	13.3	10.2	-1.1	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	39.7	3.7	21.7	25.6	18.2	17.3	8.6	9:35	21.3	4.6	13.0	10.4	-1.0	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	34.9	4.2	19.5	16.9	12.9	13.8	0.8	9:39	11.4	5.0	8.2	7.8	-11.4	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	35.7	3.7	19.7	19.4	14.2	14.6	3.6	9:41	14.9	4.2	9.5	7.2	-7.1	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	35.7	3.7	19.7	16.9	14.2	14.3	3.4	9:43	14.1	3.7	8.9	7.7	-7.4	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	49.0	5.8	27.4	25.2	25.4	18.9	7.6	9:46	14.1	6.6	10.4	10.2	-10.3	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	48.5	3.7	26.1	23.1	27.0	18.9	12.6	9:48	19.8	3.7	11.8	9.0	-1.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	46.9	3.7	25.3	25.5	25.4	18.5	11.7	9:51	19.4	3.7	11.6	8.9	-2.1	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	48.5	5.0	26.7	25.3	25.7	19.1	10.4	9:53	17.9	5.0	11.4	9.7	-4.9	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	50.7	5.0	27.8	28.6	27.9	20.4	12.3	9:57	20.2	5.8	13.0	9.5	-3.4	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	51.8	1.6	26.7	23.9	32.4	18.1	14.9	10:00	17.1	2.0	9.6	7.1	-2.7	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	40.6	1.2	20.9	17.0	21.6	14.4	7.4	10:02	13.3	2.5	7.9	7.6	-6.9	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	44.4	2.9	23.6	23.7	23.7	17.1	8.9	10:05	16.4	4.6	10.5	7.4	-6.0	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	48.5	1.2	24.8	28.1	29.5	17.4	14.6	10:07	18.7	1.2	9.9	6.3	-0.3	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	52.4	2.5	27.4	29.9	32.1	20.0	17.4	10:11	22.9	2.5	12.7	7.6	2.6	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	57.9	2.5	30.2	29.5	37.7	21.2	19.8	10:14	22.1	2.5	12.3	9.6	1.9	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	50.1	8.2	29.2	27.7	24.1	20.2	6.5	10:16	14.5	7.8	11.2	11.0	-11.1	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	43.9	5.0	24.4	25.7	21.1	18.5	9.3	10:19	20.2	5.0	12.6	8.3	-2.6	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	50.1	1.6	25.9	25.6	30.7	17.9	14.4	10:22	17.9	2.0	10.0	6.6	-1.9	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	52.4	0.7	26.5	27.5	33.9	19.1	18.5	10:25	22.1	1.2	11.6	7.8	3.2	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	51.8	-0.2	25.8	30.8	34.2	19.4	20.4	10:28	25.2	0.7	13.0	7.9	6.7	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	44.4	5.8	25.1	26.3	20.8	17.3	7.3	10:31	15.2	3.7	9.5	6.6	-6.3	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	42.0	0.3	21.1	20.6	23.9	14.3	9.8	10:34	14.1	0.7	7.4	5.0	-4.4	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	26.0	-2.4	11.8	11.2	10.6	7.0	1.1	10:36	7.0	-2.4	2.3	2.5	-8.3	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.4	4.6	8.0	7.4	-11.0	5.8	-10.6	10:39	7.4	-0.2	3.6	4.1	-10.2	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	41.1	-3.9	18.6	21.3	27.1	13.0	14.9	10:42	17.5	-2.9	7.3	2.0	2.7	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	45.9	-2.0	22.0	25.6	30.1	15.7	17.2	10:46	20.6	-1.5	9.5	4.4	4.3	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	42.9	2.5	22.7	15.8	22.7	15.4	8.5	10:49	14.1	2.0	8.1	4.9	-5.7	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	46.4	-1.1	22.7	23.1	29.7	15.0	13.9	10:51	15.2	-0.6	7.3	3.7	-1.9	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	53.5	1.2	27.4	27.6	34.6	19.7	19.3	10:54	22.9	1.2	12.0	6.3	3.9	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	35.7	2.5	19.1	18.2	15.5	13.8	5.3	10:57	14.9	2.0	8.4	6.2	-5.0	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	32.3	7.0	19.7	15.1	7.5	15.1	-0.8	11:00	14.9	6.2	10.5	8.3	-9.1	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	32.8	1.2	17.0	17.4	13.8	14.9	9.2	11:04	24.0	1.6	12.8	5.6	4.6	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	33.2	2.0	17.6	13.1	13.4	10.2	4.0	11:07	9.0	-3.4	2.8	0.5	-5.4	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	39.2	-7.9	15.7	15.4	29.3	10.1	17.6	11:09	16.4	-7.3	4.5	0.7	5.9	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	14.5	-0.2	7.2	4.5	-3.2	5.8	-7.6	11:12	7.4	1.6	4.5	3.3	-11.9	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	35.3	-1.5	16.9	15.8	19.0	9.9	5.5	11:15	7.8	-2.0	2.9	2.3	-8.0	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	25.6	0.7	13.1	9.0	7.1	6.8	0.4	11:18	6.2	-5.3	0.5	0.5	-6.3				
13 Sep 03	5:53	18:31	12:38	37.0	-9.5	13.8	10.7	28.7	5.9	12.4	11:22	5.0	-8.9	-2.0	-5.0	-3.9	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	37.4	-8.9	14.3	17.7	28.6	10.2	19.9	11:25	20.6	-8.4	6.1	-3.3	11.2	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	39.7	-6.8	16.4	18.3	28.7	10.0	15.9	11:28	14.1	-6.8	3.6	0.8	3.1	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	32.8	-2.0	15.4	15.6	17.0	9.6	4.9	11:31	9.0	-1.5	3.8	2.8	-7.2	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	11.0	-3.4	3.8	0.7	-3.4	1.1	-7.8	11:33	1.2	-4.3	-1.6	-2.3	-12.3	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	34.0	-5.3	14.3	9.4	21.5	8.8	11.5	11:36	12.9	-6.3	3.3	-2.7	1.5	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	37.9	-7.9	15.0	16.8	28.0	9.5	17.0	11:40	16.0	-7.9	4.1	-3.2	6.1	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	38.3	-6.8	15.8	16.0	27.4	9.7	14.2	11:43	12.9	-5.8	3.6	-2.7	1.0	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	36.6	-4.3	16.1	19.2	23.1	8.6	9.5	11:46	7.8	-5.8	1.0	-2.8	-4.1	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	40.6	-2.0	19.3	23.4	24.8	15.1	18.6	11:49	26.0	-4.3	10.8	1.8	12.5	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	41.1	-2.0	19.5	23.5	25.2	15.4	16.5	11:52	24.0	-1.5	11.3	3.3	7.7	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	38.8	-5.8	16.5	20.8	26.8	13.4	18.2	11:55	24.0	-3.4	10.3	1.7	9.6	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	40.1	3.7	21.9	25.3	18.6	17.2	13.9	11:58	26.0	-1.1	12.4	5.1	9.2	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	39.7	3.3	21.5	22.5	18.6	13.6	2.9	12:01	8.2	3.3	5.8	6.7	-12.9	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

653284

Greybull 2800 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	36.6	5.8	21.2	24.4	13.0	17.3	5.2	9:16	21.0	5.8	13.4	10.1	-2.6	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	38.3	10.2	24.3	24.7	10.3	19.3	2.4	9:19	20.6	8.2	14.4	11.1	-5.4	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	34.4	4.2	19.3	24.5	12.5	16.5	6.5	9:21	22.9	4.6	13.7	9.4	0.5	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	40.6	8.2	24.4	26.4	14.6	18.5	3.2	9:23	17.5	7.8	12.7	11.4	-8.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	35.7	10.6	23.2	17.6	7.3	17.3	-3.3	9:26	13.3	9.4	11.4	10.9	-13.9	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	29.9	6.6	18.3	19.4	5.5	16.2	1.4	9:28	21.7	6.6	14.2	9.9	-2.7	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	34.9	2.9	18.9	21.2	14.2	14.5	5.1	9:30	17.1	3.3	10.2	7.0	-4.0	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	35.3	3.7	19.5	23.6	13.8	15.9	5.2	9:33	19.4	5.0	12.2	9.9	-3.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	35.7	5.8	20.8	25.4	12.1	16.9	3.6	9:35	19.4	6.6	13.0	10.7	-5.0	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	33.6	7.0	20.3	18.0	8.8	14.4	-1.9	9:39	11.0	5.8	8.4	8.9	-12.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	43.4	3.3	23.4	21.4	22.3	15.5	7.1	9:41	12.5	2.9	7.7	6.8	-8.1	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	47.4	3.3	25.4	17.9	26.3	16.8	9.1	9:43	12.9	3.3	8.1	7.4	-8.2	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	50.1	5.4	27.8	25.3	26.9	18.8	8.5	9:46	13.7	5.8	9.8	9.2	-9.9	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	45.4	5.0	25.2	23.4	22.6	18.4	9.9	9:48	19.0	4.2	11.6	8.2	-2.9	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	48.0	3.7	25.8	25.4	26.4	19.5	12.9	9:51	21.7	4.6	13.1	8.9	-0.6	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	49.6	5.8	27.7	25.2	26.0	18.8	9.4	9:53	15.2	4.6	9.9	9.2	-7.1	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	51.8	4.2	28.0	28.9	29.9	21.8	17.9	9:57	27.5	3.7	15.6	9.6	6.0	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	52.9	2.0	27.5	23.8	33.1	18.0	14.5	10:00	15.2	1.6	8.4	6.4	-4.1	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	39.7	1.2	20.4	16.7	20.7	13.5	7.4	10:02	12.5	0.7	6.6	7.1	-6.0	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	42.5	1.2	21.8	24.3	23.5	16.8	10.9	10:05	19.8	3.7	11.8	6.2	-1.7	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	50.7	2.0	26.4	29.1	30.9	17.8	14.7	10:07	17.5	1.2	9.3	5.6	-1.4	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	51.8	5.8	28.8	30.2	28.2	21.1	15.4	10:11	23.6	3.3	13.5	7.1	2.5	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	54.7	7.4	31.1	29.5	29.5	21.5	15.7	10:14	21.7	2.0	11.9	9.3	1.9	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	48.5	9.0	28.8	26.5	21.7	19.6	5.7	10:16	14.1	6.6	10.4	9.9	-10.3	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	44.4	4.2	24.3	24.2	22.5	17.1	9.9	10:19	17.5	2.5	10.0	6.8	-2.7	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	47.4	4.2	25.8	24.9	25.5	18.6	12.7	10:22	20.2	2.5	11.3	6.5	-0.1	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	49.6	0.3	24.9	26.8	31.5	18.8	16.7	10:25	22.5	2.9	12.7	7.9	1.8	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	49.6	0.3	24.9	30.2	31.5	19.0	20.1	10:28	26.3	-0.2	13.1	6.4	8.7	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	41.5	7.0	24.3	25.5	16.7	17.0	6.8	10:31	17.1	2.5	9.8	6.2	-3.1	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	38.8	1.2	20.0	20.2	19.8	13.2	7.6	10:34	12.9	-0.2	6.4	4.3	-4.7	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	25.6	-3.9	10.9	11.2	11.6	6.4	1.7	10:36	6.6	-2.9	1.9	1.6	-8.3	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	12.2	4.6	8.4	7.6	-10.2	8.6	-6.4	10:39	16.4	1.2	8.8	4.6	-2.6	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	32.8	-2.4	15.2	19.2	17.4	11.6	9.3	10:42	17.5	-1.5	8.0	3.7	1.3	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	39.2	1.2	20.2	23.7	20.3	15.5	11.0	10:46	20.6	1.2	10.9	6.3	1.6	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	37.9	5.4	21.6	16.8	14.7	14.7	2.1	10:49	11.4	4.2	7.8	6.6	-10.6	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	38.3	2.0	20.2	21.8	18.5	14.2	6.2	10:51	14.1	2.5	8.3	5.6	-6.2	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	41.5	5.0	23.3	25.1	18.8	18.4	9.0	10:54	22.1	5.0	13.5	9.2	-0.7	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	29.1	5.4	17.3	16.8	5.9	12.6	-2.9	10:57	11.0	5.0	8.0	7.9	-11.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	20.2	3.7	12.0	9.8	-1.3	14.9	5.4	11:00	32.8	2.9	17.8	12.0	12.1	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	17.1	-4.3	6.4	2.8	3.7	8.0	8.4	11:04	25.2	-5.8	9.7	6.2	13.2	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	25.6	1.2	13.4	8.0	6.6	13.4	8.1	11:07	27.1	-0.2	13.5	10.5	9.5	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	1.2	-0.2	0.5	0.5	-16.5	1.2	-14.1	11:09	5.0	-1.1	2.0	0.0	-11.7	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	24.4	1.2	12.8	7.1	5.5	12.7	5.7	11:12	24.4	0.7	12.6	9.6	5.9	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	9.0	-7.9	0.6	-2.3	-0.9	4.0	7.6	11:15	24.4	-9.5	7.5	3.1	16.1	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	25.6	-6.3	9.6	1.0	14.1	9.4	15.3	11:18	26.3	-7.9	9.2	7.5	16.4				
13 Sep 03	5:53	18:31	12:38	24.0	-3.4	10.3	5.7	9.6	11.0	11.0	11:22	26.7	-3.4	11.7	11.3	12.3	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	29.5	2.0	15.8	9.5	9.7	15.8	11.6	11:25	31.5	0.3	15.9	14.4	13.5	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	22.5	-4.8	8.8	4.7	9.5	10.4	13.1	11:28	29.1	-5.3	11.9	10.0	16.6	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	1.2	-3.9	-1.3	-1.9	-12.8	1.0	-7.6	11:31	11.0	-4.3	3.3	0.4	-2.5	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	20.6	-7.3	6.6	1.7	10.1	6.2	9.4	11:33	19.0	-7.3	5.9	2.4	8.6	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	27.5	-1.1	13.2	6.1	10.8	12.5	12.6	11:36	27.9	-4.3	11.8	9.8	14.5	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	23.6	-4.3	9.6	3.5	10.2	11.0	12.9	11:40	29.1	-4.3	12.4	10.4	15.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	24.0	-4.8	9.6	3.6	11.1	11.4	10.9	11:43	27.5	-1.1	13.2	11.4	10.8	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	27.9	0.3	14.1	8.6	9.8	15.3	11.4	11:46	31.9	1.2	16.6	14.7	13.0	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	26.7	1.2	14.0	9.0	7.8	13.8	11.6	11:49	30.3	-2.9	13.7	12.6	15.4	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	26.7	1.2	14.0	8.3	7.8	15.1	9.6	11:52	30.7	1.6	16.2	14.7	11.3	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	27.5	5.4	16.5	11.1	4.3	16.4	7.6	11:55	30.7	2.0	16.4	14.7	10.9	15.6	5.0	10.0	-7.2

Appendix A, Hobo Totals

653288 E

Greybull 2800 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	35.7	7.8	21.8	22.9	10.1	17.4	2.6	9:16	19.4	6.6	13.0	11.1	-5.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	33.2	10.2	21.7	22.1	5.2	18.0	-1.1	9:19	19.4	9.0	14.2	11.9	-7.4	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	32.8	5.0	18.9	23.3	10.0	16.3	4.9	9:21	22.5	5.0	13.7	9.9	-0.3	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	37.9	11.8	24.8	24.9	8.3	18.6	-1.0	9:23	16.0	8.6	12.3	12.3	-10.4	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	32.8	9.8	21.3	16.7	5.2	16.3	-4.4	9:26	13.3	9.4	11.4	11.4	-13.9	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	24.8	7.0	15.9	17.3	0.0	15.0	-2.7	9:28	20.2	7.8	14.0	9.8	-5.4	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	35.7	3.7	19.7	20.7	14.2	14.5	3.4	9:30	14.5	4.2	9.3	7.6	-7.5	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	41.5	3.7	22.6	23.8	20.0	17.2	8.0	9:33	18.7	5.0	11.8	9.4	-4.1	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	50.1	5.8	28.0	28.2	26.5	20.4	11.0	9:35	19.4	6.2	12.8	10.6	-4.6	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	35.7	7.0	21.4	17.0	10.9	14.9	-0.8	9:39	11.0	5.8	8.4	8.8	-12.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	45.4	6.2	25.8	20.7	21.4	18.3	6.3	9:41	15.2	6.2	10.7	8.0	-8.8	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	42.9	8.6	25.8	17.6	16.5	18.1	3.5	9:43	14.5	6.2	10.3	9.9	-9.5	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	45.4	8.6	27.0	23.4	19.0	19.1	3.5	9:46	14.1	8.2	11.2	10.7	-11.9	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	37.0	7.4	22.2	21.0	11.8	17.7	3.6	9:48	19.8	6.6	13.2	10.5	-4.6	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	46.4	8.2	27.3	24.5	20.4	20.8	7.3	9:51	20.2	8.2	14.2	12.0	-5.8	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	50.1	9.4	29.8	26.4	22.9	21.5	6.4	9:53	17.1	9.4	13.3	12.3	-10.1	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	52.9	8.2	30.6	28.3	26.9	22.6	10.9	9:57	21.0	8.2	14.6	11.5	-5.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	51.8	5.8	28.8	25.4	28.2	20.0	10.7	10:00	16.8	5.8	11.3	9.4	-6.8	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	38.3	5.8	22.1	19.0	14.7	15.9	3.2	10:02	14.5	5.0	9.7	9.2	-8.3	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	51.2	3.7	27.5	28.4	29.7	21.3	14.9	10:05	24.0	6.2	15.1	9.3	0.0	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	55.4	6.2	30.8	31.9	31.4	22.4	14.1	10:07	21.3	6.6	14.0	10.2	-3.1	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	51.2	9.8	30.5	30.3	23.6	23.7	11.6	10:11	25.6	8.2	16.9	11.6	-0.4	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	47.4	9.4	28.4	27.6	20.2	22.7	10.7	10:14	26.3	7.4	16.9	12.7	1.1	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	45.4	10.2	27.8	24.2	17.4	19.7	2.7	10:16	14.5	8.6	11.5	11.2	-11.9	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	38.8	5.8	22.3	22.8	15.2	17.4	5.3	10:19	19.0	5.8	12.4	9.2	-4.5	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	42.5	7.0	24.7	24.3	17.7	18.9	6.7	10:22	19.8	6.2	13.0	9.7	-4.2	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	52.9	5.0	29.0	29.1	30.2	22.0	14.1	10:25	22.9	7.0	14.9	11.0	-1.9	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	50.1	5.8	28.0	31.3	26.5	23.1	16.4	10:28	30.3	6.2	18.3	11.7	6.3	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	37.9	9.4	23.7	24.6	10.7	18.8	2.6	10:31	20.2	7.8	14.0	9.9	-5.4	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	36.1	4.6	20.4	20.6	13.8	15.7	5.3	10:34	18.3	3.7	11.0	7.8	-3.2	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	31.1	0.3	15.7	14.7	13.1	10.4	2.0	10:36	9.4	0.7	5.1	4.2	-9.1	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.0	5.0	8.0	7.0	-11.8	6.4	-12.1	10:39	7.4	2.0	4.7	5.0	-12.4	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	37.9	-1.5	18.2	22.0	21.6	14.7	14.3	10:42	23.6	-1.1	11.3	5.3	6.9	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	45.9	2.5	24.2	25.9	25.7	19.0	14.9	10:46	24.8	2.9	13.8	8.2	4.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	43.9	5.8	24.9	17.1	20.3	17.3	6.0	10:49	14.5	5.0	9.7	7.7	-8.3	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	43.9	2.9	23.4	23.4	23.2	16.5	9.5	10:51	16.4	2.9	9.6	6.7	-4.3	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	51.2	6.2	28.7	27.6	27.2	24.0	17.8	10:54	32.3	6.2	19.3	10.6	8.4	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	31.9	6.2	19.1	18.1	7.9	14.1	-1.9	10:57	12.2	6.2	9.2	9.0	-11.8	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	37.0	1.2	19.1	13.8	18.1	15.7	5.4	11:00	17.5	7.0	12.3	8.7	-7.3	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	32.8	3.3	18.0	15.7	11.7	15.8	6.7	11:04	23.2	3.7	13.5	7.7	1.7	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	26.3	4.6	15.5	11.1	4.0	10.3	-0.7	11:07	11.4	-1.1	5.2	3.3	-5.3	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	33.6	-4.8	14.4	12.3	20.6	10.6	11.1	11:09	16.4	-2.9	6.7	1.6	1.5	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.6	0.7	1.2	1.4	-16.9	1.8	-16.1	11:12	3.7	1.2	2.5	1.7	-15.2	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	30.3	1.2	15.7	10.0	11.4	11.8	3.4	11:15	14.5	1.2	7.8	2.8	-4.5	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	17.5	1.6	9.6	6.5	-1.9	4.6	-5.8	11:18	3.7	-4.3	-0.3	0.4	-9.7				
13 Sep 03	5:53	18:31	12:38	31.5	-6.3	12.6	9.3	20.1	6.0	6.8	11:22	5.0	-6.3	-0.7	-3.2	-6.5	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	34.4	-6.3	14.1	14.9	23.0	11.4	16.7	11:25	22.9	-5.3	8.8	0.0	10.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	32.8	-0.2	16.3	15.5	15.1	10.5	5.8	11:28	11.8	-2.4	4.7	2.7	-3.6	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	23.2	2.0	12.6	12.1	3.4	7.9	-3.4	11:31	7.0	-0.6	3.2	2.8	-10.1	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	7.0	-3.4	1.8	1.1	-7.4	0.1	-10.3	11:33	0.7	-3.9	-1.6	-1.9	-13.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	24.4	-4.8	9.8	6.5	11.4	8.6	8.5	11:36	19.0	-4.3	7.4	-1.4	5.6	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	33.2	-5.8	13.7	14.6	21.2	11.2	15.8	11:40	22.9	-5.3	8.8	-0.3	10.4	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	34.9	-3.4	15.7	15.1	20.4	12.5	13.5	11:43	21.3	-2.9	9.2	0.9	6.5	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	39.7	-1.5	19.1	19.0	23.4	15.2	16.2	11:46	24.8	-2.0	11.4	1.2	9.0	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	38.8	-0.2	19.3	20.4	21.2	17.5	17.1	11:49	31.1	0.3	15.7	5.1	13.1	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	39.7	2.5	21.1	20.3	19.4	18.3	14.4	11:52	29.1	2.0	15.6	6.2	9.3	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	41.5	-1.1	20.2	21.4	24.8	18.5	19.5	11:55	32.8	0.7	16.7	6.1	14.3	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	40.1	4.6	22.4	22.7	17.8	19.7	14.1	11:58	31.1	2.9	17.0	7.5	10.5	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	36.6	3.3	19.9	15.4	15.5	12.7	0.5	12:01	7.0	3.7	5.4	6.0	-14.5	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

653290 F

Greybull 3000 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	31.5	7.0	19.3	20.9	6.7	16.0	0.9	9:16	19.0	6.2	12.6	10.0	-5.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	31.5	8.6	20.1	20.6	5.1	17.5	1.2	9:19	22.5	7.4	15.0	11.5	-2.7	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	31.5	5.8	18.7	21.9	7.9	16.6	5.8	9:21	25.2	3.7	14.5	8.5	3.7	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	36.6	10.6	23.6	22.7	8.2	17.2	-1.5	9:23	14.1	7.4	10.8	11.2	-11.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	29.5	9.4	19.5	15.4	2.3	15.2	-5.4	9:26	13.3	8.6	11.0	10.1	-13.1	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	24.0	6.2	15.1	15.7	0.0	14.9	0.0	9:28	23.6	5.8	14.7	8.7	0.0	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	30.3	2.9	16.6	18.5	9.6	14.2	4.4	9:30	20.2	3.3	11.8	7.1	-0.9	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	29.9	4.2	17.0	20.2	8.0	14.2	2.4	9:33	18.7	4.2	11.4	8.6	-3.3	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	31.9	7.0	19.5	21.7	7.1	15.7	0.3	9:35	17.5	6.2	11.9	10.4	-6.5	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	28.7	8.6	18.7	15.5	2.3	13.8	-5.4	9:39	11.4	6.6	9.0	9.5	-13.0	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	28.7	8.2	18.5	17.5	2.7	15.4	-1.9	9:41	17.9	6.6	12.3	9.0	-6.5	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	27.1	9.8	18.5	16.0	-0.5	15.2	-6.2	9:43	14.9	9.0	11.9	10.9	-12.0	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	34.9	9.4	22.1	21.8	7.7	17.4	-2.2	9:46	15.6	9.8	12.7	11.8	-12.0	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	30.7	10.6	20.7	21.2	2.3	18.0	-0.6	9:48	22.5	8.2	15.4	11.1	-3.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	36.1	7.0	21.6	19.8	11.3	18.5	5.7	9:51	24.4	6.6	15.5	10.4	0.0	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	40.6	7.4	24.0	20.8	15.4	17.8	2.5	9:53	15.2	7.8	11.5	10.4	-10.4	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	37.9	6.2	22.0	22.9	13.9	19.5	9.5	9:57	28.3	5.4	16.9	10.2	5.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	38.8	4.6	21.7	18.1	16.4	15.4	4.7	10:00	14.5	3.7	9.1	7.1	-7.0	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	27.1	2.9	15.0	13.1	6.5	11.8	0.1	10:02	14.5	2.9	8.7	7.3	-6.2	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	42.9	2.0	22.5	21.1	23.1	18.8	13.2	10:05	25.6	4.6	15.1	7.8	3.2	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	43.9	4.2	24.0	23.3	22.0	17.6	10.0	10:07	19.0	3.3	11.2	7.2	-2.1	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	44.9	7.0	26.0	24.1	20.1	21.0	11.4	10:11	26.3	5.8	16.1	9.3	2.8	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	49.0	7.4	28.2	23.7	23.8	22.6	13.9	10:14	27.9	6.2	17.1	11.3	3.9	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	38.3	10.2	24.3	20.6	10.3	17.3	-0.8	10:16	13.3	7.4	10.4	10.1	-11.9	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	32.3	5.0	18.7	16.6	9.6	14.9	2.4	10:19	17.5	4.6	11.0	7.2	-4.8	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	42.0	5.0	23.5	19.3	19.2	18.0	10.3	10:22	22.1	2.9	12.5	7.5	1.4	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	48.0	2.0	25.0	20.6	28.1	18.8	14.4	10:25	21.7	3.3	12.5	8.4	0.6	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	46.4	3.3	24.9	24.6	25.3	20.5	17.1	10:28	29.5	2.9	16.2	8.9	8.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	38.3	7.4	22.9	20.4	13.1	19.3	7.5	10:31	25.6	5.8	15.7	8.5	2.0	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	34.9	3.7	19.3	16.8	13.3	14.1	4.6	10:34	15.6	2.0	8.8	6.0	-4.2	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	19.4	1.2	10.3	11.1	0.5	6.7	-4.4	10:36	7.4	-1.1	3.2	2.9	-9.3	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	9.0	2.5	5.7	5.5	-11.2	4.8	-11.3	10:39	7.0	0.7	3.9	4.1	-11.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	33.6	-2.0	15.8	14.4	17.8	14.1	13.9	10:42	26.3	-1.5	12.4	4.4	10.1	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	39.7	0.3	20.0	18.4	21.6	16.8	14.7	10:46	26.3	0.7	13.5	6.3	7.8	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	32.3	3.7	18.0	12.2	10.8	13.3	1.7	10:49	13.7	3.3	8.5	5.7	-7.4	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	37.9	1.2	19.5	15.9	18.9	14.3	7.6	10:51	16.0	2.0	9.0	4.9	-3.8	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	46.4	3.7	25.1	22.1	24.9	20.8	16.4	10:54	29.5	3.7	16.6	8.0	8.0	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	26.0	4.2	15.1	15.2	4.0	11.5	-3.5	10:57	11.4	4.6	8.0	7.2	-11.0	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	24.8	4.6	14.7	12.8	2.4	13.8	-1.1	11:00	19.4	6.2	12.8	8.3	-4.6	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	21.7	2.5	12.1	11.9	1.5	11.9	0.7	11:04	20.6	2.9	11.7	6.3	-0.1	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	22.1	4.2	13.1	9.3	0.2	8.6	-2.3	11:07	10.6	-2.4	4.1	2.0	-4.7	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	26.3	-5.8	10.3	7.6	14.4	8.6	9.6	11:09	18.3	-4.3	7.0	0.4	4.8	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.2	0.7	0.9	0.9	-17.3	1.4	-16.5	11:12	2.9	0.7	1.8	1.1	-15.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	20.6	0.7	10.6	4.8	2.1	8.8	-1.6	11:15	13.3	0.7	7.0	2.0	-5.2	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	11.4	0.3	5.8	4.0	-6.7	2.8	-9.5	11:18	2.5	-2.9	-0.2	0.0	-12.4				
13 Sep 03	5:53	18:31	12:38	19.4	-5.3	7.1	3.2	7.0	2.7	-2.2	11:22	1.6	-4.8	-1.6	-3.2	-11.4	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	24.4	-6.3	9.0	7.8	12.9	7.7	9.2	11:25	17.9	-5.3	6.3	-1.1	5.4	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	28.7	-1.5	13.6	10.5	12.4	8.4	3.5	11:28	9.4	-2.9	3.3	1.3	-5.5	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	19.0	0.7	9.9	9.0	0.5	6.2	-5.0	11:31	6.2	-1.1	2.6	1.7	-10.5	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	8.6	-4.3	2.1	0.7	-4.8	-0.4	-8.0	11:33	0.3	-6.3	-3.0	-2.4	-11.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	17.9	-3.9	7.0	2.0	4.0	6.0	1.9	11:36	13.7	-3.9	4.9	-1.9	-0.2	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	27.1	-5.8	10.7	9.5	15.2	8.5	10.9	11:40	18.7	-5.8	6.4	-1.6	6.7	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	26.3	-4.3	11.0	9.5	12.9	8.7	8.3	11:43	17.1	-4.3	6.4	-1.0	3.7	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	31.1	-2.4	14.3	12.7	15.8	11.4	10.4	11:46	19.8	-2.9	8.5	-0.5	4.9	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	32.8	-2.0	15.4	14.8	17.0	14.0	12.9	11:49	26.0	-0.6	12.7	3.4	8.8	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	32.8	1.6	17.2	14.9	13.4	14.8	9.4	11:52	24.0	0.7	12.4	4.7	5.5	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	33.2	-2.9	15.1	14.5	18.3	13.7	14.0	11:55	26.0	-1.5	12.2	3.9	9.7	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	33.6	3.3	18.5	17.8	12.5	15.8	9.0	11:58	24.8	1.6	13.2	5.6	5.4	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	21.3	0.7	11.0	8.1	2.8	7.5	-5.6	12:01	5.8	2.0	3.9	4.3	-14.0	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

653291 G

Greybull 3100 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	33.2	5.8	19.5	22.0	9.6	15.3	0.8	9:16	16.0	6.2	11.1	9.7	-8.0	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	32.8	7.8	20.3	21.0	7.1	16.2	-1.0	9:19	16.4	7.8	12.1	10.9	-9.2	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	31.5	5.4	18.5	22.2	8.3	15.2	1.9	9:21	18.7	5.4	12.0	8.6	-4.5	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	37.9	9.8	23.8	23.3	10.3	17.5	-0.4	9:23	14.5	7.8	11.2	11.5	-11.1	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	29.1	8.2	18.7	14.6	3.1	14.2	-5.0	9:26	12.2	7.4	9.8	10.1	-13.1	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	24.0	4.6	14.3	15.4	1.7	12.2	-3.3	9:28	14.9	5.4	10.1	7.6	-8.3	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	28.7	4.2	16.4	18.4	6.8	13.0	-0.2	9:30	14.9	4.2	9.5	6.8	-7.1	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	28.7	5.4	17.1	20.2	5.5	13.9	-0.4	9:33	16.4	5.0	10.7	8.8	-6.4	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	29.1	7.4	18.3	21.4	3.9	15.0	-2.7	9:35	16.0	7.4	11.7	10.2	-9.2	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	28.3	7.4	17.9	15.8	3.1	13.4	-5.8	9:39	10.6	7.4	9.0	8.6	-14.6	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	27.9	7.4	17.7	17.3	2.7	13.7	-4.8	9:41	12.5	7.0	9.8	9.0	-12.3	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	26.7	9.0	17.9	15.7	-0.1	14.6	-7.0	9:43	13.3	9.4	11.4	10.6	-13.9	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	32.8	10.6	21.7	21.5	4.4	17.0	-4.2	9:46	14.9	9.8	12.3	11.6	-12.7	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	37.9	8.2	23.1	21.1	11.9	19.3	3.2	9:48	21.7	9.4	15.6	11.5	-5.5	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	41.1	7.4	24.2	21.8	15.8	19.2	6.6	9:51	21.7	6.6	14.2	9.8	-2.7	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	48.0	4.2	26.1	23.0	26.0	17.9	7.7	9:53	13.3	6.2	9.8	8.9	-10.7	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	45.9	3.7	24.8	24.8	24.4	19.4	13.2	9:57	24.0	4.2	14.1	8.5	2.1	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	46.4	2.5	24.4	22.0	26.2	15.9	10.5	10:00	13.7	1.2	7.4	5.6	-5.2	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	34.9	2.5	18.7	14.1	14.6	13.3	6.1	10:02	15.6	0.3	8.0	6.1	-2.5	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	48.0	-0.6	23.7	22.3	30.8	17.5	15.8	10:05	20.6	2.0	11.3	5.2	0.8	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	48.0	-0.2	23.9	25.8	30.3	16.0	13.7	10:07	15.6	0.7	8.2	4.4	-2.9	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	48.0	5.8	26.9	26.6	24.4	19.4	11.5	10:11	20.2	3.7	12.0	7.0	-1.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	49.0	6.6	27.8	24.6	24.6	21.5	13.5	10:14	25.2	5.0	15.1	9.8	2.4	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	38.3	8.2	23.3	20.6	12.3	16.1	0.4	10:16	12.2	5.8	9.0	8.5	-11.4	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	38.3	3.3	20.8	19.6	17.2	15.0	6.1	10:19	15.6	2.9	9.3	6.0	-5.1	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	46.4	3.3	24.9	21.7	25.3	17.9	11.8	10:22	19.0	2.9	11.0	6.0	-1.6	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	48.5	1.2	24.8	23.0	29.5	17.4	13.8	10:25	17.9	2.0	10.0	6.4	-1.9	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	46.4	2.0	24.2	27.5	26.6	19.1	17.2	10:28	26.7	1.2	14.0	7.0	7.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	34.0	5.8	19.9	19.7	10.4	16.1	4.9	10:31	21.0	3.7	12.3	6.5	-0.6	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	38.3	2.0	20.2	18.7	18.5	13.1	6.9	10:34	12.5	-0.6	6.0	3.6	-4.6	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	23.2	0.3	11.8	11.7	5.2	6.2	-1.4	10:36	5.4	-4.3	0.5	0.8	-8.0	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	8.2	0.3	4.3	3.0	-9.8	2.8	-9.7	10:39	5.4	-2.9	1.2	2.1	-9.5	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	39.2	-6.8	16.2	19.0	28.3	12.6	20.0	10:42	23.6	-5.8	8.9	1.1	11.7	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	44.4	-3.4	20.5	23.0	30.0	15.6	19.8	10:46	24.4	-2.9	10.7	3.6	9.5	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	41.5	1.2	21.3	13.8	22.6	13.6	7.5	10:49	11.0	0.7	5.9	3.7	-7.5	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	46.4	-1.1	22.7	18.1	29.7	14.2	12.3	10:51	12.2	-0.6	5.8	2.8	-5.0	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	47.4	2.0	24.7	25.1	27.6	19.7	16.6	10:54	26.3	2.9	14.6	6.1	5.7	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	29.5	2.5	16.0	15.5	9.3	10.8	-1.6	10:57	8.2	2.9	5.6	5.4	-12.4	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	37.4	4.6	21.0	14.3	15.1	16.5	6.1	11:00	19.4	4.6	12.0	6.5	-2.9	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	31.9	-0.6	15.7	13.8	14.8	12.9	8.9	11:04	20.6	-0.2	10.2	3.7	2.9	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	29.9	3.7	16.8	9.9	8.4	10.2	3.2	11:07	11.4	-4.3	3.5	0.8	-2.1	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	29.9	-6.8	11.5	10.4	18.9	7.8	11.4	11:09	14.9	-6.8	4.0	-1.4	3.9	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	-0.2	-0.2	-0.2	-0.2	-17.8	0.2	-16.7	11:12	1.6	-0.6	0.5	-0.1	-15.6	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	25.6	-0.2	12.7	7.3	7.9	9.6	1.8	11:15	13.3	-0.2	6.6	1.1	-4.3	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	15.6	-0.6	7.5	3.9	-1.6	3.2	-6.5	11:18	2.0	-4.3	-1.2	-0.8	-11.4				
13 Sep 03	5:53	18:31	12:38	26.7	-6.3	10.2	6.1	15.3	3.6	3.0	11:22	1.2	-7.3	-3.1	-5.0	-9.3	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	29.9	-10.0	10.0	12.5	22.1	6.9	14.4	11:25	16.0	-8.4	3.8	-3.7	6.6	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	34.4	-2.9	15.8	14.7	19.6	9.1	8.2	11:28	9.8	-4.8	2.5	0.2	-3.1	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	22.9	0.3	11.6	10.3	4.8	6.1	-2.5	11:31	4.6	-3.4	0.6	0.5	-9.8	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	11.8	-9.5	1.2	-0.9	3.5	-2.2	-2.7	11:33	-1.1	-10.0	-5.5	-5.0	-8.8	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	21.7	-8.4	6.7	3.3	12.3	3.9	5.6	11:36	9.4	-7.3	1.0	-5.0	-1.0	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	31.5	-7.9	11.8	12.2	21.6	6.9	12.8	11:40	12.9	-8.9	2.0	-4.3	4.1	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	31.9	-7.9	12.0	12.7	22.0	7.1	10.6	11:43	10.6	-6.3	2.1	-3.3	-0.9	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	32.3	-5.3	13.5	14.8	19.9	8.1	9.0	11:46	10.6	-5.3	2.6	-2.9	-1.9	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	34.0	-4.8	14.6	17.5	21.0	11.0	12.0	11:49	17.9	-2.9	7.5	0.9	3.0	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	31.5	-0.2	15.7	17.6	13.9	12.0	7.4	11:52	17.5	-1.1	8.2	2.6	0.8	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	35.3	-4.8	15.2	17.6	22.3	11.2	13.8	11:55	18.7	-4.3	7.2	0.8	5.2	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	33.6	1.2	17.4	19.2	14.6	12.9	7.5	11:58	17.5	-0.6	8.5	3.4	0.3	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	28.7	-2.4	13.1	9.2	13.4	7.3	0.4	12:01	4.2	-1.1	1.6	1.4	-12.6	21.7	10.0	15.6	-6.1

Appendix A, Hobo Totals

653292 RPC-002

Greybull 2680 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	37.4	2.5	20.0	24.6	17.2	15.8	9.0	9:16	21.0	2.5	11.7	7.9	0.7	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	41.5	7.8	24.7	25.1	15.9	19.3	7.6	9:19	22.5	5.4	13.9	9.7	-0.7	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	35.3	1.2	18.2	25.1	16.3	15.9	11.3	9:21	25.6	1.6	13.6	8.0	6.2	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	40.1	4.2	22.1	26.1	18.2	16.9	7.7	9:23	19.0	4.2	11.6	9.8	-2.9	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	36.6	7.8	22.2	17.5	11.0	16.4	0.1	9:26	14.1	7.0	10.6	9.3	-10.7	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	31.5	5.4	18.5	20.3	8.3	16.7	4.0	9:28	23.6	6.2	14.9	10.1	-0.4	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	38.8	1.6	20.2	22.9	19.4	14.9	8.0	9:30	16.8	2.5	9.6	7.6	-3.5	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	42.5	3.7	23.1	24.9	21.0	17.9	9.4	9:33	20.6	5.0	12.8	10.2	-2.2	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	44.9	2.9	23.9	27.3	24.2	18.3	12.2	9:35	21.7	3.7	12.7	9.6	0.2	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	36.6	2.9	19.7	17.2	15.9	13.8	3.3	9:39	12.2	3.7	7.9	7.1	-9.4	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	38.8	2.9	20.8	19.7	18.1	15.1	5.7	9:41	14.9	3.7	9.3	7.2	-6.7	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	37.9	2.5	20.2	16.4	17.6	14.4	5.7	9:43	14.5	2.9	8.7	7.4	-6.2	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	45.9	4.6	25.2	24.5	23.5	18.3	8.9	9:46	17.5	5.4	11.5	10.5	-5.7	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	45.4	4.6	25.0	23.5	23.0	19.0	10.6	9:48	21.0	5.0	13.0	10.5	-1.8	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	42.5	5.0	23.7	24.9	19.7	18.4	8.7	9:51	21.0	5.4	13.2	10.3	-2.2	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	44.9	5.8	25.4	23.9	21.3	18.5	7.2	9:53	17.1	6.2	11.7	10.3	-6.9	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	46.4	6.2	26.3	27.2	22.4	20.9	10.4	9:57	23.6	7.4	15.5	11.3	-1.6	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	44.9	3.7	24.3	23.8	23.4	17.8	10.3	10:00	18.7	3.7	11.2	9.4	-2.9	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	33.6	1.2	17.4	17.6	14.6	13.0	3.2	10:02	13.3	3.7	8.5	9.3	-8.2	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	38.3	3.7	21.0	24.6	16.8	16.8	5.9	10:05	19.0	6.2	12.6	8.9	-5.0	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	44.9	1.6	23.2	28.2	25.5	17.4	13.3	10:07	21.0	2.0	11.5	7.8	1.1	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	46.9	3.3	25.1	29.6	25.8	19.5	14.6	10:11	24.4	3.3	13.9	9.3	3.3	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	44.4	5.0	24.7	26.5	21.6	19.1	11.3	10:14	22.9	4.2	13.5	11.4	0.9	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	45.9	9.8	27.9	27.4	18.3	20.3	3.2	10:16	15.6	9.8	12.7	12.7	-12.0	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	36.1	7.0	21.6	23.2	11.3	17.1	3.6	10:19	19.4	5.8	12.6	9.4	-4.2	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	42.9	4.6	23.8	23.2	20.6	17.0	9.1	10:22	17.9	2.5	10.2	7.2	-2.3	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	47.4	0.3	23.9	27.0	29.4	17.7	16.7	10:25	22.5	0.7	11.6	7.7	4.0	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	48.0	0.3	24.1	28.7	29.9	18.8	18.9	10:28	26.3	0.7	13.5	8.2	7.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	35.3	7.4	21.4	22.7	10.1	15.1	3.3	10:31	16.0	1.6	8.8	6.2	-3.4	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	44.9	0.7	22.8	23.4	26.4	14.8	10.8	10:34	13.3	0.3	6.8	4.1	-4.8	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	29.5	-3.9	12.8	12.5	15.6	7.2	4.8	10:36	7.4	-4.3	1.6	1.7	-6.0	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	11.4	5.0	8.2	7.5	-11.4	5.7	-9.9	10:39	7.8	-1.5	3.2	4.1	-8.4	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	43.4	-5.8	18.8	23.4	31.5	13.1	18.5	10:42	19.0	-4.3	7.4	1.2	5.6	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	46.4	-2.9	21.7	25.2	31.5	15.4	18.8	10:46	21.0	-2.9	9.0	2.9	6.1	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	48.5	1.2	24.8	16.9	29.5	15.4	11.6	10:49	11.8	0.3	6.0	3.6	-6.3	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	46.9	-2.4	22.2	24.0	31.6	13.8	14.2	10:51	12.5	-2.0	5.3	1.9	-3.3	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	51.8	-1.1	25.4	24.1	35.1	18.1	20.0	10:54	22.1	-0.6	10.7	4.2	4.9	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	34.4	0.3	17.4	17.7	16.4	11.5	4.6	10:57	11.0	0.3	5.6	4.6	-7.1	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	36.1	7.0	21.6	16.5	11.3	15.9	0.7	11:00	14.1	6.2	10.2	8.1	-9.9	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	37.0	0.3	18.6	16.8	18.9	14.3	10.1	11:04	19.4	0.3	9.9	4.6	1.4	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	33.6	2.0	17.8	12.8	13.8	10.7	5.4	11:07	11.0	-3.9	3.6	0.5	-2.9	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	36.1	-7.9	14.1	15.3	26.2	8.1	14.7	11:09	12.5	-8.4	2.1	0.3	3.1	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	1.2	0.3	0.7	0.6	-16.9	1.6	-15.2	11:12	4.6	0.3	2.4	1.6	-13.5	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	36.6	-1.1	17.8	15.1	19.8	10.1	5.5	11:15	7.0	-2.0	2.5	1.9	-8.8	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	23.2	1.2	12.2	8.3	4.3	5.9	-0.9	11:18	5.4	-6.3	-0.5	0.1	-6.1				
13 Sep 03	5:53	18:31	12:38	34.0	-10.0	12.0	12.6	26.2	4.6	11.5	11:22	4.6	-10.0	-2.7	-5.9	-3.2	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	34.9	-10.6	12.1	17.5	27.6	7.0	17.3	11:25	14.1	-10.6	1.8	-5.2	6.9	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	38.3	-7.9	15.2	18.5	28.4	8.6	15.6	11:28	12.2	-8.4	1.9	-0.6	2.8	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	32.3	-3.4	14.5	14.9	17.9	8.5	5.5	11:31	7.8	-2.9	2.5	1.8	-7.0	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	15.2	-3.4	5.9	2.1	0.8	1.5	-5.2	11:33	0.3	-6.3	-3.0	-2.3	-11.2	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	25.6	-4.8	10.4	6.9	12.6	6.6	7.5	11:36	12.9	-7.3	2.8	-2.5	2.5	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	36.6	-8.9	13.8	16.0	27.7	7.7	15.5	11:40	12.2	-8.9	1.6	-4.4	3.3	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	43.9	-7.3	18.3	17.0	33.5	10.4	17.6	11:43	12.2	-7.3	2.4	-4.1	1.7	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	37.4	-4.8	16.3	19.9	24.5	8.6	10.6	11:46	8.2	-6.3	1.0	-3.7	-3.2	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	39.7	-0.6	19.5	23.3	22.5	13.1	13.3	11:49	17.5	-4.3	6.6	1.5	4.1	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	41.1	-5.8	17.6	22.7	29.1	12.2	15.3	11:52	16.4	-2.9	6.7	2.1	1.5	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	40.1	-7.9	16.1	21.4	30.2	10.6	17.1	11:55	16.0	-5.8	5.1	-0.6	4.0	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	38.8	3.3	21.0	24.1	17.7	14.5	9.0	11:58	17.1	-1.1	8.0	4.3	0.4	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	41.1	2.5	21.8	24.3	20.8	14.1	12.3	12:01	17.1	-4.3	6.4	3.2	3.7	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	37.9	-7.9	15.0	16.2	28.0	4.6	6.6	12:04	-4.3	-7.3	-5.8	-5.6	-14.8	17.8	3.9	11.1	-3.9

Appendix A, Hobo Totals

653293 GR-006

Greybull 2547 West

	Sun		Daylight Temps						Day/Night Avg		Nighttime Temps						CODY NOAA			
	Rise	Set	Hours	Max	Min	/2	Avg	Range	Temp	Range	Hours	Max	Min	/2	Avg	Range	Max	Min	Mean	Range
30 Jul 03	5:00	19:44	14:44	41.5	0.3	20.9	24.6	23.5	15.6	12.8	9:16	20.2	0.3	10.2	6.8	2.1	31.7	15.6	23.3	-1.7
31 Jul 03	5:02	19:43	14:41	42.9	7.0	25.0	26.0	18.1	17.0	6.4	9:19	15.2	2.9	9.1	7.7	-5.4	28.9	16.7	22.8	-5.6
01 Aug 03	5:03	19:42	14:39	37.9	-1.1	18.4	24.9	21.2	14.1	12.1	9:21	20.2	-0.6	9.8	6.7	3.0	30.0	12.8	21.1	-0.6
02 Aug 03	5:04	19:41	14:37	44.9	1.6	23.2	27.1	25.5	16.0	10.7	9:23	15.6	2.0	8.8	7.7	-4.2	32.8	16.7	24.4	-1.7
03 Aug 03	5:05	19:39	14:34	34.9	5.0	19.9	17.1	12.1	14.3	0.9	9:26	12.5	5.0	8.8	7.8	-10.2	28.9	18.9	23.9	-7.8
04 Aug 03	5:06	19:38	14:32	32.3	4.2	18.3	19.7	10.4	14.1	2.0	9:28	15.6	4.2	9.9	7.8	-6.3	26.7	15.6	21.1	-6.7
05 Aug 03	5:07	19:37	14:30	40.1	-1.5	19.3	22.8	23.9	12.6	10.0	9:30	12.9	-1.1	5.9	4.7	-3.8	30.6	11.7	21.1	1.1
06 Aug 03	5:08	19:35	14:27	38.3	2.5	20.4	24.4	18.1	16.3	8.6	9:33	20.6	3.7	12.2	8.2	-0.9	32.8	15.6	24.4	-0.6
07 Aug 03	5:09	19:34	14:25	57.2	-0.6	28.3	29.6	40.1	19.1	19.9	9:35	18.7	1.2	9.9	7.1	-0.3	32.8	15.6	24.4	-0.6
08 Aug 03	5:11	19:32	14:21	50.7	1.6	26.1	20.9	31.3	17.0	11.8	9:39	12.9	2.9	7.9	7.1	-7.7	32.8	13.9	23.3	1.1
09 Aug 03	5:12	19:31	14:19	38.8	3.3	21.0	20.0	17.7	15.0	5.1	9:41	14.1	3.7	8.9	7.1	-7.4	28.9	17.8	23.3	-6.7
10 Aug 03	5:13	19:30	14:17	40.1	2.5	21.3	16.0	19.9	14.8	6.5	9:43	13.7	2.9	8.3	7.4	-7.0	31.7	15.6	23.3	-1.7
11 Aug 03	5:14	19:28	14:14	48.0	5.8	26.9	24.5	24.4	19.0	8.2	9:46	16.0	6.2	11.1	10.6	-8.0	32.8	20.6	26.7	-5.6
12 Aug 03	5:15	19:27	14:12	45.4	5.4	25.4	22.6	22.2	18.4	8.3	9:48	17.5	5.4	11.5	10.1	-5.7	32.8	15.6	24.4	-0.6
13 Aug 03	5:16	19:25	14:09	45.4	5.0	25.2	23.9	22.6	18.4	8.3	9:51	17.5	5.8	11.7	9.4	-6.1	35.6	18.9	27.2	-1.1
14 Aug 03	5:17	19:24	14:07	46.4	5.4	25.9	25.3	23.2	18.9	8.8	9:53	17.9	5.8	11.9	10.0	-5.7	33.9	20.6	27.2	-4.4
15 Aug 03	5:19	19:22	14:03	51.8	5.8	28.8	27.5	28.2	20.3	9.9	9:57	16.4	7.0	11.7	10.0	-8.4	35.0	20.0	27.8	-2.8
16 Aug 03	5:20	19:20	14:00	52.4	2.9	27.6	24.6	31.7	18.9	13.9	10:00	17.1	3.3	10.2	8.6	-4.0	33.9	15.6	24.4	0.6
17 Aug 03	5:21	19:19	13:58	40.1	2.9	21.5	18.5	19.5	15.3	4.6	10:02	12.9	5.4	9.2	9.3	-10.2	23.9	15.0	19.4	-8.9
18 Aug 03	5:22	19:17	13:55	42.9	5.4	24.2	24.2	19.8	17.1	5.7	10:05	14.9	5.4	10.1	8.4	-8.3	26.7	10.6	18.9	-1.7
19 Aug 03	5:23	19:16	13:53	50.1	1.6	25.9	27.9	30.7	17.6	13.8	10:07	16.8	2.0	9.4	6.4	-3.1	31.7	12.8	22.2	1.1
20 Aug 03	5:25	19:14	13:49	48.0	2.0	25.0	27.8	28.1	18.0	13.7	10:11	19.4	2.5	10.9	7.7	-0.8	30.6	18.9	24.4	-6.1
21 Aug 03	5:26	19:12	13:46	55.4	2.5	28.9	28.8	35.1	20.0	16.9	10:14	19.4	2.9	11.2	9.7	-1.2	32.8	15.0	23.9	0.0
22 Aug 03	5:27	19:11	13:44	53.5	8.6	31.1	27.6	27.1	21.5	7.6	10:16	14.9	9.0	11.9	12.1	-12.0	30.6	18.9	24.4	-6.1
23 Aug 03	5:28	19:09	13:41	42.9	6.6	24.8	23.5	18.5	18.7	6.0	10:19	18.3	7.0	12.7	9.9	-6.5	30.0	17.8	23.9	-5.6
24 Aug 03	5:29	19:07	13:38	46.9	3.3	25.1	24.0	25.8	17.7	10.5	10:22	16.8	3.7	10.2	7.9	-4.8	30.6	12.8	21.7	0.0
25 Aug 03	5:30	19:05	13:35	49.6	2.0	25.8	25.9	29.8	18.6	14.8	10:25	20.2	2.5	11.3	8.5	-0.1	30.0	15.6	22.8	-3.3
26 Aug 03	5:32	19:04	13:32	50.1	0.7	25.4	27.8	31.6	18.4	17.2	10:28	21.7	1.2	11.4	8.2	2.8	32.8	13.9	23.3	1.1
27 Aug 03	5:33	19:02	13:29	46.4	6.2	26.3	24.2	22.4	17.3	6.9	10:31	12.9	3.7	8.3	6.7	-8.6	23.9	16.7	20.0	-10.6
28 Aug 03	5:34	19:00	13:26	36.1	1.2	18.7	20.5	17.2	13.4	6.3	10:34	14.9	1.6	8.2	6.1	-4.5	21.7	13.9	17.8	-10.0
29 Aug 03	5:35	18:59	13:24	29.1	-0.6	14.2	13.5	11.9	9.4	2.3	10:36	9.8	-0.6	4.6	4.7	-7.4	15.0	10.0	12.2	-12.8
30 Aug 03	5:36	18:57	13:21	12.5	6.6	9.6	9.1	-11.9	8.0	-11.8	10:39	9.4	3.3	6.4	6.5	-11.7	15.6	8.9	12.2	-11.1
31 Aug 03	5:37	18:55	13:18	37.4	-0.6	18.4	18.1	20.3	12.3	7.6	10:42	12.5	-0.2	6.2	4.2	-5.1	23.9	3.9	13.9	2.2
01 Sep 03	5:39	18:53	13:14	40.1	0.7	20.4	20.7	21.6	14.1	8.6	10:46	14.5	1.2	7.8	5.7	-4.5	28.9	8.9	18.9	2.2
02 Sep 03	5:40	18:51	13:11	38.8	4.2	21.5	15.1	16.8	14.7	3.7	10:49	12.2	3.7	7.9	6.2	-9.4	23.9	10.6	17.2	-4.4
03 Sep 03	5:41	18:50	13:09	40.6	1.2	20.9	19.5	21.6	14.1	8.0	10:51	13.3	1.2	7.2	5.2	-5.6	27.8	8.9	18.3	1.1
04 Sep 03	5:42	18:48	13:06	46.9	1.6	24.3	23.1	27.5	17.2	13.0	10:54	18.3	2.0	10.2	7.0	-1.5	30.6	12.8	21.7	0.0
05 Sep 03	5:43	18:46	13:03	26.0	2.9	14.4	15.6	5.3	11.5	-0.5	10:57	14.5	2.9	8.7	7.3	-6.2	27.8	13.9	21.1	-3.9
06 Sep 03	5:44	18:44	13:00	28.3	8.2	18.3	15.3	2.3	14.6	-4.6	11:00	14.1	7.8	11.0	9.6	-11.5	22.8	16.7	20.0	-11.7
07 Sep 03	5:46	18:42	12:56	38.3	3.7	21.0	16.9	16.8	15.2	4.7	11:04	14.5	4.2	9.3	7.4	-7.5	25.6	15.6	20.6	-7.8
08 Sep 03	5:47	18:40	12:53	26.3	2.9	14.6	13.0	5.7	9.8	-1.7	11:07	9.4	0.7	5.1	3.4	-9.1	21.7	12.8	17.2	-8.9
09 Sep 03	5:48	18:39	12:51	33.2	-3.4	14.9	14.9	18.8	9.1	6.7	11:09	9.4	-2.9	3.3	2.9	-5.5	20.6	5.6	13.3	-2.8
10 Sep 03	5:49	18:37	12:48	12.9	2.0	7.5	5.8	-6.9	7.0	-9.9	11:12	9.0	4.2	6.6	5.5	-12.9	13.9	7.8	11.1	-11.7
11 Sep 03	5:50	18:35	12:45	31.9	1.2	16.6	13.9	13.0	10.7	1.3	11:15	8.6	1.2	4.9	4.3	-10.3	10.6	5.6	7.8	-12.8
12 Sep 03	5:51	18:33	12:42	22.9	3.7	13.3	10.4	1.4	8.0	-4.4	11:18	6.6	-1.1	2.8	3.1	-10.1				
13 Sep 03	5:53	18:31	12:38	29.9	-4.3	12.8	11.7	16.5	7.2	4.8	11:22	7.0	-3.9	1.6	-0.8	-6.9	20.6	3.9	12.2	-1.1
14 Sep 03	5:54	18:29	12:35	33.2	-4.8	14.2	13.7	20.2	8.2	7.7	11:25	8.6	-4.3	2.1	-1.0	-4.8	11.7	3.9	7.8	-10.0
15 Sep 03	5:55	18:27	12:32	34.4	-3.9	15.3	15.8	20.5	9.9	9.3	11:28	12.5	-3.4	4.6	2.1	-1.9	22.8	8.9	15.6	-3.9
16 Sep 03	5:56	18:25	12:29	31.5	-0.6	15.5	13.7	14.4	10.1	2.7	11:31	9.0	0.3	4.7	4.0	-9.0	20.6	10.6	15.6	-7.8
17 Sep 03	5:57	18:24	12:27	10.6	0.3	5.4	3.0	-7.5	3.2	-11.1	11:33	2.5	-0.6	0.9	0.8	-14.7	5.6	1.7	3.3	-13.9
18 Sep 03	5:58	18:22	12:24	22.9	-2.0	10.4	7.3	7.1	6.7	0.0	11:36	8.2	-2.4	2.9	0.0	-7.1	15.6	-4.4	5.6	2.2
19 Sep 03	6:00	18:20	12:20	29.9	-4.3	12.8	12.3	16.5	7.2	5.2	11:40	7.4	-4.3	1.6	-1.1	-6.0	20.6	7.8	14.4	-5.0
20 Sep 03	6:01	18:18	12:17	30.7	-3.4	13.7	13.6	16.3	8.1	5.3	11:43	8.6	-3.4	2.6	-0.6	-5.8	17.8	10.6	14.4	-10.6
21 Sep 03	6:02	18:16	12:14	32.8	-3.4	14.7	14.4	18.4	8.0	4.9	11:46	5.8	-3.4	1.2	-1.2	-8.6	17.8	1.7	10.0	-1.7
22 Sep 03	6:03	18:14	12:11	35.3	-1.5	16.9	17.6	19.0	10.5	7.1	11:49	10.6	-2.4	4.1	0.8	-4.7	23.9	0.6	12.2	5.6
23 Sep 03	6:04	18:12	12:08	34.4	-2.4	16.0	17.4	19.1	10.4	6.9	11:52	11.0	-1.5	4.7	1.9	-5.3	25.6	6.7	16.1	1.1
24 Sep 03	6:05	18:10	12:05	34.4	-4.3	15.0	15.9	21.0	9.2	7.8	11:55	9.4	-2.9	3.3	0.8	-5.5	15.6	5.0	10.0	-7.2
25 Sep 03	6:07	18:09	12:02	36.6	2.5	19.5	19.2	16.3	12.3	5.9	11:58	11.8	-1.5	5.1	3.3	-4.5	26.7	3.9	15.6	5.0
26 Sep 03	6:08	18:07	11:59	36.6	2.0	19.3	19.7	16.8	12.7	5.6	12:01	12.2	-0.2	6.0	4.4	-5.5	21.7	10.0	15.6	-6.1
27 Sep 03	6:09	18:05	11:56	31.9	-4.3	13.8	11.7	18.5	5.8	2.0	12:04	-0.6	-3.9	-2.2	-2.3	-14.5	17.8	3.9	11.1	-3.9

APPENDIX B

HOBO gauge mean temperature data and location

HOBO Field No.	Elev. (masl)	Easting NAD83	Northing NAD 83	Mean Night Temp.	Mean Day Temp.	Mean Temp.
HB1	2790	632458	4879554	30.17	6.76	18.46
HB2	2796	632525	4879485	24.47	6.08	15.28
HB3	2800	633474	4879593	24.77	8.56	16.66
HB4	2800	633369	4879444	25.64	9.07	17.36
48PA2772	2836	confidential		26.34	7.07	16.7
HB6	2846	632638	4879569	29.07	6.94	18.01
48PA2772	2846	confidential		35.12	4.63	19.87
48PA2773	2868	confidential		25.58	5.77	15.67
48PA2773	2870	confidential		22.25	4.74	13.49
HB11	2875	633152	4879370	33.29	5.64	19.47
HB12	2910	633690	4879444	25.13	6.92	16.02
HB13	2950	633812	4879482	20.94	8.51	14.72
HB14	2950	633822	4879584	20.09	9.03	14.56
HB15	2950	633821	4879682	26.22	8.33	17.27
HB16	3165	634840	4879567	19.24	7.13	13.18

Table B.1: Mean day and night temperatures and UTM location for Jack Creek HOBO temperature gauges. Locations of temperature gauges within site boundaries are confidential.

HOBO Field No.	Elev. (masl)	Easting NAD 83	Northing NAD 83	Mean Day Temp.	Mean Night Temp.	Mean Temp.
42PA2744	2547	confidential		29.21	6.63	17.92
42PA2744	2600	confidential		25.38	7.03	16.21
42PA2751	2680	confidential		24.94	6.66	15.8
HBD	2800	627350	4876455	25.02	6.36	15.69
HBE	2900	627930	4876477	29.38	5.64	17.51
HBF	3000	628538	4875738	16.06	7.22	11.64
HBG	3100	629468	4875107	18.66	5.68	12.17

Table B.2: Mean day and night temperatures and UTM locations for Greybull HOBO temperature gauges. Locations of temperature gauges within site boundaries are confidential.

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