AN ENVIRONMENTAL HISTORY OF LITTLE BIGHORN BATTLEFIELD NATIONAL MONUMENT

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INTRODUCTION

On the afternoon of June 25th, 1876, Lt Col. George Armstrong Custer led the U. S. Seventh Cavalry into the valley of the Little Bighorn to attack a massive village of Sioux (Lakotas and some Dakotas), Cheyennes, and Arapahos. Native peoples, led by Sitting Bull, Gall, and Crazy Horse, among others, opposed the colonial policies of the United States and sought to live free of the reservations by continuing their customary lifeways. By the end of the day Custer and all of the men in the five companies under his immediate command were dead. The surviving seven companies of the regiment entrenched on bluffs above the river and endured a siege for the next day and a half. The Battle of the Little Bighorn was the greatest engagement of the Great Sioux War of 1876-1877 and became one of the iconic moments in the history of United States' westward expansion. Countless books and articles have detailed, and speculated upon, the movements, actions, and intentions of the soldiers and warriors. While some of these accounts have discussed the landscape of the battlefield and its impact on the course of the engagement,, there has been no in-depth study of the environmental history of the battlefield.

In 2009, the Cultural Resource Program Review of Little Bighorn Battlefield National Monument identified an environmental history of the monument as a high priority. This

report was commissioned through the Rocky Mountains Cooperative Ecosystems Studies Unit (RM-CESU) to meet that need. It will give park staff the necessary historical context to make management decisions regarding protection and restoration of the battlefield as well as enable them to interpret for visitors the similarities and differences between today's landscape and the battlefield of 1876.

LITTLE BIGHORN BATTLEFIELD NATIONAL MONUMENT (LIBI)

Little Bighorn Battlefield National Monument is situated within the Crow Indian Reservation in Bighorn County, southeastern Montana (Lat. 45.5689748, Long. 107.43362). The monument is divided into two units; the Custer Battlefield and the Reno-Benteen Battlefield totaling 765.32 acres. While both are critical elements in the story of the battle, their acquisition by the government occurred at different times resulting in different administrative histories.

The largest section of the monument, known as the Custer Battlefield, was established as Custer Battlefield National Cemetery by the United States Army on August 1, 1879. As such, it was intended to memorialize the army dead of the Battle of the Little Bighorn, and later, the dead of the nation's other wars. Although proclaimed in 1879, it was not until December 7, 1886 that Executive Order 337443 established the one square mile boundary of the cemetery that is the footprint of the Custer Battlefield section of the monument today.[1] The 600 acres of Custer Battlefield contain the majority of the

[1] General Order No. 78, Headquarters of the Army, 1 August 1879; Don Rickey, Jr., *History of Custer Battlefield* (reprint ed., Fort Collins, CO: The Old Army Press, 1998), 29-30; Jerome A. Greene, *Stricken Field: The Little Bighorn Since 1876* (Norman: University of Oklahoma Press, 2008), 30.

developed and most heavily visited areas within the park, including the National Cemetery, the visitors center, the Indian Memorial and Last Stand Hill.

Over time, public interest in commemorating the combat associated with the Reno-Benteen area heightened. On April 14, 1926 Congress authorized the secretary of the Interior to acquire the 162 acre Reno-Benteen Battlefield from the Crow Tribe.[2] However, it was not until 1930 that the land was actually transferred to Custer Battlefield National Cemetery.[3]

In 1940, administration of Custer Battlefield National Cemetery was transferred from the War Department to the National Park Service. The Act of March 26, 1946 redesignated Custer Battlefield National Cemetery as Custer Battlefield National Monument. In an effort to provide a more complete view the battle from all perspectives, a new law, enacted in 1991, redesignated Custer Battlefield National Monument as Little Bighorn Battlefield National Monument. The act also authorized an Indian Memorial to honor Native American participants in the Battle of the Little Bighorn and designated the 7 acres of interment space as Custer National Cemetery.[4]

The two units of the park constitute only a small portion of the actual field of battle. The Custer Battlefield and Reno-Benteen Battlefield are of great historical significance, yet other important areas of the battlefield are not under NPS management. Lands in this category include the site of the great Indian village and Maj. Reno's initial attack in the

[2] An Act Authorizing the Secretary of the Interior to acquire land and erect a monument on the site of the battle with the Sioux Indians in which the commands of Major Reno and Major Benteen were engaged. April 14, 1926. 44 Stat.251.
[3] An Act Providing Compensation to the Crow Indians for Custer Battlefield National Cemetery, and for other purposes. April 15, 1930. 46 Stat. 168.
[4] Little Bighorn Battlefield National Monument. Public Law 102-201 (HR 848), 10 December 1991. 105 Stat. 1631.

valley as well as the lands between the park's two units over which Custer marched his doomed battalion. In order to provide a meaningful historic context, this report will treat the entire historic battlefield, not just Park Service lands, as its subject.

PURPOSE OF THE REPORT

This environmental history has two principal goals. The first is to provide park staff with an historical context for understanding what the battlefield may have looked like in 1876, as well as the plant and animal species that were present. The report can then be used as a comprehensive reference and planning tool to guide efforts to restore the battlefield's natural landscape as closely as possible to its historic 1876 condition and appearance. The second goal of this history is to enhance the visitor's experience at the monument by increasing public awareness, understanding, and appreciation of the historic natural landscape. In order to achieve these goals, the report asks two broad questions. First, what was the landscape of the battlefield like on June 25 and 26, 1876, and why? And secondly, what has changed since and why? The first two chapters of the report answer the first set of questions, while chapters three and four deal with the second set.

Environmental history takes as its subject the ways in which human societies engage nature, the ways that nature influences human life, and the consequences of those interactions for both nature and people. As a discipline it is useful to public land managers seeking to understand the context of past and present environmental change. Environmental history is uniquely suited to contribute to the integration of natural and cultural resource management of public lands.

The report is presented in four chapters and a conclusion. Chapter one covers a vast expanse of time preceding the battle in order to understand the natural and human forces that shaped the battlefield as it appeared in June of 1876. Chapter two presents an environmental history of the Great Sioux War of 1876-1877 and the Battle of the Little Bighorn. Between 1877 and 1940 the War Department administered the area as a National Cemetery. This is the subject of chapter three. Chapter four then looks at the period since 1940 when the monument has been part of the national park system. Finally, the conclusion presents an executive summary and comparative look at the battlefield in 1876 and today.

CHAPTER 1: THE NATURAL AND HUMAN LANDSCAPE OF THE NORTHERN PLAINS AND THE LITTLE BIGHORN VALLEY BEFORE 1876.

This chapter explores the environmental history of the Little Bighorn Battlefield in the vast expanse of time before the battle of June 25-26, 1876. Part one addresses the natural forces that shaped the Northern Plains and the Little Bighorn Valley both before and after the arrival of human beings. Here "natural forces" refers to the impact of non-human nature: i. e. the forces that are essentially beyond human control. Geologic forces, climate, and the ecological relationships that developed between plant and animal species make up this broad category. Part two then moves into the impact of human cultures on the ecology and landscape of the plains. Throughout history all human societies have sought to shape nature to fit their needs. Whether small foot-going groups or larger equestrian bands, the Native peoples of the Northern Plains were no different. Their land use practices thus constitute a second broad force in creating the landscape of the Little Bighorn battlefield as it existed in 1876.

I. Natural Forces and the Creation of the Great Plains and Little Bighorn Valley.

Three broad categories of natural forces shaped the Little Bighorn Valley and its surrounding uplands. At the most basic level geologic forces, including volcanism, uplift, and erosion, determined the area's topography as well as the nature of its soils. Climatic forces further transformed the landscape; in the long term advancing and retreating glaciers physically transform the land while shorter cooling or warming conditions created

new possibilities for life. Finally, ecologic forces – the interrelationship between species and their environments – also play an important role in producing a landscape.

A. GEOLOGIC FORCES

Though seemingly remote from the events of June 25 and 26, 1876, the geology of the Little Bighorn Valley is the most basic factor in understanding the environmental history of the monument. During most of the Cretaceous period the interior of North America, including the future Little Bighorn Valley, was covered in a warm shallow sea. Two fossil bearing layers from the Upper Cretaceous, the sandstone and shale Judith River Formation and Bearpaw Shale, are exposed at the monument. At other locations in Montana the older Judith River formation has yielded the remains of fish, sharks, and numerous dinosaurs. In 1977 Little Bighorn was the site of an important paleontological discovery when an NPS employee uncovered the fossilized remains of a rare Short Necked Plesiosaur (*Dolichorhynchops osbornii*). The fossil was embedded in the Bearpaw shale and located inside section H of the national cemetery. Plesiosaurs were carnivorous marine reptiles that lived sometime during the late Campanian Age about 75 million years ago when the shallow inland seas expanded for the last time. The specimen is now in the permanent collection of the Smithsonian Institution's National Museum of Natural History.[5]

Two periods of uplift produced the basic contours of the Great Plains and the Little Bighorn Valley. The broader shape of the plains began to emerge between seventy and eighty million years ago as a period of uplift known as the Laramide Orogeny led to the rise

[5] Allison L. Koch, Jason P. Kenworthy, and Vincent L. Santucci, Paleontological Resource Inventory and Monitoring, Rocky Mountain Network, National Park Service, TIC #D-436, September 2004, 34-35.

of the Rocky Mountains. The peaks eventually blocked the flow of waters from the Arctic and Pacific Oceans and the great inland seaway, the home of the plesiosaur, dried up. As layers of sediments washed out of the mountains and moist conditions prevailed the stage was set for a massive forest that covered the central continent. But as the height of the mountains increased, their rain shadow produced increasingly drier conditions on the plains and by the late Miocene and early Pliocene epochs grasslands expanded as the forest receded. A second important period of uplift began around five million years ago and created the Missouri Plateau. As the land rose, the streams that had been depositing sediments onto the plains began cutting channels and valleys. By about two million years ago most of the modern river channels had been established.[6]

Like much of the Missouri Plateau, the Little Bighorn valley and surrounding areas, are characterized by broadly terraced river valleys interspersed with irregularly eroded uplands. To the southwest the Bighorn and Pryor Mountains were part of a single uplift that occurred after the Cretaceous. To the east the Little Bighorn is separated from Rosebud Creek and the Tongue River drainage by the much lower pine covered escarpment called the Wolf or Rosebud mountains. The Little Bighorn River rises at the northern end of the Bighorn Range.[7] The exposed bedrock at Little Bighorn is Cretaceous Era shale and

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[6] Nevin M. Fenneman, *Physiography of Western United States* (New York: McGraw-Hill, 1931), 61-66; William D. Thornbury, *Regional Geomorphology of the United States* (New York: John Wiley & Sons, 1965); Donald E. Trimble, *The Geologic Story of the Great Plains* United States Geological Survey Bulletin 1493 (Washington D. C.: Government Printing Office, 1980), 32-42; Jerome A. Greene, *Stricken Field: The Little Bighorn since 1876* (Norman: University of Oklahoma Press, 2008), 4-5; Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (New York: Oxford University Press, 1979), 66-69.

[7] E. A. Moulder, M. F. Klug, D. A. Morris, and F. A. Swenson, "Geology and ground-Water Resources of the Lower Little Bighorn Valley, Bighorn County, Montana," U. S. Geologica Survey, Water Supply Paper 1487 (1960), 11. "The Little Bighorn River drains an area of

sandstone of the Bearpaw and Judith River formations. Along the terraces and river bottoms are much younger, Pleistocene and Holocene deposits. The nature of shales and sandstones produces highly erodible soils. Erosion was a principal factor in shaping the deep ravines or coulees that played such a prominent role in the battle. While the sheet flow of water is the most common type of erosion at Little Bighorn, the soils are also prone to the process of "piping;" the "formation of narrow conduits, tunnels, or 'pipes' through which soluble or granular soil material is removed." Combined, these two erosional processes could lead to the degradation of upland soils, especially in heavily visited areas.[8]

B. CHANGING CLIMATE

Climate is the second fundamental physical force that shapes any landscape. The particular physical setting of the Great Plains sets some basic conditions. The Rocky Mountains cast a rain shadow and consequently the Plains as a whole are semi-arid with precipitation generally increasing the farther east one goes away from the mountains. On the Plains themselves, however, there are no high mountains (the Black Hills excepted) or large bodies of water. As a result neither the flow of large air masses nor precipitation is channeled in a predictable manner. The shifting intersections of three major air masses over the center of North America adds to the volatility of the Great Plains climate. Cold,

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about 1,275 square miles. From its headwaters in the Bighorn Mountains in Wyoming to the base of the Bighorn Mountains in Montana, the Little Bighorn River flows swiftly and turbulently through a narrow canyon about 2,000 feet deep."

[8] Geologic Resources Inventory Report, Little Bighorn Battlefield National Monument, NPS Geologic Resources Division, June 2011, 5-6; W. T. Thom Jr., G. M. Hall, C. H. Wegemann, and G F. Moulton, *Geology of Bighorn County and the Crow Indian Reservation Montana*, United States Geological Survey Bulletin 856 (Washington, D. C.: Government Printing Office, 1935), 12-23; Fenneman, *Physiography of Western United States*, 61-67; Don Rickey Jr., *History of Custer Battlefield* (reprint ed., Fort Collins, CO: Old Army Press, 2005), 1.

generally dry air moves south from Canada while prevailing winds bring a sometimes moisture-laden air mass from the Pacific Ocean and warm, moist air moves up the Mississippi Valley from the Gulf of Mexico. The collision of these three air masses produces the region's precipitation in often short violent bursts. Climatically, then, the Great Plains is a land of extremes marked by widely ranging seasonal temperatures with limited and often unpredictable precipitation.[9]

Ice Ages are the most extreme and important example of climatic forces shaping landforms and environments. Geologic forces may have set the basic shape of North America, but the ice produced much of the world we see now. The Pleistocene epoch (2.5 million – 12,000 BP±) saw ice advance and retreat across the Northern Hemisphere numerous times. The basic shape of the landscape that Native peoples and Europeans encountered in North America was a result of the last Ice Age – the Wisconsinan Glaciation – that ended about 12,500 years ago. During the Wisconsinan two huge ice sheets – the Cordilleran and Laurentide – covered much of North America, meeting in what is today Montana. Since the mid-twentieth century some scholars have theorized that an ice-free corridor between the two was the principal means of Paleoindian migration into North America in the late Pleistocene. Although the Little Bighorn Valley is situated on the unglaciated section of the Missouri Plateau, during the Wisconsin glaciation, a large ice-

[9] Carl Frederick Kraenzel, *The Great Plains in Transition* (Norman: University of Oklahoma Press, 1955), 12-14; James E. Sherow, *The Grasslands of the United States: An Environmental History* (Santa Barbara, CA: ABC-Clio), 15-17; Robert T. Coupland, "The Effects of Fluctuations in Weather Upon the Grasslands of the Great Plains," *The Botanical Review* 24 (May 1958): 278-79, 281-86.

marginal lake extended down the Yellowstone Valley as far as the location of modern Miles City.[10]

Since the last retreat of the glaciers the climate of North America has seen both broad phases of climate change as well as smaller fluctuations within each. Particularly important was the relatively hot and dry Altithermal period (9,000 BP – 4,500 BP) during which the east-west extent of the grasslands reached its maximum. It also appears that during the altithermal the range of warm season grasses expanded, as did the grazing species associated with them.[11] Within the larger climate phases numerous shorter periods saw substantial fluctuations. One of the most important was the Neo-Boreal or "Little Ice Age," a period of pronounced cooling and greater rainfall that stretched from the end of the sixteenth century to roughly 1850. It was during this period that buffalo populations on the Plains increased and numerous Native peoples first acquired horses and developed equestrian cultures.[12]

Just as important as these larger climate shifts are cycles of drought that characterize the Great Plains. Pollen studies and dendrochronology indicate that unpredictable rainfall has been a fact of life and a central factor that has shaped the grasslands since the end of the ice ages.[13] Direct observations collected since the late

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[10] Trimble, *Geologic Story of the Great Plains*, 32-35; Thornbury, *Regional Geomorphology* 293-96.
[11] Sherow, *Grasslands of the United States*, 19-20.
[12] Elliott West, *The Way to the West: Essays on the Central Plains* (Albuquerque: University of New Mexico Press, 1995), 80.
[13] Donald Worster, *Dust Bowl: The Southern Plains in the 1930s* (New York: Oxford University Press, 1979), 12-13, 75; K. J. Brown, J. S. Clark, E. C. Grimm, J. J. Donovan, P. G. Mueller, B. C. S. Hansen, I. Stefanova, and H. E. Wright, Jr., "Fire Cycles in North American Interior Grasslands and Their Relation to Prairie Drought," *Proceedings of the National Academy of Sciences of the United States of America* 102 (June 21, 2005): 8865-8870.

nineteenth century illustrates the drought cycle on Montana's eastern Plains. The years between 1878 and 1946 saw an average of 8.2 inches of rain, but three distinct periods of above average rainfall and two severe droughts. The first dry period lasted from 1881 to 1904. While nine years during the period saw average or slightly above average precipitation, fifteen years fell below average with two periods of drought so sever as to be deemed "killer years" when even grasses died off. After a very wet twelve years between 1905 and 1916, an even worse dry period set in and lasted until 1939 where over one-third of the period were "killer years."[14] (This cycle of wet and dry years corresponds with the Homestead boom and bust discussed in chapter three of this study.) Rainfall measured over four decades at Crow Agency, Montana, just three miles from Little Bighorn Battlefield, illustrates the same wide fluctuations between drought and heavy rainfall. Over the period in question rainfall averaged 15.12 inches a year, yet in any single year as little as 8.03 inches (1889) or as much as 25.25 inches (1912) fell.[15]

Long term and short term drought cycles have forced all life forms, from grasses to wildlife to human beings, to adjust to changing realities on the Plains. In the most severe of circumstances the only choice was to move. Extended severe droughts reshaped the land over decades or centuries. At times, shortgrasses died off on the Western Plains but colonized the prairies farther east as tallgrass species, poorly adapted to dry conditions,

[14] Kraenzel, *The Great Plains in Transition*, 22-23. Kraenzel quotes from a study by T. Lommasson of the U. S. Forest Service titled "The Influence of Rainfall on the Prosperity of Eastern Montana."
[15] Thom, et. al., *Geology of Bighorn County*, 24-25.

receded. During these times bison as well as human beings left the driest reaches of the plains.[16]

C. ECOLOGIC FORCES

Grassland Ecology.

The grasslands known as the Great Plains are the largest biome on the North American continent. In evolutionary terms grasses are newcomers. The ancestors of modern grasses only appeared on the planet between sixty and seventy million years ago, while the grassland communities of North America are an even more recent development, dating in their historic form only from the end of the last Ice Age. As the climate became drier during the Miocene and Pliocene epochs (23-1.6 mya) the forests that once covered much of the North American interior began to recede. By the time of the Miocene-Pliocene transition (7-5 mya) pronounced aridity increasingly restricted woodlands to valleys and riparian areas. Still, these were not the true grasslands of the modern era. The fossil record contains evidence of greater numbers of grazing species, but many large browsers also remained, indicating a patchwork landscape of prairies and woods. The Pleistocene glaciations that followed covered the northern plains. As the ice retreated and the climate again became drier, the Great Plains gradually emerged as true grasslands. Yet, climate alone did not shape the Plains. There is ample evidence that fires, ignited by lightning as well as humans, were an essential factor in favoring grasses and forbs over trees and

[16] West, *The Way to the West*, 80.

shrubs. It has also been suggested that the large browsing mammals present during the late Pleistocene and early Holocene also played a role in limiting the advance of woodlands.[17]

The grasslands of central North America are broadly classified into three regions determined by levels of soil moisture and the corresponding height of the graminoid species. On the eastern margins of the Great Plains are the Tallgrass or "true" prairies. Lower elevations and more ample rainfall allow a number of grasses, including Big Bluestem (*Andropogon gerardii),* Switchgrass (*Panicum virgatum*), and Indian grass (*Sorghastrum nutans*), to grow to heights of five to eight feet. To the west lies the Mixed Grass prairie. While there is substantial overlap in species with the tallgrass region, lower soil moisture means their growth is not as lush and that other species predominate. Common species in the mixed grass prairie include Little Bluestem (*Andropogon scoparius)*, Western Wheatgrass (*Andropogon smithii)*, Sideoats Grama (*Bouteloua curtipendula*), and Needle and Thread (*Stipa comata*) They generally grow two to four feet in height. Finally, farthest to the west is the Shortgrass Prairie. Once again, many of the same species found farther east will be found on the shortgrass prairies. Still, bunch grasses that grow only twelve to eighteen inches in height, along with more numerous forbs than found farther east, are often the dominant ground cover on these high plains. Blue Grama (*Bouteloua gracilis*), Hairy Grama (*Bouteloua hirstuta*), and Buffalograss (*Buchloes dactyloides*) are common species of the short grass prairie.[18]

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[17] Daniel I. Axelrod, "Rise of the Grassland Biome, Central North America," *The Botanical Review* 51 (Apr.-Jun. 1985): 163-201; Sherow, *Grasslands of the United States*, 2.
[18] Sherow, *Grasslands of the United States*, 2; Douglas B. Bamforth, *Ecology and Human Organization on the Great Plains* (New York: Plenum Press, 1988), 32.

Approximate boundaries of tallgrass, mixed-grass, shortgrass, desert, and intermountain grassland biomes.

Figure 1. Grassland Types. Source: Sherow, *Grasslands of the United States*.

It bears repeating that the tall/mixed/short grass classification does not refer to exclusive plant communities, but rather to climatic conditions and the relative abundance of particular species as well as their growth patterns. Cycles of heavy rainfall or drought can effectively change the species composition from decade to decade or even year to year, especially in the mixed grass region. And even on the high and arid shortgrass steppe, species that thrive in more moist conditions can still be found. While most surveys and generalized maps of the Great Plains place eastern Montana and the Little Bighorn Battlefield National Monument within the shortgrass prairie region, the grassland community at the park is a mixture of species that are found in all three regions, including Western Wheatgrass, Sideoats Grama, and Blue Grama, and even Big Bluestem. The

grassland community at the park is thus is better characterized as "northern mixed grassland."[19]

Perhaps more important to understanding the ecology of the grasslands and the complex relationship between grazing animals and human societies is a second method of classifying grasses; their seasonal pattern of growth. Growth cycles matter because no individual grass species can maintain its nutritional value for grazing animals throughout the entire year. Grasses are at their most nutritious in their active growth phase and lose value as they mature and approach dormancy. Some grasses are "cool season," meaning they grow and bloom from fall through spring.[20] Cool season grasses are most valuable to grazers early in the spring but are eclipsed by the warm season species from late spring through the summer. Warm season grasses then provide a wealth of protein throughout the summer. The secondary growth cycle of cool season grasses that occurs in the fall provides supplemental forage, but in general the nutrition available to grazers declines throughout the fall and reaches its nadir at the end of each winter. As a result bison and other grazers are unable to maintain their body weight through the winter.[21]

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[19] Jane H. Bock and Carl E. Bock, The Effects of Fire on Virgin Northern Mixed Grassland at Custer Battlefield National Monument: Final Report," NPS Contract No. CX-1200-4-A034, May 1987; P. G. Risser, et. al., *The True Prairie Ecosystem,* US/IBP Synthesis Series No. 16 (Stroudsburg, PA: Hutchinson Ross Publishing Company, 1981), 9-18; Andrew Isenberg, *The Destruction of the Bison* (New York: Cambridge University Press, 2000), 18-20; Jane H. Bock and Carl E. Bock, "A Survey of the Vascular Plants and Birds of Little Bighorn National Battlefield," CESU Task Agreement CA-1200-99-007, July 2006; Theodore Binnema, *Common and Contested Ground: A Human and Environmental History of the Northwestern Plains* (Norman: University of Oklahoma Press, 2001), 20.
[20] Sherow, *The Grasslands of the United States*, 6-8.
[21] Bamforth, *Ecology and Human Organization on the Great Plains*, 32-34; Binnema, *Common and Contested Ground*, 18-20.

The northern mixed grassland at Little Bighorn Battlefield National Monument today includes both cool season and warm season grasses. The cool season native grasses found during a recent survey at Little Bighorn were Bluebunch Wheatgrass (*Agropyron spicatum*), Western Wheatgrass, Thickspike Wheatgrass (*Agropyron dasystachyum*), Wild Rye (*Elymus trachycaulus*), Junegrass (*Koeleria macrantha*), Redtop (*Agrostis giganteum*), Canbys Bluegrass (*Poa canbyi*), Fowl Bluegrass (*Poa palustrus*), Sandberg Bluegrass (*Poa sandbergii*), Needle and Thread, and Green Needlegrass (*Stipa viridula*). Seven warm season species also occurred at the monument: Big Bluestem, Sideoats Grama, Blue Grama, Prairie Sandweed (*Calamovilfa longifolia*), Plains Muhly (*Muhlenbergia cuspidata*), Alkali Sacaton (*Sporobolus airoides*), and Sand Dropseed (*Sporobolus cryptandrus*). In addition, four other warm season grasses were found in the riparian areas along the Little Bighorn; Northern Reedgrass (*Calamagrostis inexpansa*), Switchgrass, and Common Reed (*Phragmmites australis*). The current grassland community at Little Bighorn reflects common species associations found on other northern mixed prairies. In 1986, for instance the dominant native grasses at the park were Bluebunch Wheatgrass, Thickspike Wheatgrass, and Alkali Bluegrass (*Poa juncifolia*). Junegrass and Needle and Thread were also very common. Another study found that of all the grasses at Little Bighorn the most abundant is Bluebunch Wheatgrass, accounting for over 30% of the total vegetation in the park.[22]

[22] Bock and Bock, "Vascular Plants," 9-10; Bock and Bock, "Effects of Fire," Part IV," 6-7; "Little Bighorn Battlefield," in An Identification of Prairie in National Park Units in the Great Plains, NPS Occasional Paper No. 7, Section Two: Identification of Prairie in National Park Units, 13.

Sedges, forbs and shrubs are also part of any grassland vegetative community. Sedges are related to and resemble grasses but are physiologically distinct. *Carex filifolia*, the threadleaf sedge, is a common component of the vegetative community at Little Bighorn. Forbs are non-graminoid herbs that along with grasses make up the understory of prairies. The three most commonly occurring native forbs at Little Bighorn found during a recent survey were American Vetch (*Vicia americana*), Mountain Trumpet (*Collomia linearis*), and Hood's Phlox (Phlox hoodii). Numerous other native forbs are discussed in a later section detailing their uses by American Indian peoples. Unlike sedges and forbs, shrubs have persistent woody growth. Varieties of sage have historically been the most common shrubs at Little Bighorn.[23]

The composition of the grasslands was never static. Little Bighorn Battlefield is situated on the border of the shrub-steppe ecosystem that dominates large parts of the intermountain West. In its pre-nineteenth century state species such as Bluebunch Wheatgrass, Sandberg Bluegrass, and Junegrass dominated the shrub-steppe. All of these species are present at Little Bighorn, with Bluebunch Wheatgrass being the most common native grass. The most conspicuous shrub was Big Sagebrush. Like other grassland ecosystems, the extent of shrub-steppe could expand and contract. Over the course of the nineteenth and twentieth century as grazing increased, the areas of shrub steppe increased and sagebrush became more dominant. Introduced species such as Japanese Brome (*Bromus japonicus*), the most common exotic grass at Little Bighorn, also became

[23] Bock and Bock, "Effects of Fire," 6-7.

commonplace.[24] The mobile boundary between the northern mixed grassland and the shrub steppe is an important part of the environmental history of Little Bighorn valley. Because there are no taxonomic studies or historical accounts of the vegetative community at Little Bighorn battlefield before the battle, the precise composition of the grasslands in the distant past can only be surmised. The grassland ecology that would mark the Little Bighorn in 1876 was the result of some 12,000 years of co-evolution of Great Plains plants and ungulates, along with the intervention of human societies. Scholars debate the relative reasons for these changes. Some point to non-human natural causes while others emphasize human management decisions including hunting and, most importantly, anthropogenic fire.

Fire Regimes and the Shaping of the Grasslands.

While the importance of drought cycles cannot be discounted, scholars have long recognized that climate alone cannot explain the existence of grasslands. Worldwide grasslands exist in a wide range of climates and on variable soils. What they have in common, however, is that they are generally found in climates with a dry season or prone to substantial dry spells that allow the vegetation to dry out, and fairly smooth or rolling terrain with prevailing winds. Both of these factors favor the ignition and spread of fire and both characterize the Great Plains. Thus, fire was an essential factor in the expansion of the North American grasslands during the peak of dry climate periods such as the early

[24] Bock and Bock, "Effects of Fire, Part I," 11; Risser, et. al., *True Prairie Ecosystem*, 16-17.

Pliocene (when grasses advanced at the expense of woody plants) and the Altithermal, and their maintenance ever since.[25]

The basic effect of fire is to suppress the growth of woody plants and favor grasses. Most vegetative communities tend toward increased diversity with several types of plants filling available niches. Grasslands, however, offer the opposite example – less diversity. "This is a most curious plant sociology," wrote geographer Carl Sauer, "from which the philogenetically most varied woody plants are mainly or even wholly excluded." Ample evidence shows that in the absence of fire trees and shrubs will regularly colonize grasslands in all but the driest of conditions. Henry Allan Gleason recognized this dynamic is the early twentieth century. In effect, fires keep the woods at bay. Conversely the absence of fire allows trees and shrubs to expand their range. In the modern era, the suppression of fires, both lightning and human caused, has allowed trees to move into the Plains from the east and shrub-steppe to expand from the southwest.[26]

The relationship between drought cycles, fire, and the expansion and contraction of grasslands is complex. Recent studies have found that fires were actually more common on the Great Plains during relatively wet periods than during prolonged droughts. By analyzing pollen (as a measure of vegetation) and charcoal (as an indicator of fire) found in lakebed sediments, scientists have reconstructed a picture of a "climate-fuel-fire" cycle. It appears that during the middle Holocene the Plains experienced a drought cycle every 130 to 160 years. During wet years the growth of grasses produced ample fuel and large fires.

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[25] Carl O. Sauer,"Grassland Climax, Fire, and Man," *Range Management* 3 (1950): 16-22; Axelrod, "Rise of the Grassland Biome," 187-89.

[26] Sauer, "Grassland Climax, Fire, and Man," 19; Henry Allan Gleason, "The Relation of Forest Distribution and Prairie Fires in the Middle West," *Torreya* 13 (August 1913): 173-81; Axelrod, "Rise of the Grassland Biome," 188.

Extreme drought, on the other hand, led to scarce and scattered fuel sources. As a result fires were not constant, but oscillated in relation to "short term climate cycling." The authors of these studies focus on climate as a driving factor behind the fires, but they also reported that charcoal becomes rare in sediments after 1850. They attribute this to agricultural expansion on the Northern Plains and the suppression of fires. [27]

Fire interval is a key factor in the expansion or contraction of grasslands. Regular fires favor the expansion of grasslands at the expense of trees and shrubs. Grasses are monocots with most of their stem structure underground. Thus their growth points at or just below the surface make them better suited to withstand fire. Since the fire season peaks in late summer, after most grasses have finished their growth cycle, fires only destroy one years' worth of growth and have a limited effect on reproduction and carbohydrate storage. Grasses are also able to produce seeds within one or two years of germination, much more quickly than woody plants. Trees and shrubs on the other hand grow from exposed trunks and branches and multiple years of growth can be completely destroyed by fire. They may take three or more years to produce seeds, slowing their regeneration. If regular burning helps perennial grasses maintain dominance, extending the time between fires benefits other types of vegetation. Less frequent fires allow "fire-tolerant, resprouting shrubs and trees," like chokecherry, serviceberry and aspen to

[27] K. J. Brown, J. S. Clark, E. C. Grimm, J. J. Donovan, P. G. Mueller, B. C. S. Hansen, I. Stefanova, and H. E. Wright, Jr., "Fire Cycles in North American Interior Grasslands and Their Relation to Prairie Drought," *Proceedings of the National Academy of Sciences of the United States of America* 102 (June 21, 2005): 8865-8870; J. S. Clark, E. C. Grimm, J. J. Donovan, S. C. Fritz, D. R. Engstrom, and J. E. Almendinger, "Drought Cycles and Landscape Responses to Past Aridity on Prairies of the Northern Great Plains, USA," *Ecology* 83 (2002): 595-601.

colonize grasslands. Even longer intervals favor non-sprouting shrubs such as *Artemisia tridenta*, Big Sagebrush.[28]

Fire regimes are important biologically in other ways. Fire not only favor the expansion of grasslands, they result in a richer growth of grass and thus provide more attractive forage for bison. During one study carried out on both tallgrass and mixed grass prairies, bison selectively grazed burned areas during the growth season for one to three years after a fire. They avoided the areas of older burns and unburned patches. The conclusion that bison prefer recently burned grasslands was supported by a second study done at Wind Cave National Park in South Dakota.[29]

Natural, lightning ignited fires were very common on northern mixed grasslands and may have been very prevalent in areas surrounding the Little Bighorn Valley before fire suppression and agricultural change took place. Season, climate, and rangeland ecosystem are all important factors in determining fire frequency. On the northern Great Plains, lightning ignited fires occur from April to September, corresponding with the freeze-free period and the average period of thunderstorm distribution. Using data from a forty-year period in the twentieth century, one study found that on the wetter grasslands of eastern North Dakota there was an annual average of 6.0 lightning caused fires per 10,00

[28] Joseph A. Antos, Bruce McCune, and Cliff Bara, "The Effect of Fire on an Ungrazed Western Montana Grassland," *American Midland Naturalist* 110 (October 1983): 354-65; Stephen F. Arno, "Ecological Effects and Management Implications of Indian Fires," Proceedings, Symposium and Workshop on Wilderness Fire, Missoula, Montana, November 15-18, 1983, USFS General Technical Report, November 1983, 81-86.

[29] Stephen F. Arno and George E. Gruell, "Fire History at the Forest-Grassland Ecotone in Southwestern Montana," *Journal of Range Management* 36 (May 1983): 332-36; Mario E. Biondini, Allen A. Steuter, and Robert G. Hamilton, "Bison Use of Fire-managed Remnant Prairies," *Journal of Range Management* 52 (September 1999): 454-61; D. Layne Coppock and James K. Detling, "Alteration of Bison and Black-Tailed Prairie Dog Grazing Interactions by Prescribed Burning," *The Journal of Wildlife Management* 50 (July 1986): 452-55.

km2. On the more arid grasslands of south central and western North Dakota the average jumped to 22.4 and 24.7 respectively. In the pine-savanna lands of northwestern South Dakota and southeastern Montana the annual average soared to 91.7 lightning caused fires per 10,000 km2. The presence of trees, mostly Ponderosa pines (*Pinus ponderosa*), made lightning strikes four times more likely than on true grasslands. The pine-savanna ecosystem characterizes much of the higher ground in southeast Montana including the Wolf Mountains just east of the Little Bighorn Valley. It is impossible to know how widespread these fires would have become as nearly all were suppressed. Still, it is clear that on the drier mixed grasslands of the Little Bighorn as well as on surrounding pine-savanna lands lightning caused fires were a common natural occurrence.[30]

The archaeological and historic record indicates that human-ignited, or anthropogenic, fire was even more common. For scholars who emphasize human action in shaping the ecology of the Great Plains, no factor is greater than anthropogenic fire. Depending on the location American Indian peoples used fire to drive game, harvest grains and nuts, enrich the soil for agriculture, clear land for travel, or as an offensive and defensive weapon. Fire was such an important tool for Native peoples that Sauer suggested "the earlier human economies collectively may be called fire economies."[31]

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[30] Kenneth F. Higgins, "Lightning Fires in North Dakota Grasslands and in Pine-Savanna Lands of South Dakota and Montana," *Journal of Range Management* 37 (March 1984): 100-03.

[31] Sauer, 19; Stephen J. Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (Princeton, NJ: Princeton University Press, 1982), 71-83; Omer C. Stewart, *Forgotten Fires: Native Americans and the Transient Wilderness* (Norman: University of Oklahoma Press, 2002).

Bison Ecology.

At the end of the last ice age thirty-five genera large mammals in North America went extinct. These megafauna included saber-toothed cats, the dire wolf, and giant ground sloths. Also gone were a wide range of grazing species that had evolved with the North American grasslands including mammoths, mastodons, camels, the earliest horses, and larger ancestors of modern bison. Since the late 1960s scholars have debated the causes of the Pleistocene extinctions. Proponents of the "Pleistocene Overkill" theory argue that the arrival of human hunters in North America was the single most important factor in the extinctions.[32] Current consensus in the scientific community is that human predation was likely a contributing factor but may not have been the principal, and certainly not the only, reason for the mass extinctions.[33]

Regardless of the reasons for the Pleistocene extinctions, the crucial effect was that the majority of herbivores present on the North American plains were gone and with their demise the number of grazing and browsing species was reduced to five – bison (*Bison bison*), pronghorn (*Antilocapra Americana*), mule deer (*Odocoileus hemionus*), whitetail

[32] See, Paul S. Martin, "Prehistoric Overkill," in Martin and H. E. *Wright* Jr., eds., *Pleistocene Extinctions: The Search for a Cause* (New Have: Yale University Press, 1967), pp. 75-120; Paul S. Martin, *Twilight of the Mammoths: Ice Age Extinctions and the Rewilding of America* (Berkeley: University of California Press, 2005).

[33] See, Donald K. Grayson and David J. Meltzer, "A Requiem for North American Overkill," *Journal of Archaeological Science* 30 (2003): 585-93; Stuart Fiedel and Gary Haynes, "A premature burial: Comments on Grayson and Meltzer's 'Requiem for Overkill,'" *Journal of Archaeological Science* 31 (2004): 121-31; Grayson and Meltzer, "North American Overkill Continued," *Journal of Archaeological Science* 31 (2004): 133-36; Sherow, *Grasslands of the United States*, 12-13.

deer (*Odocoileus virginianus*), and elk (*Cervus canadensis*).[34] All of these species were present at one time or another in and around the Little Bighorn Valley. While Native peoples hunted all of them from the Paleoindian period through the historic equestrian cultures, bison stand out as singularly important. As glaciers receded, the North American grasslands expanded, the modern bison became the most populous mammals to ever exist on the continent. Today two subspecies of bison exist, the Plains Bison (*B. bison bison*) and the slightly larger Wood Bison (*B. bison athabascae*) found on the northeastern Plains of Canada.[35] As the most numerous grazers, the life cycle and behavior of bison helped shape the North American grasslands. Moreover, the economic, social, cultural, and spiritual importance of bison for Native peoples in the historic period cannot be overstated. For these reasons understanding bison ecology is most critical for understanding the grasslands of the Little Bighorn.

Bison numbers have been subject of debate for well over a century. Historic estimates of peak populations were wildly inflated. Many nineteenth century observers such as Gen. Philip H. Sheridan estimated that some one hundred million bison roamed the plains. Others more conservatively suggested sixty million. In his pioneering 1889 study, William T. Hornaday wrote, "It would have been as easy to count or to estimate the leaves

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[34] D. C. Hartnett, A. A. Steuter, and K. R. Hickman, "Comparative Ecology of Native and Introduced Ungulates," in Fritz B. Knopf and Fred B. Samson, eds., *Ecology and Conservation of Great Plains Vertebrates* (New York: Springer, 1997), 72-101.

[35] See, Jerry N. McDonald, *North American Bison: Their Classification and Evolution* (Berkeley: University of California Press, 1981); R. D. Guthrie, "Bison Evolution and Zoogeography in North America During the Pleistocene," *The Quarterly Journal of Biology* 45 (March 1970): 1-15; Björn Kurtén and Elaine Anderson, *Pleistocene Mammals of North America* (New York: Columbia University Press, 1980), 335-38; Francis Haines, *The Buffalo: The Story of the American Bison and Their Hunters from Prehistoric Times to the Present* (reprint ed., Norman: University of Oklahoma Press, 1995), 7-15.

in a forest as to calculate the number of buffaloes . . . previous to 1870."[36] These estimates, however, were essentially guesses. There were no solid counts and most of the anecdotal observations took place in summer, when great herds formed for the rut. In the twentieth century scholars began to use the concept of carrying capacity to reassess bison numbers. The most recent estimates also take into account complex environmental factors such as competition from other grazers, the impact of fires and drought, bovine diseases, and naturally volatile rates of reproduction. As a result, the currently accepted figures for the total bison population before the introduction of horses for all of the Great Plains is between twenty-eight and thirty million.[37]

While bison migrations were popularly understood on a grand continental scale, the seasonal cycles of the herds actually played out over more limited geographic areas. Many nineteenth century observers such as Hornaday surmised that bison migrated the length of the plains from Canada to Texas in massive herds each year. The myth of "regular" continental migrations persisted into the mid-twentieth century when Frank Gilbert Roe put it to rest, at least in scholarly circles.[38] Modern understandings of ungulate ecology suggest that bison migrations took place with "home ranges" or "familiar areas" where the animals had learned where to find forage, water, and shelter. While home ranges could be substantial they were certainly not continental, nor were these ranges static. Changing

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[36] William Temple Hornaday, *The Extermination of the American Bison* in the *Annual Report of the Board of Regents of the Smithsonian Institution*, 1889 (reprint ed., Washington, D. C.: The Smithsonian Institution, 2002), 387; Frank Gilbert Roe, *The North American Buffalo: A Critical Study of the Species in its Wild State* (Toronto: University of Toronto Press, 1951).
[37] Dan Flores, "Bison Ecology and Bison Diplomacy: The Southern Plains from 1800 to 1850," *Journal of American History* 78 (September 1991); Isenberg, *Destruction of the Bison* 23-25.
[38] Roe, *North American Buffalo*, 521-42.

patterns of rainfall and fire impacted the availability of forage and could lead to shifts in migration patterns.[39] Some ecologists have also argued that cycles of drought and fire "imposed a deferred rotation" that prevented migratory bison herds from grazing the same land year after year. This may have been a crucial factor in "promoting vegetation-herbivore stability i the Great Plains grasslands."[40]

The seasonal migration of bison within a given home range is best understood in terms of patterns of aggregation and dispersal. The size of bison herds as well as their preferred diet fluctuated according to the season. Bison normally spend the period from fall through late spring in smaller sexually segregated herds. Cow-calf herds contained females, calves and yearlings, as well as a few sexually immature bulls. They could number between three-dozen and several hundred individuals. Herds of adult bulls were smaller, generally numbering thirty or fewer animals. The calving season began in April, just as the herds were coming out of the leanest time of the year and the growth of cool season grasses offered a renewed food source. Small, dispersed herds remained the rule in the spring. The largest herds congregated several months later on gently rolling plains during the summer breeding season, or rut, which peaked in July and August. Warm season grasses provided the bulk of the bison diet at this time. The wealth of protein and carbohydrates available meant that by late summer cows and calves were in the best conditions of the year. Adult bulls, on the other hand, generally lost weight during the rut. It was the assumption that of these massive herds, sometimes numbering in the tens of thousands, were indicative of bison numbers year round that led to the exaggerated

[39] Bamforth, *Ecology and Human Organization*, 45-48.
[40] Hartnett, et. al., "Comparative Ecology of Native and Introduced Ungulates," 81-82.

estimates of bison populations discussed earlier. As summer turned to fall and warm season grasses went dormant the great herds again split up into cow-calf and bull herds. These smaller groups of animals moved into more sheltered broken topography where they again consumed cool season grasses, now in their secondary growth phase. As winter set in the nutritional value of the grasses steadily declined to the point that the animals could not maintain their body weight. By the end of March each year the available nutrition as well as the bison population had reached its absolute nadir just as a new season was to begin.[41]

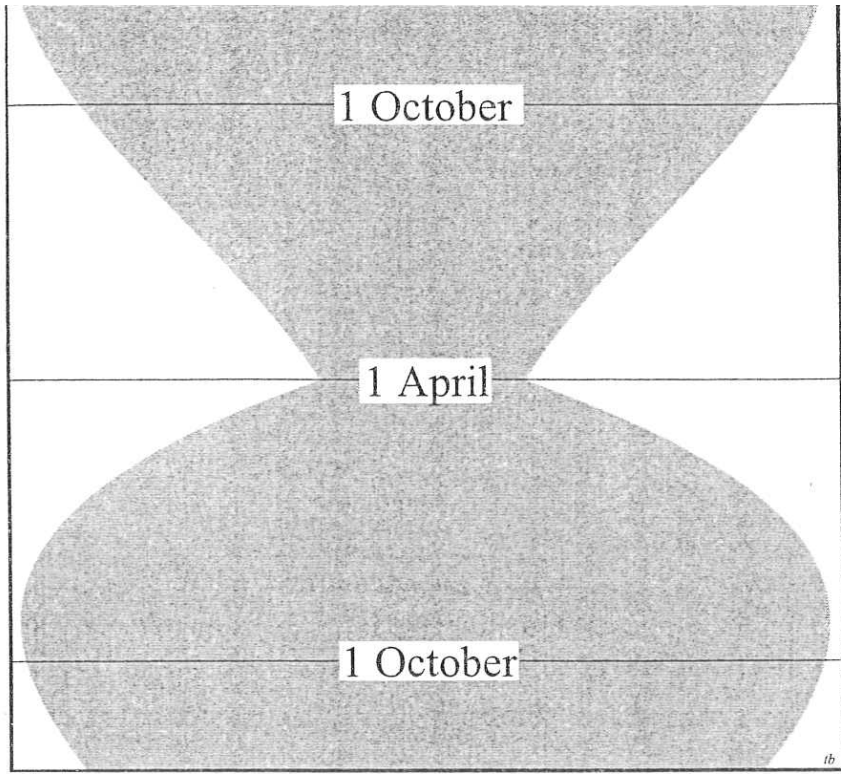

Figure 2. The "Bison Hourglass" - showing the annual cycle of nutrition available to bison and thus the energy ultimately available to human hunters. Source: Theodore Binemma, *Common and Contested Ground* p, 19.

[41] Bamforth, *Ecology and Human Organization*, 80-82; Isenberg, *Destruction of the Bison*, 66-68; Binnema, *Common and Contested Ground*, 40-43; West, *Way to the West*, 72-79.

The amount of forage available was one factor controlling bison population and patterns of aggregation, but focusing on this obscures the particularly valuable nature of the northern mixed grasslands found in the Little Bighorn valley. Fluctuations in rainfall affect protein and phosphorus content as well as the digestibility of grasses. In general, the availability of forage as well as its gross nutritional content decreases across the Great Plains from the northeast to the southwest. Quantity of forage and calories, however, was not the same as quality. While the northeastern plains produced the most abundant forage, the higher drier northwestern plains actually produced superior forage at the critical time of late winter and early spring, when bison populations reached their "bottleneck." Much of Eastern Montana, including the Little Bighorn valley, was not a true shortgrass prairie like those found on the western reaches of the central and southern plains where warm season species predominate. Instead, this northern mixed prairie contained a higher proportion of cool season grasses and thus provided better forage in late winter and early spring. In addition to this advantageous mix of cool and warm season grasses, the relatively greater precipitation as well as rougher topography that made for sheltered valleys, also contributed to the higher quality of forage on the western and southwestern margins of the Northern Plains. Finally, the phenomenon of foehn winds, also known as Chinooks or "snow eating" winds, functioned to cure the grasses and keep them exposed throughout the winter.[42]

Just as importantly, short-grasses and grazers like bison and pronghorn antelope were well adapted to each other. Tall grasses contained more carbohydrates and calories due to their greater size, but short grasses contain a greater proportion of protein. Bison

[42] Binnema, *Common and Contested Ground*, 20, 27-28, 31.

require and least one part protein for six parts carbohydrates. Antelope require an even greater protein forage than bison, and this is why they are found on the western reaches of the plains. Shorter grasses in the region also tend to cure well and retain carbohydrates and protein far better than the taller grasses farther east, providing better, if not always adequate, nutrition during the winter. Cured short grasses are 15 to 20% protein and 75 to 80% carbohydrates. Finally, short grasses are more resilient to heavy grazing than taller species. They respond well to grazing and will eventually become dominate in areas of heavy grazing. Thus, the ecology of the northern mixed prairies of eastern Montana was an important reason that the area became one of the last refuges of the wild bison herds in the nineteenth century.

The ecosystems of the Great Plains were not just the product of grasses and large grazing species, as smaller mammals could also exert important influence. Perhaps the most visible and well-known landscape shaped by small mammals was the prairie dog ecosystem. Members of the squirrel family, five species of prairie dog inhabit North America. Of these, the black-tailed prairie dog (*Cynomys ludovicianus)* is the most common and widespread.[43] Black tailed prairie dogs are found from southern Texas to Montana. Historically their range included the entire state of Montana, including the Little Bighorn Battlefield. Prairie dogs are social animals that live in colonies or towns established on level to moderately sloping (up to 12%) ground. A small colony currently exists just outside the northern boundary of the park. Prairie dogs "mainly consume native perennial

[43] John L. Hoogland, *The Black Tailed Prairie Dog: Social Life of a Burrowing Mammal* (Chicago: University of Chicago Press, 1995); John L. Hoogland, ed., *Conservation of the Black-Tailed Prairie Dog* (Washington DC: Island Press, 2006), C. N. Slobodchikoff, Bianca S. Perla, and Jennifer L. Verdolin, *Prairie Dogs: Communication and Community in an Animal Society* (Cambridge, MA: Harvard University Press, 2009).

graminoids and a few common perennial forbs." This means that their dietary overlap with native ungulates such as bison and pronghorn, as well as introduced domestic livestock is substantial.[44] (Indeed, it was the perceived threat of prairie dogs to agricultural and ranching interests that led to a century long campaign to eradicate the rodents that greatly reduced their numbers.) Vegetation in and around prairie dog colonies ranges in height up to 20-30 cm. While the presence of big and silver sagebrush could limit the growth of colonies, evidence also suggests that over an extended period sage can be eliminated or modified to allow colony expansion.[45] The major predators for prairie dogs were black-footed ferrets and badgers, although raptors, bull snakes and rattlesnakes, and numerous mammals including coyotes, foxes, bobcats, and even grizzly bears would occasionally prey upon them.[46]

The size of historic prairie dog colonies could be immense. While some studies have argued that small, scattered colonies characterized prairie dog populations before the impact of Euro-American settlement, others suggest that large colonies were actually the norm. These latter scholars point to the relatively short distances, generally 2 to 3 kilometers, which prairie dogs disperse when forming new colonies. They argue that some massive colonies along with complexes of smaller colonies characterized the prairie dog ecosystems of the Great Plains before Euro-American conquest.[47] The largest prairie dog

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[44] James K. Dettling, "Do Prairie Dogs Compete with Livestock?'" in Hoogland, ed., *Conservation of the Black-Tailed Prairie Dog*, 74.
[45] Craig Knowles, Jonathan Proctor, and Steven Forest, "Black-Tailed Prairie Do Abundance and Distribution in the Great Plains Based on Historic and Contemporary Information," *Great Plains Research: A Journal of Natural and Social Sciences* 12 (Fall 2002) 237-38.
[46] Hoogland, *Black Tailed Prairie Dog*, 14-15.
[47] Knowles, et. al., "Prairie Dog Abundance."

town ever reported was in Texas, covered some 25,000 square miles, and was home to an estimated 400 million animals. Nineteenth century reports suggest that very large colonies, some stretching for nearly forty miles across the plains, marked north central Montana. Similarly large towns existed in southeastern Montana. One study of prairie dog ecosystems in southeastern Montana utilized plat maps from the Northern Pacific Railway land surveys of 1908-1914. The surveys occurred after the rise of the cattle industry but before the homesteading boom came to the Yellowstone Valley. The study's findings are suggestive for understanding pre-settlement prairie dog population in the area around the Little Bighorn. The surveys excluded the Crow and Northern Cheyenne reservations and only encompassed 0.5 of the total land area of Bighorn County. Still 66% of the surveyed sections in the county contained prairie dog populations. The study's authors asserted that "prairie dogs were relatively abundant and widespread, existing in single large colonies or in large groupings of smaller colonies," and that this pattern "more closely approximate[s] prairie dog distribution in presettlement times than prairie dog distributions seen today."[48]

References to small mammals are far less common in historic documents than are descriptions of iconic megafauna such as bison. Still, early Euro-American observers did note the common presence of prairie dogs. During their travels along the Missouri and Yellowstone Rivers, for instance, Lewis and Clark left several accounts of the animals they called "burrowing" or "barking" squirrels. Lewis reported, "these squirrels burrow in the ground in the open plains . . . they generally associate in large societies placing their burrows near each other and frequently occupy in this manner several hundred acres of

[48] Dennis L. Flath and Tim W. Clark, "Historic Status of Black-footed Ferret Habitat in Montana," *Great Basin Naturalist Memoirs* 8 (1986): 65, 68.

land." In one instance Lewis tried to determine the depth of a prairie dog burrow but gave up after digging down ten feet. He also noted that as a meal prairie dog flesh was "well flavored and tender."[49]

Prairie dogs have been called a keystone species indicating the health of native grassland ecosystems. Biodiversity is greater in proximity to colonies. Prairie dog burrowing mixes soil layers and improves the distribution of nutrients and retention of moisture. It appears that bison and prairie dogs form a "grazing association." Both species benefit from the foraging of the other on the edges of prairie dog towns. Numerous other vertebrate and invertebrate species thrive in the prairie dog ecosystem, including a range of insects and arachnids. Burrowing owls commonly make their home in colonies where burrows can provide homes and short vegetation allows them to more easily spot predators. The mountain plover is a shorebird that finds welcoming habitat – short vegetation and bare ground – within prairie dog colonies. Over the course of the twentieth century as prairie dog habitat was destroyed and the animals extirpated, the once common mountain plover became increasingly rare in the plains.[50] Undoubtedly the best-known obligate species of prairie dogs is the black-footed ferret.

Black-footed ferrets (*Mustela nigripes*), are completely dependent upon the existence o appropriate sized prairie dog colonies for their survival. The earliest fossil evidence fo black-footed ferrets in North America dates back some 750,000 years.

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[49] Journals of Lewis and Clark Vol. 8, 75-76, 259.
[50] Natasha B. Kotiliar, Brian J. Miller, Richard P. Reading, and Timothy W. Clark, "The Prairie Dog as Keystone Species," in Hoogland, ed. *Conservation of the Black-Tailed Prairie Dog* Kirsten Krueger, "Feeding Relationships Among Bison, Pronghorn, and Prairie Dogs: An Experimental Analysis," *Ecology* 67 (1986):760–770; Knowles, et. al., "Prairie Dog Abundance," 244-45; 54-60

Evidence suggests that at that time the ferrets were no yet obligate species of the prairie dog, but rather followed the more diverse dietary habits of their close relatives the steppe ferret (*M. eversmanni*). By the historic period, however, black-footed ferrets were highly specialized, living in prairie dog burrows and nearly exclusively hunting the rodents at night.[51] By one estimate it takes a prairie dog colony of between 40 and 60 hectares to support a single black-footed ferret. As their nocturnal behavior made them difficult to observe, few accounts of the animal appear in the historic record. They were not scientifically described until 1851. The great expanse of prairie dog ecosystems, however, suggests that relatively large ferret populations existed in the pre-settlement era. Using population densities observed in the early 1980s as a model it is possible that some 150,000 ferrets still occupied southeastern Montana at the turn of the twentieth century.[52]

II. Native Peoples and the Ecology of the Great Plains.

For at least the last thirteen millennia human beings have been part of Great Plains ecosystems. Paleoindian and Plains Archaic peoples were foot-going hunters who used a variety of methods to take bison and other game. These peoples also used fire as a management tool. The arrival of horses and the development of equestrian cultures revolutionized Native life on the Plains beginning in the early eighteenth century. Equestrianism allowed more people to travel together longer and hunt bison more

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[51] Pamela R. Owen, Christopher J. Bell, and Emilee M. Mead, "Fossils, Diet, and Conservation of Black-footed Ferrets (*Mustela Nigripes*)," *Journal of Mammalogy,* 81(2000): 422–433.
[52] Flath and Clark, "Historic Status," 69; Biggins, Dean E. Biggins and Max H. Schroeder, "Historical and Present Status of the Black-Footed Ferret," *Great Plains Wildlife Damage Control Workshop Proceedings*, Paper 50, 1987.
http://digitalcommons.unl.edu/gpwdcwp/50

intensively. It also led to a military struggle to control prime hunting grounds. By the mid-nineteenth century many peoples had converged on the Powder River Country of Wyoming and Montana where buffalo ranged in great numbers. Their land use practices were essential in shaping the Little Bighorn battlefield as it existed in 1876.

A. HUNTING CULTURES BEFORE THE ACQISITION OF HORSES.

The distinctive Clovis point (13,000 BP±) remains the earliest archaeological evidence for human beings on the Great Plains and marks the beginning of the Paleoindian period. Clovis sites are common on the Northwestern Plains and have always been interpreted as evidence of a focused big game hunting culture. Although Clovis sites with "unequivocal evidence of mammoth-human associations are rare," the tool tradition has been central to debates over the Pleistocene megafaunal extinctions. Around 11,000 years ago a second tool tradition, Folsom, emerged on the Plains. Like Clovis, Folsom sites are widespread and associated with specialized big game hunting.[53] Expanding populations of *Bison antiquus* and its smaller relation, the modern bison, rapidly filled the ecological niche left vacant by the megafaunal extinctions and became the principal prey of Paleoindian hunters. Paleoindian sites in southeastern Montana are concentrated in foothill areas and none have been discovered in the immediate vicinity of the Little Bighorn battlefield.[54]

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[53] George C. Frison, *Prehistoric Hunters of the High Plains*, 2nd ed. (New York: Academic Press, 1991), 39, 47-57.

[54] Elliott West, *The Contested Plains: Indians, Goldseekers, and the Rush to Colorado* (Lawrence: University Press of Kansas, 1998), 20; Douglas D. Scott, "Uncovering History: The Legacy of Archaeological Investigations at the Little Bighorn Battlefield National Monument, Montana," Unpublished Report, NPS, MWAC, 2010, 9.

What archaeologists deem the Plains Archaic culture began developing around 10,000 BP. Unlike the specialized big game orientation of the earlier cultures, the Plains Archaic was a "broad spectrum hunting and gathering" tradition. The changing climate during the Altithermal Period (approximately 8,000-5,000 BP) was one reason for the diversification of subsistence strategies. Pronounced warming and drier conditions largely drove the bison from the western plains during the period, although herds remained in wetter oases such as the Black Hills. An increased reliance on both smaller game as well as wild plant foods characterized Plains Archaic culture. As the Altithermal waned bison once again shifted west to the shortgrass prairies. The fossil record from this time, known as the Middle Archaic Period, reveals that all of the bison remaining were of the modern subspecies *B. bison*.[55] Plains hunters also returned to pursue the bison. Foot-going hunters could stalk animals individually or participate in communal hunts, first utilizing buffalo jumps. In this method the herd was driven over a precipice. During the Late Archaic Period communal bison hunts grew more sophisticated with the use of arroyo traps and corrals. Several large kill sites were located in the Powder River basin of Montana and Wyoming.[56]

Archaeological work conducted at the monument, while focused on recovering and interpreting battle related artifacts, has also uncovered evidence of prehistoric native occupation. Isolated artifacts as well as two sites, that likely date to the middle or late archaic period, have been documented. Both sites were lithic scatters – concentrations of

[55] George C. Frison, "Hunting and Gathering Tradition: Northwestern and Central Plains," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 1*, pp 131-45; Frison, *Prehistoric Hunters*, 191; George C. Frison and Robson Bronnichsen, "The Pleistocene-Holocene Transition on the Plains and Rocky Mountains of North America," in Lawrence Guy Strauss, et. al., eds., *Humans at the End of the Ice Age: The Archaeology of the Pleistocene-Holocene Transition* (New York: Plenum Press, 1996), 303-18.
[56] Frison, *Prehistoric Hunters*, 103, 194-211.

discarded tools as well as the debitage associated with tool production and maintenance – located on the Custer Battlefield section of the monument. No prehistoric materials were found at the Reno-Benteen site.[57]

The later prehistoric period on the Northwestern Plains saw a succession of hunting cultures. The Besant point complex appeared about 2,500 BP and remained present for the next millennia. Besant points were originally associated with atlatls, but about 1,500 BP the transition was made to bow and arrow. Coming later and coexisting with the Besant point was the Avonlea tradition that is more clearly associated with the bow and arrow. As the climate entered a warmer drier phase and bison numbers apparently declined, so too did the efficiency of communal hunts. Under these circumstances bows offered a superior advantage over the older atlatl. The final tool complex of the late prehistoric was the Old Women, and like its predecessors was closely associated with bison hunting and processing.[58]

There is also evidence that Northern Plains hunters used fire as a tool to make the movements of bison herds more predictable and hunts more efficient. Using the fire record of grasslands in southern Manitoba, Matthew Boyd has discounted changing climate and increased fuel loads as adequate explanations for a peak in fire activity some 2,500 BP. He argues that the presence of Besant hunter-gathers, their cultural associations with Woodland cultures where anthropogenic burning was widespread, and well established

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[57] Scott, "Uncovering History," 14-16.
[58] L. Adrien Hannus, "Cultures of the Heartland: Beyond the Black Hills," in Karl S. Schlesier, ed., *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups* (Norman: University of Oklahoma Press, 1994),184-91; Sally T. Greiser, "Late Prehistoric Cultures on the Montana Plains," in Schlesier, *Plains Indians, A.D. 500-1500*, 36-43; Scott, "Uncovering History," 10.

history of Native peoples burning grasslands in later periods suggests that these early hunters were using fire as a range management tool.[59]

B. THE TRADITIONALLY ASSOCIATED TRIBES.

The equestrian era presents one of the great examples of cultural innovation in the history of Native America. Numerous peoples of different linguistic, cultural, and economic backgrounds saw the possibilities presented by the horse-bison economy and pursued those opportunities in a myriad of ways. Many were horticultural peoples who incorporated horses into a new hybrid economy or, in some cases, completely left old ways behind to become specialized hunters. Others were already hunters who reaped the benefits of the added mobility and power of horses. Of the traditionally associated tribes of the Little Bighorn Battlefield National Monument, only the Crow people lived in the area at the beginning of the equestrian era. Thus, migrations go hand in hand with innovation in understanding the development of Plains Indian cultures.

<u>The Crow People</u>.

Little Bighorn Battlefield National Monument is situated within the reservation of the Crow tribe. The Crow people speak a Siouan language and in their own tongue they are the Apsáalooke, or "children of the big beaked bird," but since the earliest historical accounts this name has been rendered "Raven," or most often "Crow." The Crows are culturally related to the Hidatsa people. Linguistic evidence suggests that the separation of

[59] Matthew Boyd, "Identification of Anthropogenic Burning in the Paleoecological Record of the Northern Prairies: A New Approach," *Annals of the Association of American Geographers* 92 (2002): 471-87.

the Crows from the Hidatsas might have begun as early as the 1500s, while other scholars place the date a century later. Whatever the starting point, the separation was a gradual process. Foot-going Crow groups moved farther and farther west. By 1730 the Crows had obtained horses through intertribal trade from the Comanches, Shoshones and Nez Perce. By the end of the eighteenth century the Crow Nation consisted of two major subdivisions, the Mountain Crows and the River Crows. Some anthropologists believe that these divisions stemmed from associations with ancestral Hidatsa groups. The River Crows traditionally ranged along the lower Yellowstone and northwest into the valleys of the Milk, Marias, and Judith Rivers. The Mountain Crows generally stayed south of the Yellowstone and their traditional hunting range included the Bighorn, Little Bighorn, Tongue, and Powder Rivers. A smaller clan-based division of the Crows, the Kicked in the Bellies, separated from the Mountain Crows sometime around 1850 and generally ranged throughout north-central Wyoming and as far south of the North Platte and Sweetwater Rivers.[60]

The Cheyenne People.

At the beginning of the seventeenth century the Cheyenne people lived in the woodlands and prairies west of the Great Lakes in what is today Wisconsin and Minnesota.

[60] For an ethnographic summary of the Crows see, Fred W. Voget, "Crow," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 2*, pp. 695-717. The most important ethnographic sources on the Crows are the numerous works of Robert Lowie published between 1912 and 1964 (Lowie died in 1957). For a summary of his work see, Robert Lowie, *The Crow Indians* (New York: Farrar and Rinehart, 1935; reprint ed. Lincoln: University of Nebraska Press, 1983). For a modern history of the Crows see, Frederick E. Hoxie, *Parading Through History: The Making of the Crow Nation in America, 1805-1935* (New York: Cambridge University Press, 1995).

In the Cheyennes' own Algonquian language they are the *tsétsEhéstAhese* (commonly Anglicized as Tsistsistas) variously translated as "those that are from this group," or "the called out people." The name Cheyenne originated in the Lakota and Dakota languages. They began their migration to the high Plains in the seventeenth century as they faced mounting pressure from well-armed Ojibwe and Assiniboine peoples engaged in fur trade. By the early eighteenth century the center of Cheyenne settlement was along the Sheyenne River in present North Dakota. Tribal traditions recall a devastating Ojibwe attack on their village sometime in the 1720s. To escape this unrelenting pressure and drawn by trade opportunities along the Missouri, the Cheyennes moved ever westward. After a period when some Cheyenne bands established horticultural villages along the Missouri, the acquisition of horses, as well as the impact of epidemics, spurred another move to the West. According to Cheyenne tradition it was then that the culture hero and prophet Sweet Medicine journeyed into the sacred mountain – *nóvávóse.* (Known commonly as Bear Butte, it is located near present-day Sturgis, South Dakota). Inside the mountain, Sweet Medicine met Maheo, the All Being, who gave the Cheyennes the four sacred arrows as well as the name Tsistsistas. Shortly thereafter the Cheyennes merged with an associated Algonquian-speaking group called the Sutaio who brought with them the sacred hat as well as the Sun Dance. The unified Cheyenne people then moved to secure their place on the buffalo plains west and south of the Black Hills. Over the course of the nineteenth century the Cheyennes ranged over a vast areas stretching from the Powder River basin to the Arkansas Valley. Over time they split into southern and northern divisions – the former allying with the

Kiowas, Comanches, and Southern Araphos after 1840 and the latter forming a similar alliance with the Lakotas, especially the Oglalas, and the Northern Arapahos.[61]

The Arapho People.

Like their historic allies, the Cheyennes, the Araphos speak an Algonquian language. The derivation of the name Arapaho is uncertain but is not of Arapaho origin. Their self-designation is *hinóno?éino?,* meaning "our people." According to Arapaho traditions there were originally five divisions of the tribe. At some point the northernmost of these groups separated and became the Gros Ventre tribe. By the early nineteenth century the Arapahos ranged mostly along the North Platte River. They also formed a strong alliance with the Cheyennes, initially to resist the expansion of Lakota peoples from the Northeast. And like the Cheyennes, over the course of the nineteenth century the Arapahos split into northern and southern divisions.[62]

The Lakota and Dakota Peoples.

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[61] John H. Moore, Margot P. Liberty, and A. Terry Straus, "Cheyenne," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 2*, pp. 863-85. Important sources on the Cheyennes include John Stand in Timber and Margot P. Liberty, *Cheyenne Memories* (New Haven: Yale University Press, 1967); James Mooney, "The Cheyenne Indians," *Memoirs of the American Anthropological Association* (1907): 357-442; George Bird Grinnell, *The Cheyenne Indians: Their History and Ways of Life* (New Haven: Yale University Press, 1923); John H. Moore, *The Cheyenne Nation: A Social and Demographic History* (Lincoln: University of Nebraska Press, 1987); and Fr. Peter J. Powell, *People of the Sacred Mountain: A History of the Cheyenne Chiefs and Warrior Societies*, 2 vols. (San Francisco: Harper & Row, 1981).

[62] Loretta Fowler, " Arapaho," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 2*, pp. 840-62.

The Lakotas and Dakotas are the two principal linguistic branches of the Sioux Nation. The name Sioux derives from an Ojibwe word for snake and refers to an enemy, while the self-designations Lakota and Dakota mean “friendly” or “ally.” All Lakota and Dakota people speak mutually intelligible dialects of a Siouan language. By the mid nineteenth century the greater Sioux Nation consisted of three main divisions; the Santee who remained in southern and western Minnesota, the Yankton-Yanktonai in the eastern halves of modern North and South Dakota, and the Teton who ranged far west from the Missouri. Santee and Yankton-Yankonai bands spoke the Dakota dialect, while the Tetons spoke the Lakota. Each of these larger divisions was further divided into numerous bands. The seven Lakota bands are the Oglala, Hunkpapa, Brule, Sans Arcs, Minneconjou, Blackfeet, and Two Kettles. Warriors from these bands made up the bulk of the fighting force that faced the Seventh Cavalry at the Little Bighorn in 1876. At the beginning of the historic period the ancestors of the Lakota and Dakota peoples lived west of Lake Michigan i what is now Wisconsin and southeast Minnesota. The arrival of Europeans and the advent of the fur trade were catalysts of great change. Pushed by expanding groups from the east and pulled by opportunities on the Plains all Lakota and Dakota peoples shifted their territories to the west over the course of the eighteenth century. By mid-century, the Tetons and the Yankton-Yanktonais were hunting the lands east of the Missouri. Now in possession of horses the Lakotas pushed farther west. By the time of Lewis and Clark’s outbound journey in 1805 the Lakotas had established themselves as a military and economic power on the northern Plains, and by the 1850s they were pushing west and

south beyond the Black Hills to vie with other native groups for control of the bison grounds.[63]

The Assiniboine People.

The Assiniboine people are linguistically to the Lakota and Dakota peoples but have but have been a distinct tribe from at least the beginning of the historic period. From the seventeenth to the nineteenth centuries Assiniboine territory stretched across portions of the Canadian provinces of Manitoba and Saskatchewan, northwest North Dakota, and eastern Montana north of the Missouri. Two major divisions of the Assiniboines, the Northern or Woodland and the Southern or Plains, reflected their life straddling two biomes. Hostilities between the Assiniboines and the Lakotas emerged by the late seventeenth century, due in part to the former's alliances and intermarriage with the Crees. The Assiniboines acquired horses by the early 1750s and like so may other peoples they sought to access the profitable horse-bison economy, but conflicts with the Blackfeet and Gros Ventres kept the Assiniboines horse poor well into the nineteenth century. The period between the 1770s and the 1820s saw increasing numbers of Assiniboines gradually moving south toward the Missouri River. The Assiniboines were signatories of the 1851 Fort Laramie Treaty which defined their tribal territory between the Yellowstone and

[63] Raymond J. DeMallie, "Sioux Until 1850," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 2*, pp. 718-60; Richard White, "The Winning of the West: The Expansion of the Western Sioux in the Eighteenth and Nineteenth Centuries." *Journal of American History* 65 (1978): 319-43; Jeffrey Ostler, *The Plains Sioux and U. S. Colonialism from Lewis and Clark to Wounded Knee* (New York: Cambridge University Press, 2004), 21-23.

Missouri Rivers. By the late 1860s and early 1870s agencies for the Assiniboines in Montana had been established at Milk River and then Fort Peck.[64]

The Three Affiliated Tribes.

Today the Mandan, Hidatsa, and Arikara Nation, also known as the Three Affiliated Tribes, reside on the Fort Berthold Reservation in North Dakota. The histories of these distinct yet closely associated peoples illustrate a village based adaptation to the Great Plains unlike any of the other traditionally associated tribes of Little Bighorn Battlefield National Monument. Mandan origin stories tell of the emergence of the ancestral Corn People near a body of water, their migration up the Missouri River, and the subsequent creation of the ancestral Buffalo People near their historic home on the middle Missouri. Anthropologists believe these stories relate the Mandans' part of a greater migration of Siouan peoples from the Mississippi River Valley to the west. By the late seventeenth century the Mandans lived in eight or nine fortified earth lodge villages that lined both sides of the Missouri near the mouth of the Heart River in modern North Dakota.[65] Like the Mandans, the Hidatsa people speak a Siouan language. The Hidatsa have traditionally consisted of three divisions: the Hidatsa proper, the Awatixa, and the Awaxawi. Oral traditions hold that the Awatixa always lived on the Missouri while the other two bands migrated to the area. By the eighteenth century the three Hidatsa divisions lived in separate earth lodge villages at the mouth of the Knife River upstream of the Mandan

[64] Raymond J. DeMallie and David Reed Miller, "Assiniboine," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 1*, pp. 572-95.
[65] W. Raymond Wood and Lee Irwin, "Mandan," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 1*, pp. 349-64.

villages. It was sometime before this that the Crow people separated from their Hidatsa kin and moved farther west onto the plains.[66] Unlike the Mandans and Hidatsas, the Arikara people speak a Caddoan language that diverged from Pawnee in the distant past. Ancestors of the Arikaras and Pawnees were part of a Caddoan migration up the Mississippi and Missouri Rivers and had established earth lodge villages along rivers in present day Nebraska by the 1400s. By the late eighteenth century the Arikaras lived in a number of villages located near the mouth of the Cheyenne River in present South Dakota.[67]

While coming from distinct cultural backgrounds, the Mandans, Hidatsas, and Arikaras borrowed greatly from one another and development nearly identical village based ecologies and economies. Unlike the Lakotas and Cheyennes who left horticultural traditions behind to become specialized bison hunters, the Three Tribes continued to rely upon agriculture. Each spring women planted corn, beans, squash, and sunflowers. The gardens were in close proximity to the large summer earth lodges. At the height of summer the people would leave their villages for an extended bison hunt. The Mandans traditional hunting grounds extended along the valleys of the Heart and Cannonball Rivers, beyond the Little Missouri and into present Montana. The Hidatsa hunts generally took place across a vast territory north of the Mandans, encompassing much of the western half of North Dakota. Before increased military pressure from the Lakotas, the Arikaras generally undertook two hunts each year, one in early summer and the other in the fall. While bison were the most important game species, men hunted a wide range of other large and small

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[66] Frank Henderson Stewart, "Hidatsa" in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 1*, pp. 329-48.
[67] Douglas R. Parks, "Arikara" in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 1*, pp. 365-90.

game. At the conclusion of the hunt the peoples returned to their summer villages where they tended and harvested crops and conducted trade. The sedentary nature of the Mandan and Hidatsa summer villages made them important trade centers in both the pre-contact and post-contact eras. The villages were important nodes for the dispersal of horses on the Northern Plains and subsequently became the primary sources of corn and other horticultural produces for the specialized bison hunting tribes. I exchange the river tribes got horse and buffalo robes. European and American fur traders also began frequenting the villages beginning in the 1740s. Each fall the peoples once again left their summer villages to winter in smaller, scattered villages. A principal reason for this shift was the depletion of wood around the larger summer villages. In order to obtain firewood and forage for their horses the peoples moved into smaller, more crudely built earth lodges located in heavily wooded riparian areas.[68]

The mixed economy of the Three Tribes that combined horticulture with bison hunting offered security in its diversity, but its sedentary nature also left the peoples more vulnerable to military attack and epidemic disease. As a result, the late eighteenth and early nineteenth century saw horrific population losses, shifting village sites, and a greater association between the tribes. The impact of "virgin soil epidemics," diseases that strike populations without previous exposure and thus little or no inherited immunity, cannot be overstated in the history of Native America.[69] Two smallpox epidemics, one in 1781 and the

[68] Wood and Irwin, "Mandan"; Parks, "Arikara"; Stewart, "Hidatsa."
[69] Alfred W. Crosby, "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America," William and Mary Quarterly 33 (1976): 289-99; Russell Thornton, *American Indian Holocaust and Survival: A Population History Since 1492* (Norman:University of Oklahoma Press, 1990); Anne F. Ramenofsky, *Vectors of Death: The Archaeology of European Contact* (Albuquerque: University of New Mexico Press, 1988).

other in 1837, were the most devastating events in the history of the Three Tribes. In the mid eighteenth century the Mandans probably numbered 9,000, but their population was already in decline when the 1781 epidemic struck. In its wake only 1,000 to 1,500 Mandans remained in two villages. The same epidemic cut the Hidatsa population in half to perhaps 2,000. The period that followed saw increased Lakota and Assiniboine attacks on the vulnerable river tribes. As a result the Mandans and Hidatsas drew closer together. At the time of Lewis and Clarks visit in the winter of 1804-05 three Hidatsa and two Mandan villages were clustered together near the mouth of the Knife River. These villages and their populations remained fairly stable until the second smallpox epidemic in 1837. The Hidatsa population fell by two-thirds to 700. Mandan losses were even worse. About ninety percent of the Mandans perished leaving barely 150 alive. Farther to the south the Arikaras had weathered the first epidemic but after 1800 faced growing conflict with American fur traders and the Army as well as Lakota attacks. In 1832 the Arikaras abandoned their villages on the Missouri and lived for the next two and a half years near the Pawnees on the Loup River in Nebraska. Friction with the Pawnees and fear of a U. S. Army expedition led the Arikaras to slowly return north by 1837, where they lost half their number in the smallpox epidemic. In 1845, most of the Hidatsas and many of the surviving Mandans moved upriver and established Like-a-Fishhook village at an easily defensible bend in the Missouri River. By 1862 Lakota attacks led the Arikaras to join the other two peoples at Like-a-Fishhook. Over the next dozen years many young Arikara men would enlist with the U. S. Army to serve as mail carriers, hunters, and scouts in the campaigns against the Lakotas, Cheyennes, and their allies.[70]

[70] Wood and Irwin, “Mandan”; Parks, “Arikara”; Stewart, “Hidatsa.”

C. THE HORSE-BISON ECOLOGY AND ECONOMY OF THE PLAINS PEOPLES.

The acquisition of horses was one of the greatest catalysts for cultural and environmental change on the plains of Native North America. While the earliest horses evolved in North America, all were extinct at the end of the Pleistocene. In the sixteenth century Spanish Conquistadors brought horses, as well as an Iberian horse culture, to the Americas. In the late 1930s Francis Haines presented a theory of horse distribution and acquisition that remains accepted today. Haines surmised that horses first reached the Native peoples of North America when Indian peoples who had been incorporated into Spanish society absconded with their mounts and the knowledge to care for them. That trickle became a flood with the Pueblo Indian revolt of 1680. Thousands of horses made their way out of New Mexico into preexisting Native trade routes on both sides of the Rocky Mountains. It was through these networks that horse reached as far north as modern Canada by the 1720s.[71]

Before the acquisition of horses, dogs were the only domesticated animals that the pedestrian hunters of the plains possessed. The remains of dogs have been found in archaeological sites on the plains dating back 10,000 years. Archaeological evidence as well as accounts from the historic period indicates that dogs served numerous purposes for Plains peoples. They served as camp guards, alerting residents at the approach of potential threats. In times of necessity they were a ready supplemental food source. Their hides, along with those of wolves and wolf-dog hybrids provided camouflage for pedestrian bison hunters. They were kept as pets. Most importantly, dogs were the principal beasts of

[71] Francis Haines, "Where Did the Plains Indians Get Their Horses?" *American Anthropologist* 40 (1938): 112-17; Francis Haines, "The Northward Spread Horses Among the Plains Indians," *American Anthropologist* 40 (1938): 429-37.

burden, dragging travois and carrying loads attached to them. Hybrid canines were quite large and often capable of carrying loads up to 100 pounds. Even after the acquisition of horses, dogs remained important parts of village life. In the mid-nineteenth century some Lakotas, Cheyennes, and other Plains peoples continued to use dog travois to haul smaller loads. Moreover, dogs retained cultural importance for Plains peoples. Numerous men's and soldier societies were named for dogs, including the Hidatsa age-grade societies the "Little Dogs" and the "Crazy Dogs," as well as the famed Cheyenne warrior society the "Dog Soldiers." [72]

Horses revolutionized the ecological relationships between Native peoples, bison, and the grasslands. The size of dogs, even of the largest hybrids, limited the loads they could carry or drag and the distance they could travel in a day. A large dog train covered only perhaps five or six miles a day and the animals required water on a very regular basis. The size speed and endurance of horses lifted these restrictions. In many ways horses replaced dogs, yet they were much more than simply "big dogs," the literal translation of the Blackfeet word for horse. Horses entailed a fundamentally different trophic relationship with the plains. The grasslands themselves were the largest biomass on the North American continent. Grasses converted the energy of the sun into protein and carbohydrates. All that energy, however, was essentially locked away from human beings, and their dogs, in the form of largely inedible grasses and forbs. To get at that stored

[72] William R. Swagerty, "History of the United States Plains Until 1850," in *Handbook of North American Indians, Vol. 13: Great Plains*, Part 1, 258-60; Gilbert L. Wilson, "The Horse and the Dog in Hidatsa Culture," *American Museum of Natural History Anthropological Papers* 15 (2): 127-311 (New York: American Museum Press, 1924); Frank Gilbert Roe, "From Dogs to Horses among the Western Indian Tribes," *Proceedings and Transactions of the Royal Society of Canada* 33 (1939); William Pferd III, *Dogs of the American Indians* (Fairfax, Va.: Denlinger's Publishers Ltd., 1987).

energy hunting peoples had to kill the bison that could digest the grass. Horses on the other hand were commensal with bison and could tap into the energy reserves of the plains. "The crucial relationship, in short, is not so much between people and their animals," writes historian Elliott West, "It is between people and the things their animals eat."[73]

Horses thus gave Plains people the ability to pursue the bison as specialized hunters. Earlier pedestrian adaptations to the plains were more diversified as foot-going groups were never able to pursue and take bison with certainty. Horses, however, allowed people to cover vast distances in search of bison and trade. They revolutionized the hunt. Individual hunters taking bison from horseback increasingly replaced communal methods, such as arroyo trap and corrals. Finally, the nature of warfare changed. At approximately the same time as horses reached the Plains from the southwest, guns were coming from the northeast. The combination of horses and guns led to the development of distinct warrior cultures across the region.[74]

The new horse-bison economy brought with it three "unbendable rules" for equestrian tribes. First, and most obvious, dedicated bison hunting demanded great mobility throughout much of the year. Bison herds generally stayed within a home range, but their movements within that range were not regular. Rather they were determined by

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[73] Swagerty, United States Plains Until 1850," 260; West *Contested Plains*, 51; Alan T. Osburn, "Ecological Aspects of Equestrian Adaptations in Aboriginal North America," *American Anthropologist* 85 (September 1983): 563-91.

[74] West, *Contested Plains*, 50-51; Preston Holder, *The Hoe and the Horse on the Plains: A Study of Cultural Development Among North American Indians* (Lincoln: University of Nebraska Press, 1970); Frank Raymond Secoy, *Changing Military Patterns of the Great Plains Indians* (Seattle: University of Washington Press, 1953; reprint ed., Lincoln: University of Nebraska Press, 1992); Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *Journal of American History* 90 (December 2003): 833-62.

available water and forage. Finding the herds meant moving constantly.[75] That horses and bison are commensals, with a dietary overlap around 80 %, also increased the demand for mobility. Horses posed direct competition to bison for both forage and water. Keeping large horse herds meant constantly moving in search of pasture. The average Plains Indian village could only remain in one place for a few days.[76] Even then limited forage might dictate other measures. The trader Edwin Denig reported that the Crows, whom he deemed some of the most devoted of horse owners, would drive them up to a dozen miles from camp. This allowed access the better grass but also put the herds at risk and necessitated that young men constantly tend and guard them. But the risk had to be taken. "They must have them [horses] or starve," wrote Denig.[77]

The movement of Plains village was a complicated, but efficient affair. In describing the movement of Crow camps, Edwin Dening wrote, "The baggage is all packed on the horses, at which they are very expert. Kettles, pots, pans, etc., have each their sack with cords attached. These are on the sides of the animal, and on top of the saddle is either one large child fit to guide the horse, or two or three small children so enveloped and well tied as to be in no danger of falling. Often the heads of children are seen popping up alongside of pup dogs or cub bears on the same horse. The lodge occupies one horse and the poles another. The meat and other provisions are put up in bales well secured." The Crows were so "expeditious in packing," that Denig estimated it could take as little as twenty minutes to strike a lodge, pack and get under way. When necessary a Crow camp could traverse

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[75] Bamforth, *Ecology and Human Organization*, 41-52, 67-84.
[76] West, *Contested Plains*, ; Sherow, *Grasslands of the United States*, 43-45.
[77] Edwin Thompson Denig, *Five Indian Tribes of the Upper Missouri*, John C. Ewers, ed. (Norman: University of Oklahoma Press, 1961), 145.

between twenty and forty miles in a day, although generally they moved only about ten to fifteen.[78]

The second rule of life on the Plains for equestrian peoples seems contrary to the first; they had to remain relatively sedentary and in control of vital resource areas at other times, especially during the winter. Between the time that cool season grasses went dormant in the fall and when the new growth began in the spring both bison populations and the amount of energy available in forage declined. Both reached their nadir at the end of each March. This was the resource "bottleneck" that bison faced and so all Plains peoples had to confront (figure 2 above). It can also be understood in terms of Liebig's "Law of the Minimum," that states the success of any organism is not governed by the total amount of critical resources, available, but rather the minimum amount available at any one time. During the winter the type of mobility that equestrian peoples practiced in the summer was simply impossible. The harshness of Plains winters could also make movement dangerous. Instead, Plains peoples established more extended camps in riparian areas where forage, water, timber, and sheltered terrain could be found. Access to these valuable and limited sites led to conflicts between groups and also carried with it an environmental impact. The same bottomlands coveted by Native peoples were also the refuge of the smaller sexually segregated winter bison herds. Competition for forage between horses and bison continued throughout the winter.[79]

The third rule, or necessity, for the equestrian peoples was the ability to access trade in order to acquire the things they could not produce on their own. Horses, bison, and

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[78] Denig, *Five Indian Tribes*, 159.
[79] Bamforth, *Ecology and Human Organization*; Binnema, *Common and Contested Ground* 18-20; West, *Way to the West*, 24-26.

trade were the economic nexus of equestrian cultures. The Crows, for example, participated in trade networks that spanned much of the continent. To the west their principal trading partners were the Nez Perces, Salish, and the Shoshones, from whom they obtained horses and even some items of Spanish manufacture. To the east lay the most important trade centers – the Missouri River villages of the Mandans, Arikaras, and their own relations, the Hidatsas. Here the Crows traded hides and meat for corn, a necessary supplement of carbohydrates for their protein rich diet. They could also obtain a myriad of trade goods of both European and Native manufacture.

While mobility, control over critical resource areas, and trade were components of all Plains cultures, climatic and ecological variables affected the possibilities that different tribes could embrace. Environmental restraints imposed limits on the size of horse herds as well reproductive rates. On the northernmost reaches of the Plains severe winters kept herds to a minimum. The Blackfeet generally owned about a half dozen horses per family, the bare minimum needed. Crees and Assiniboines were forced to trade for horses to maintain adequate numbers. On the southern Plains, however, warm winters and proximity to Spanish settlements in New Mexico and Texas allowed the Comanches to establish a commercial and pastoral empire where the average Comanche family owned several dozen horses and mules. Such prosperity came at a great cost. The sheer number of Comanche horses diminished the forage available to bison and sped the decline of the southern herds. It was on the northern Plains that a more sustainable balance emerged. Severe winters prevented the development of a pastoral economy like that on the southern plains and smaller horse herds had a smaller impact on riparian areas. The Lakotas in the mid-nineteenth century probably owned around twenty horses per household. Still the

bison ecology on the northern Plains between the Missouri River and the Bighorn Mountains remained relatively stable into the 1860s.[80]

D. THE NATIVE ETHNOBOTANY OF THE LITTLE BIGHORN VALLEY

While the hunting of bison and other game were central to the economy and culture of Plains peoples, hunting alone could not sustain life. Native peoples also shared intricate ecological relationships for the flora of the Plains. The traditionally associated tribes of Little Bighorn Battlefield National Monument also relied upon a wide range of the region's flora. Native uses of plants can be divided into three broad categories; food, medicine, and construction materials/technology. Sharply drawn lines did not divide these categories. Native peoples often ascribed spiritual and cultural significance to plants whose use might appear to be strictly utilitarian. Moreover, many species had multiple uses and thus fit in more than one category. This ethnobotanical summary focuses on plants found within Little Bighorn National Monument during survey conducted in 2003.[81]

Riparian Plants

Whenever possible, Plains Indian peoples situated their villages in or adjacent to riparian areas where water and ample floral resources were in close proximity. The most conspicuous plant species along the Little Bighorn, the Plains or Eastern Cottonwood (*Populus deltoides*) was also one of the most important to Native lifeways. Cottonwoods

[80] Hämäläinen, "Plains Indian Horse Cultures"; Pekka Hämäläinen, *The Comanche Empire* (New Haven: Yale University Press, 2008).
[81] Jane H. Bock and Carl E. Bock, "A Survey of the Vascular Plants and Birds of Little Bighorn National Battlefield," CESU Task Agreement CA-1200-99-007, July 2006.

provided shelter and firewood, and by some reports their inner bark was consumed as a human food. More importantly, cottonwood bark was an important winter and supplemental forage for Indian ponies. The Lakotas called the Cottonwood *canya'hu* or *wa'ga'can*, translated as "peel off wood" and "take off wood" in reference to its use as forage. The Cheyennes produced various color dyes from the leaf buds in the spring. Finally, cottonwoods were revered as a sacred plant with the trunk of a carefully selected tree serving as the center pole for the Sun Dance.[82]

Peachleaf Willow (*Salix amygdaloides*) and Sandbar or Coyote Willow (*Salix exigua*) are also found along the course of the Little Bighorn. Willows were commonly used as building materials. Longer poles were the framing material for sweat lodges and other structures. Smaller branches were used to fashion fish and animal traps as well as meat drying racks. Stirrups were often made from willow wood. Among the Cheyennes willow also served medicinal purposes. Willow bark tea was used to treat diarrhea and other intestinal illness, while strips of bark were used as dressings for wounds. Willow bough also served ceremonial and symbolic functions during the Sun Dance.[83] Plains people mixed trade tobacco with other plants. The warrior Wooden Leg explained that Cheyennes generally purchased plugs of chewing tobacco that they then shaved in to thin layers and mixed with the dry inner bark of the willow called kinnikinick.[84]

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[82] Melvin R. Gilmore, *Uses of Plants by the Indians of the Missouri River Region* (Washington, D. C.: Government Printing Office, 1919; reprint ed., Lincoln: University of Nebraska Press, 1991), 20; Kelly Kindscher, *Medicinal Wild Plants of the Prairie: An Ethnobotanical Guide* (Lawrence: University Press of Kansas, 1992), 270; Jeffrey A. Hart, "The Ethnobotany of the Northern Cheyenne Indians of Montana," *Journal of Ethnopharmacology* 4 (1981): 36-37.
[83] Hart, "Ethnobotany of the Northern Cheyenne," 37-38; Gilmore, *Uses of Plants*, 21 Kindscher, *Medicinal Plants*, 196.
[84] *Wooden Leg*, 157.

The Crows were unique in cultivating their own tobacco (*Nicotiana quadrivalvis*) in the area. "This nation has from time immemorial planted tobacco." Wrote Edwin Denig, "They have carefully preserved the original seed discovered with the continent, which produces leaves similar to the cultivated plant in the Western States and has something of its taste and flavor. They believe that as long as they continue to preserve the seed and have in their homes some of the blossom they will preserve their national existence."[85] This sacred tobacco continues to grow in the Bighorn Mountains and Devil's Tower. Modern surveys, however, have not found it in the area of the battlefield.

The understory along the Little Bighorn was characterized by shrubs including Alderleaf Buckthorn (Rhamnus alnifolia), Silverberry (*Eleagnus commutata*), Golden Currant (*Ribes cereum*), and Buffaloberry (*Sheperdia argentea*). Of these, the several species of buffaloberry were most important to the Plains tribes. The Crow people call buffaloberry *baishhesha*, "red face," in reference to its effect on eaters. The Cheyenne name is *mat'si-ta-si'mins*, "red hearted," while the Lakotas call the buffaloberry bush *mas'tinca-pute'-can* or "rabbit lip tree." The fruit of the buffaloberry was eaten raw, cooked, or dried. It was also made into juice, puddings, or a sauce that accompanied buffalo. Until the first frost buffaloberries are hard to pick and bitter, for that reason they were traditionally the last berries of the season to be harvested. Dried and ground buffaloberries were also used for medicinal purposes.[86]

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[85] Denig, *Five Indian Tribes*, 189.
[86] Alma Hogan Snell, *A Taste of Heritage: Crow Indian Recipes & Herbal Medicines* (Lincoln: University of Nebraska Press, 2006), 55-56; Kelly Kindscher, *Edible Wild Plants of the Prairie: An Ethnobotanical Guide* (Lawrence: University Press of Kansas, 1987), 209-13; Kindscher, *Medicinal Plants*, 281-82; Gilmore, *Uses of Plants*, 54; Hart, "Ethnobotany of the Northern Cheyenne," 25.

In addition to the trees and shrubs numerous other species were indigenous to the riparian bottomlands of the Little Bighorn. Several were important due to their nutritional or medicinal value. With the outer covering peeled away, the tender inner flesh of bullrush (*Scirpus acutus*) was eaten by Cheyennes and other Plains peoples.[87] Wild or American Licorice (*Glycyrrhiza lepidota*) had both nutritional and medicinal importance. The roots were roasted and then pounded to separate inedible fibers. The Cheyennes also ate the early shoots of the licorice plant when fresh. The Oglala Lakota used the roots of the plant to treat toothaches and the leaves for earaches while the Cheyennes made a tea to soothe upset stomachs and treat diarrhea. The Oglalas also used licorice to make a poultice that they applied to the sore backs of horses.[88]

Although absent from the modern botanical survey of the monument, historical sources identify boxelder (*Acer negundo*) as a common species in the Little Bighorn Valley. Farther east Plains tribes used boxelder sap to make sugar and its charcoal for painting. It was also reported that the Cheyennes preferred boxelder for firewood due its long lasting coals.[89]

Upland Plants

The many varieties of sage found on the Great Plains were of great cultural importance to the region's native peoples. Five species of sage occur at Little Bighorn Battlefield National Monument; Silver Sagebrush (*Artemesia cana*), Prairie Sagewort or

[87] Hart, 8; Gilmore, 17.
[88] Kindscher, *Edible Wild Plants*, 119-22; Kindscher, *Medicinal Plants*, 113-17; Georg Robert Morgan and Ronald R. Weedon, "Oglala Sioux Use of Medicinal Herbs," *Great Plains Quarterly* 10 (Winter 1990), 25; Gilmore, 40; Hart, 28-29.
[89] Hart, "Ethnobotany," 13.

Pasture Sage (*A. frigida*), Sand Sagebrush (*A. filifolia*), White Sage (*A. ludoviciana*), and Big Sage (*A. tridentata*).[90] All were likely used for medicinal or ceremonial purposes. While Native peoples in the Great Basin and Southwest consumed the seeds of sage species, there is no indication that this was common on the Plains. Finally, sage was historically used for manufacturing purposes as a towel or bedding.

Various sage species were used as a medicinal herb. The Crows call sage *esushgexuwa* [need translation] and recognized its healing power on infections and used it to stop internal and external bleeding. Crows also applied salve of white sage mixed with the neck muscle fat of bison to treat sores. While they have names for seven distinct species, the generic Lakota name for sage is *peji'ho'ta* or "gray herb." White Sage is of particular importance. Its leaves are boiled to make a tea used to treat colds and upset stomachs. This species was also used as a smoke cure for headaches. Among the Cheyennes, the leaves of white sage were crushed and "used as a snuff for sinus attacks, nose bleed, and headaches." One reported Lakota name for pasture sage was *nasula jazanpi ipije*, translated as "no appetite cure," indicating one of its uses, while yet another Lakota name for the same plant is *peji'ho'ta wastemna*, "women's sage" in reference to its use as a cure for irregular menstruation.[91]

The uses of sage for both physical and spiritual cleansing were of great cultural importance for Plains peoples. Crows, Cheyennes, Arapahos, and Lakotas all variously

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[90] Bock and Bock identify the common name Silver Wormwood with *A. filifolia* while the USDA as a second common name for Silver sagebrush *A. cana*.

[91] Snell, A Taste of Heritage, 145-48; Kindscher, *Medicinal Wild Plants*, 47-50; Hart, "Ethnobotany of the Cheyenne," 18-19; Morgan and Weedon, "Oglala Sioux Use of Medicinal Herbs," 25-26; Patrick T. Munson, "Contributions to Osage and Lakota Ethnobotany," *The Plains Anthropologist* 26 (August 1981): 232.

bathed with or smudged with sage. The use of sage species in purification ceremonies was even more significant. Jeffrey Hart has deemed white sage (*A. ludoviciana*) "perhaps the most important ceremonial plant of the Cheyennes." Called *hetane-vano* or "man sage" the use of white sage as incense was common in many Cheyenne purification rites, especially for persons who might have broken a taboo. In historic times Cheyenne contrary warriors "found this sage especially beneficial for purification," while modern day Cheyenne hunters rub sage on their rifles. Sage is widely used during the Sun Dance. Dance leaders used sage smoke on all the participants, while dancers made beds and mats of sage and wore wreaths of sage on their "arms, waists, and heads." The Cheyennes call pasture or fringed sage (*A. frigida*) *he?e-vano?etse* "woman sage" "because of its use in the Sun Dance in connection with the sacred woman."[92] Among the Lakotas sage smoke was likewise used for purification. It was believed to be powerful in driving away evil influences. In similar ways, many Plains peoples used the Rocky Mountain Juniper (*Juniperus scopulorum*) as incense in purification rituals.[93]

Echinacea (*Echinacea angustifolia*) or Purple Coneflower is one of most culturally significant plants found on the uplands of the Little Bighorn Valley, and indeed, was the most widely used medicinal species among all Plains peoples. Melvin Gilmore reported the "universal" use of Echinacea to treat venomous bites and that the plant "seemed to have been used as a remedy for more ailments than any other plant."[94] It was used as a pain reliever and just as commonly to treat respiratory illnesses (colds, coughs, sore throat,

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[92] Hart, "Ethnobotany of the Cheyenne," 18-19
[93] Snell, A Taste of Heritage, 145-48; Kindscher, *Medicinal Wild Plants*, 47-50, 130-35; Morgan and Weedon, "Oglala Sioux Use of Medicinal Herbs," 25-26.
[94] Gilmore, 79.

pneumonia). The Crows call it *Egigeshishibita*, "black root," and it is the root of the plant that produces the strongest medicine. The root could be chewed, or more commonly, used to make a tea. Like the Crows, the Lakotas and Cheyennes used the root of Echinacea to treat various maladies. The Lakotas would also eat the plant's green fruit as a pain reliever. Both Lakotas and Cheyennes chewed the root to produce saliva and relieve thirst. Although the results of modern scientific trials have been mixed, many have suggested the efficacy of Echinacea as a treatment for colds and as an immune system booster. In addition to its medicinal uses Echinacea was also commonly used to make hair combs.[95]

Nearly as widely used as Echinacea, was Yarrow (*Achillea millefolium*). Native names for yarrow illustrate its importance as a medicine. The Cheyennes call it "cough medicine," while one reported Lakota name is *taopi pexuta*, or "wound medicine." The late Crow elder and healer Alma Snell listed yarrow as one of the three medicinal plants she would never be without (Echinacea and bear root were the other two). The Crows used yarrow to treat numerous problems including sunburn, stings and bites (including snakebite), cuts, and open wounds. The leaves could be chewed, applied as a compress, or made into tea. Cheyennes made a medicinal tea from the finely powdered plant for the treatment of colds and coughs as well as nausea. Lakotas dried and chewed yarrow as a wound medicine.[96]

Wild Mint (Mentha arvensis) was widely used in cooking and to make medicinal teas. Many tribes steeped the leaves in water and then drank the tea to relieve gas. The

[95] Snell, A Taste of Heritage, 113-19; Kindscher, *Medicinal Wild Plants*, 85-88; Morgan and Weedon, "Oglala Sioux Use of Medicinal Herbs," 23-24; Hart, "Ethnobotany of the Northern Cheyenne," 20-21.
[96] Snell, A Taste of Heritage, 107-13; Kindscher, *Medicinal Wild Plants*, 17-21; Hart, "Ethnobotany of the Cheyenne," 17-18; Munson, "Osage and Lakota Ethnobotany," 231.

Lakotas also used these teas for colds and upset stomachs. Cheyenne Sun Dancers stood upon mint during the ceremony. In addition, mint was used in making sauces for meats. Another member of the mint family, Beebalm (*Monarda fistulosa*) also known as Wild Bergamot or Horsemint was used as a flavoring and for medicinal teas. The Lakotas and Dakotas used the tea to treat colds, fevers, and sore throats. Likewise the Crows used beebalm tea for respiratory aliments. They called it *aw wa xom bilish bi baba*, "mountain mint." Hart reported that among the Cheyennes, "young men formerly perfumed their horses with it, chewing the leaves and blowing the aromatic properties on the horse."[97]

At least a dozen other medicinal herbs grow in the Little Bighorn valley. Several tribes boiled Curlytop Gumweed (*Grindelia squarrosa*) to make a tea that had numerous applications. The Lakotas used the tea to help people spitting up blood, while the Crows used it for stomachaches and to treat postpartum pain. The Cheyennes also used gumweed to make a topical remedy for scabs and sores. Lakotas used Snakeweed or Broomweed (*Gutierrezia sarothrae*) to treat colds and coughs. The Cheyennes called the Skeleton Plant (*Lygodemsa junca*) *matana'his-se'heyo*, "milk medicine," due to its efficacy in increasing the milk flow of nursing mothers. Puccoon or Narrowleaf Gromwell (*Lithospermum incisium*) was the basis of Cheyenne treatments for both paralysis and delerium. Indeed, the Cheyenne name for the plant translates as "paralysis medicine." The Lakotas used the same species to treat hemorrhaging of the lungs. The Lakotas used Western Wallflower (*Erysimum asperum*) to treat cramps, while by one early report it was a common medicine among the Arikaras. Dakotas used a teas made from Snowberry (*Symphoricarpos*

[97] Kindscher, *Medicinal Wild Plants*, 151-59; Hart, "Ethnobotany of the Cheyenne,"27-28; Munson, "Lakota Ethnobotany," 236; Snell, *A Taste of Heritage*, 60-61; Morgan and Weedon, 29.

occidentalis) to heal sore eyes, while it was a Crow cure for sinus problems and head colds. Prairie Pea (*Psoralea tenuiflora*), also known as Wild Alfalfa, was a Lakota headache remedy. Members of both Lakota and Cheyenne contrary healing societies used Scarlet Mallow (*Sphaeralcea coccinea*). The latter people, who called the plant "sweet medicine," also added it to more bitter medicines to render them more palatable. Although potentially toxic, the Cheyennes mixed Locoweed (*Oxytropis sericea*) with other herbs to create a tea to assist nursing mothers. Pasque Flower (*Anemone patens*) could also be harmful if taken internally, but was used as a symbolic purifying medicine by Cheyenne healers who passed it over the body. Gaura (*Guara coccinea*), was used in an equally symbolic way by Lakotas to improve the chances of catching horses. While there are no reports of False Solomon's Seal (*Smilacina racemosa* and *S. stellata*) being used by Plains peoples, it was a common medicinal herb in both the Great Basin and the Great Lakes region.[98]

Rosa arkansana, the Wild Rose, a common shrub at Little Bighorn had both nutritional and medicinal value. The inner bark, as well as the rose petals and fruit – rose hips – could be boiled in tea to treat diarrhea and stomach trouble. It was also used to make an eye wash to treat snow blindness. The young shoots and petals of the rose bush could be eaten fresh. The Crows, Cheyennes, and Assinboines, however, all warned against consuming too many rose hips as it would cause an "itchy bottom."[99]

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[98] Kindscher, *Medicinal Wild Plants*, 36-40, 118-21, 141-45, 160-63, 175-78, 207-09, 227-28, 243-45, 247-48, 251, 261-62, 265-66, 282-84; Hart, "Ethnobotany of the Cheyenne," 17, 21-22, 29-31, 34; Gilmore, Uses of Plants, 41, 64, 81, 84; Munson, "Lakota Ethnobotany," 234, 235-37, 239; Snell, *A Taste of Heritage*, 149-50; Morgan and Weedon, 23, 29.

[99] Kindscher, *Medicinal Wild Plants*, 189-93; Kindscher, *Edible Wild Plants*, 199-204; Snell, A Taste of Heritage, 51-54; Hart, "Ethnobotany of the Cheyenne," 36; Morgan and Weedon, 29.

While medicinal uses were dominant among the herbs and forbs of the uplands, a number of plants were important food sources. Perhaps the most important of these plants was Prairie Turnip (*Psorlea esculenta*). Sometimes called "Indian Breadroot," turnips were widely used by all of the Native peoples of the Great Plains. According to Melvin Gilmore, "*Psoralea* has so important a place in the economy of the Plains tribes and has had for so long a time that it enters into their mythology, folklore, stories, and sleight of hand tricks." It was also a commodity that Dakota people traded with the Arikaras in exchange for corn. Alma Snell called the turnips the Crow people's "bread food," and stated that their suitability for drying made them critically important to her people. Women and children dug up the bulbs that could be eaten fresh, cooked alone or with other foods, or cut into thin slices and dried for winter use. Turnips were harvested from late May through early July while their tell-tale stems were visible and the bulbs were most palatable. Indeed, several Lakota women were digging turnips west of the river when Major Reno's battalion began its attack on the afternoon of June 25, 1876. Prairie turnips are no longer as common as they were in the nineteenth century and evidence suggests that cattle grazing had a pronounced effect on the plant.[100] A relative of the turnip found at Little Bighorn, Silverleaf Scurf Pea (*Psoralea argophylla*), is not eaten but used in medicinal teas.[101]

Plains peoples harvested other important root vegetables in the Little Bighorn valley, including two species o Wild Onion (*Allium geyeri* and *A. textile*) and Sego or Mariposa Lily (*Calochortus nuttallii*). As with prairie turnips, wild onions were part of the

[100] Kindscher, *Edible Wild Plants*, 183-89; Hart, "Ethnobotany of the Cheyenne," 29-30; Snell, *A Taste of Heritage*, 4-10; Gilmore, Uses of Plants, 40-41; Accounts quoted in Greene, *Lakota and Cheyenne*, (Red Horse) 33, (She Walks) 42.
[101] Hart, "Ethnobotany of the Cheyenne," 29.

diet of nearly all Plains peoples. The bulbs, collected in late fall or early spring, were eaten raw or cooked, and also served as a flavoring for other foods. Onion greens were eaten fresh spring through fall. Crow call wild onions *bitxua* [get translation] and prize it for its strong garlic like flavor. This same pungent quality led to its Cheyenne name *tóhtoo-?e-xaóe-nestavo* or "prairie skunk."[102] The Dakota name for the mariposa lily is *psin tanka* or "big onion." The Cheyennes also collected the lily bubs that were cooked fresh or dried. Dried bulbs were pounded into a fine powder and then made into porridge. Likewise, the Crows made fine flour from the lily bulbs that worked as a thickening agent in stews.[103]

Chokecherry (*Prunus virginiana*) was the most commonly consumed and important fruit for Plains peoples. The ripe berries could be gathered from June to October and were, "pits and all," pounded into cakes for storage. The pounded fruit was also commonly combined with buffalo meat and fat to make pemmican. The Arikaras gathered their own chokecherries but to ensure a supply to meet their needs they also traded corn to the Dakotas in exchange for more of the fruit. Although most important as a food, un-ripened berries were used to treat diarrhea in children, while chokecherry wood was a preferred material for arrow shafts. "The small tree," wrote Alma Snell, "provides food, a medicine, and good wood."[104]

One of the most conspicuous plants in the upland areas of Little Bighorn Battlefield National Monument, the Yucca (*Yucca glauca*), was likewise a versatile resource. While its

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[102] Kindcsher, *Edible Wild Plants*, 12-17; Hart, "Ethnobotany of the Cheyenne," 12; Snell, *A Taste of Heritage*, 12; Gilmore, Uses of Plants, 19.
[103] Kindcsher, *Edible Wild Plants*, 241; Hart, "Ethnobotany of the Cheyenne," 12; Snell *A Taste of Heritage*, 65-66.
[104] Kindcsher, *Edible Wild Plants*, 176-82; Hart, "Ethnobotany of the Cheyenne," 35-36; Snell, *A Taste of Heritage*, 38-42; Gilmore, *Uses of Plants*, 36-37.

spiny appearance could be off-putting, leading the Lakotas to call the plant *hupe'stola* "sharp pointed stem, and to its Crow name *oox'ish bautshua* "deer's awl," Native peoples found many uses for this member of the lily family. The central stalk could be eaten, as could the flower petals in spring. The immature fruit of the yucca could also be cooked. The Lakotas used yucca tea to treat stomachaches. Many tribes used the plant to make soap, hence its colloquial name "soapweed." The Cheyennes used Yucca for a wide variety of skin ailments and as a shampoo. Both the Cheyennes and the Crows reported its efficacy in treating baldness. They, and other Plains peoples, also used yucca flower stalks as fire making drills.[105]

Perhaps the least likely candidate as a food source was *Cirsium undulatum* – the Wavy Leafed Thistle. Except for its painful spines, most of the plant can be eaten. Plains peoples consumed the leaves, flowers, seeds, and roots. According the Jeffrey Hart, among the Cheyennes the thistle is "highly regarded and considered a luxury food" that was consumed during the Sun Dance. Thistle was not as common on the Plains in the nineteenth century and so the Cheyennes would travel to the Bighorn Mountains where the plant was found in greater abundance. Thistle does well in environments disturbed by grazing and is likely more common around Little Bighorn today than in the past.[106]

Plains Indian peoples also consumed two species of cactus occurring at Little Bighorn Battlefield National Monument, Prickly Pear (*Opuntia polyacantha*) and Pincushion

[105] Kindscher, *Edible Wild Plants*, 224-27; Kindscher, Medicinal Wild Plants, 219-23; Gilmore, *Uses of Plants*, 19; Hart, "Ethnobotany of the Cheyenne," 12; Munson, *Lakota Ethnobotany*, 239-40; Snell, *A Taste of Heritage*, 18,20, 169-70.
[106] Kindscher, *Edible Wild Plants*, 84-87; Hart, "Ethnobotany of the Cheyenne,"20.

or Missouri Foxtail Cactus (*Escobaria missouriensis, Corypantha missouriensis*).[107] The fruit, pads, buds and flowers of the prickly pear were all eaten at various times of the year. The Cheyennes, who called the cactus *mah-ta'-o-munst* or "prickly fruit," used the fruit as a thickening agent in stews and the fresh plant as a source of emergency water. In addition to eating fresh prickly pear, the Lakotas also used the plant in medicinal teas. Crow people collected and ate the both the sweet ripe fruits and the green fig like core of the Missouri Foxtail cactus while fresh.[108]

Several other upland plants found at Little Bighorn served both as food and medicine. The roots of Prairie Clover (*Dalea candida*) could be eaten raw and its leaves made into a tea. Lakota and Dakota people used the tea to treat stomachaches and other ailments.[109] The Sunflower (*Helianthus annuus* seeds were eaten raw, cooked, or dried. While many peoples gathered wild sunflowers, the Mandans, Hidatsas and Arikaras cultivated the plant. Lakotas boiled sunflower heads to make a treatment for pulmonary ailments.[110] Both the greens and the seeds of the Pitseed Goosefoot or Lambs Quarters (*Chenopodium berlandieri*) were consumed. The immature pods of the Groundlplum Milkvetch (*Astragalus carssicarpus*), eaten raw or cooked, were a minor food source for Plains peoples.[111]

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[107] Bock and Bock (2006) list Pincushion and Missouri Foxtail Cactus as distinct species while the USDA considers them as a single species.
[108] Kindscher, *Edible Wild Plants*, 104, 154-56; Hart, "Ethnobotany of the Cheyenne," 16-17; Munson, *Lakota Ethnobotany*, 236; Snell, *A Taste of Heritage*, 50-51.
[109] Kindscher, *Edible Wild Plants*, 109-11; Kindscher, *Medicinal Wild Plants*, 80-83
[110] Kindscher, *Edible Wild Plants*, 123-28; Kindsher, *Medicinal Wild Plants*, 253-54; Gilmore, *Uses of Plants*, 78; Morgan and Weedon, "Oglala Sioux Use of Medicinal Herbs," 29.
[111] Kindscher, *Edible Wild Plants*, 60-63.

While this ethnobotanical survey is focused upon plants indigenous to the Little Bighorn Valley it is important to note that Native peoples also incorporated introduced species as both foods and medicine. One example is the ubiquitous Common Dandelion (*Taraxacum officinale*). A Eurasian native brought to the Americans by early European immigrants to supply food for honey-bees, it spread rapidly across the entire continent. There are no historic accounts of dandelions present at the Little Bighorn at the time of the battle, but the plant still might have been present; it certainly was soon afterward. "Despite the many medicinal uses," wrote the late Crow author Alma Snell, "we mostly thought of the dandelion as a little extra food when I was growing up." Crow people picked and ate the leaves and flowers fresh or used them in soups. Dandelion preparations were used to treat warts as well as liver and kidney ailments.[112] As the many uses of the dandelion illustrate, the Native peoples of the Plains demonstrated a constant ability to adapt to the environmental changes around them.

E. THE LITTLE BIGHORN REGION AS A NINETEENTH CENTURY BORDERLAND.

Through the course of the nineteenth century the horse-bison economy of Plains Indian peoples reached its peak and then declined as the numbers of the animal it depended on spiraled downward. The decline did not occur evenly across the plains. It was felt first in the east and then the south. Other areas, however, saw bison numbers remain more stable well into the century. Eastern Montana, including the Little Bighorn Valley was one of those areas. The ecology of the Northern Mixed grasslands was certainly part of the equation. Bison, antelope and other grazing species thrived and drew numerous Native

[112] Snell, *A Taste of Heritage*, 24, 131.

groups to the region. Intertribal conflict over access to the resource created a dangerous borderland. The ecology of the area, intertwined with the history of Native peoples and the expansion of the United States, created a game preserve of sorts. From this perspective, in addition to its political and military causes, there was an environmental reason that the Battle of the Little Bighorn took place where it did.

Across North America one of the most important ecological consequences of the chronic intertribal warfare was the maintenance of what historians and anthropologists have variously called "debateable zones," "neutral zones," or "borderlands." The concept emerged from the observation that warfare operated as a mechanism to preserve game in contested regions. The anthropologist Harold Hickerson described these areas as "a zone that hunters entered only when prepared or war."[113] As long as warfare persisted and no group could control an area outright, game could not be overhunted. In the 1820s and 1830s much of the Central Great Plains between the Platte and the Arkansas rivers was such a neutral zone. Here, Comanches, Kiowas, Cheyennes and Arapahos all vied for control of the bison resource. Chronic warfare between the tribes limited the effectiveness of the hunts and the kill until the great peace of 1840 brought all of these peoples into alliance. With the threat of warfare removed the pace of hunting increased and bison numbers

[113] Harold Hickerson,"The Virginia Deer and Intertribal Buffer Zones in the Upper Mississippi Valley," in Anthony Leeds and Andrew P. Vayda, eds., *Man, Culture, and Animals: The Role of Animals is Human Ecological Adjustments* (Washington, D. C.: American Association of the Advancement of Science, 1965), 43-66; Harold Hickerson, *The Chippewa and Their Neighbors: A Study in Ethnohistory* (New York: Irvington Publishers, 1970), 96-98; Richard White, *The Roots of Dependency: Subsistence, Environment, and Social Change Among the Choctaws, Pawnees, and Navajos* (Lincoln: University of Nebraska Press, 1984) 8-10; West, *The Way to the West*, 61-63.

began to fall.[114] No great victory or peace, however, had changed the military-political situation in the Powder River and Yellowstone buffalo country by the early 1870s. The Little Bighorn Valley in particular remained an attractive but dangerous place. The bison herds could still sustain native peoples, but could only be accessed by small, daring groups of hunters, or by much larger villages always prepared for the possibility of war. Such was the situation in the spring of 1876.

Until 1876 there are no specific accounts of the landscape of the Little Bighorn battlefield. There are however, more general sources that portray the region and its environmental history. Historical observations of the area began with the Lewis and Clark expedition which ascended the Missouri River in 1805 and returned in 1806, with Meriwether Lewis essentially retracing the route down the Missouri while William Clark led the rest of the party down the Yellowstone.[115] On their outbound trip the expedition encountered few Native people between the Mandan villages and the Forks of the Missouri. They did, however, encounter and abundance of wildlife. On April 28, 1805, near the confluence of the Yellowstone and the Missouri Rivers, Lewis wrote, "we saw great quantities of game today; consisting of the common and mule deer, Elk, Buffaloe, and Antelopes; also four brown bear." He also noted the activities of beaver. In the days that followed the party reported similar scenes and sighted wolves and black bears in addition to the almost constant presence of grazers.[116] Paul Martin and Christine Szuter have argued that the abundance of game reported by Lewis and Clark along the upper Missouri and

[114] West, *Way to the West*, 61-66; Flores, "Bison Ecology and Bison Diplomacy."
[115] John L. Allen, "Landscape Change at the Confluence: From Lewis and Clark to the Present," *North Dakota History* 69 (2002): 2-23.
[116] Gary E. Moulton, ed., *The Definitive Journals of Lewis & Clark, Vol. 7:From Fort Mandan to Three Forks* (Lincoln: University of Nebraska Press, 1987), 81-87.

Yellowstone drainages was not a reflection of the rich environment, but rather of the contested nature of the area.[117]

During the return journey, William Clark's party reached the mouth of the Bighorn River on July 26th 1806. Clark took one man with him and hiked up the Bighorn about seven miles to the mouth of Tulloch Creek. In his journal Clark recorded that the extensive bottoms of the Bighorn were covered in Cottonwood, "under which there grows great quantities of rose bushes." He found the current to be swift, and "like the Missouri it washes away its banks on one side while it forms extensive sand bars on the other." Clark did not reach the Little Bighorn but reported what other Native peoples had told him of the upper reaches of the Bighorn drainage;

> Buffalow, Elk, Deer and Antelopes are plenty and the river is said to abound in beaver. it is inhabited by a great number of roveing Indians of the Crow Nation, the paunch Nation and the Castahanas all of those nations who are subdivided rove and prosue the Buffalow of which they make their principal food, their skins together with those of he Big horn and Antilope serve them for clothes.[118]

Game was apparently abundant along the Bighorn, for when Clark returned to camp he found that the men had killed "2 bull & 3 Elk."

The decades after Clark's visit saw the advent of the American fur trade on the upper Missouri. Crow people both actively hunted beaver for the trade and served as desperately needed military allies for Euro-American trappers who otherwise would be

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[117] Paul S. Martin and Christine R. Szuter, "War Zones and Game Sinks in Lewis and Clark's West," *Conservation Biology* 13 (February 1999): 36-45.
[118] Gary E. Moulton, ed., *The Definitive Journals of Lewis & Clark, Vol. 8: Over the Rockies to St. Louis* (Lincoln: University of Nebraska Press, 1993), 231-32.

easy targets for the Blackfeet. The establishment of American Fur Company posts in the Crow country beginning in the mid-1830s encouraged that people to engage in the commercial buffalo robe trade. According to Edwin Denig, before that time the Crows had to transport their furs to the Arikara and Mandan villages and "hunted nothing but beaver, the skins of which were then valuable and easy of transportation." "They had not yet turned their attention to preparing buffalo robes for sale," he wrote, "making only a sufficiency for the use of themselves and families." The construction of a post at the mouth of Rosebud Creek changed all that. In addition to turning the Crows commercial hunting toward the buffalo, Denig reported that the forts also served to "restrict their wandering habits." Some Crow bands chose to remain in camp near the fort throughout the fall and winter to kill and process buffalo. Using Fort Union, built in 1828 at the mouth of the Yellowstone as a base of operations, the American Fur Company operated some half dozen trading posts located on the middle Yellowstone to encourage the robe trade.[119]

Much of the Crow homeland became increasingly dangerous during the course of the nineteenth century as Lakotas and Cheyennes fought the Mountain Crows for control of the rich bison grounds of what is today southeastern Montana. The drainages of the Powder and Tongue Rivers straddling the modern states of Wyoming and Montana became the most hotly contested ground. Constant raiding kept the Crows from breeding enough horses to meet their needs. To replenish their herds they traded with the Shoshones, Salish, and Nez Perces. This horse trade in turn deepened their involvement in the commercial fur

[119] Denig, *Five Tribes*, 184-85, 201.

trade, as they depended upon white traders for the manufactured goods sought by the Western tribes.[120]

By 1851 the overland migration of Euro-Americans to Oregon and California was at flood stage and the United States sought to exert greater control over the Native Peoples of the Central and Northern Plains. In September, a small U. S. delegation led by David D. Mitchell and Thomas Fitzpatrick met with over 10,000 Native people near Fort Laramie. The resulting Fort Laramie Treaty of 1851 was supposed to be a grand solution to intertribal conflicts and pave the way for the extension of U. S. control over the region. By the terms of the treaty the Little Bighorn Valley as well as the contested Powder River country were recognized as Crow Territory. [121]

[120] Denig, *Five Indian Tribes*, 144-147.
[121] Treaty of Fort Laramie, September 17, 1851, 11 Stat. 749.

Figure 3. Map of Tribal Territories set out by the Fort Laramie Treaty of 1851, by Fr. Pierre Jean De Smet. Source: Library of Congress. The original orientation of the map was vertical.

The Fort Laramie Treaty of 1851 did not, however, end conflicts on the Northern Plains. To the contrary, the two decades after the treaty saw increased intertribal competition to control the rich bison grounds of the Powder River Country. Although great changes had taken place by the mid-1850s, Edwin Denig could still call the valleys of the Yellowstone and its tributaries east of the mountains, "perhaps the best game country in the world." He boasted that buffalo were always to be found in "immense herds," along with plentiful elk, deer, and antelope.[122]

[122] Edwin Thompson Denig, *Five Indian Tribes of the Upper Missouri*, John C. Ewers, ed. (Norman: University of Oklahoma Press, 1961), 139.

The increasing encroachment of Euro-Americans complicated the situation further. The discovery of gold in western Montana led to the establishment of the Bozeman Trail which cut directly through the Power River country and crossed the Little Bighorn River near the modern Wyoming-Montana border. The resulting conflict between the United States and the Lakota-Cheyenne alliance was known as Red Cloud's War, after its most famous leader. The alliance succeeded in shutting down the trail and closing the three forts that the United States had built along its course. In 1867 and 1868 a series of new treaties was negotiated at Fort Laramie. By the terms of the Crow Treaty the Little Bighorn Valley was part of their reservation. The Lakota Fort Laramie Treaty of 1868 created the Great Sioux Reservation that encompassed all of South Dakota and a strip of southern North Dakota west of the Missouri River. Importantly the treaty also guaranteed that the "country north of the North Platte river and east of the summits of the Big Horn mountains shall be held and considered to be unceded." In effect the Powder River Country would remain a Native hunting ground. Between 1868 and 1876 many Lakotas moved toward the agencies established on the reservation. Other Lakotas, along with their Cheyenne and Arapaho allies, chose to remain in the unceded territory and the lands lying to the north. These bands, led by, among others, the Hunkpapa Sitting Bull and the Oglala Crazy Horse, could remain in this long contested territory because of the survival of viable bison herds. It was a second gold rush in 1874, this time to the Black Hills, which set off an illegal invasion of the Great Sioux Reservation as well as the spiral of events that would lead to the collision between the Lakota-Cheyenne-Arapaho alliance and the United States Seventh Cavalry along the Little Bighorn in June of 1876.[123]

[123] For overviews of the Northern Plains wars see, Robert M. Utley, *The Indian Frontier of*

The Little Bighorn Valley in the mid-1870s was not an untouched wilderness, but a landscape shaped by human and non-human forces. Geologic, climatic, and ecological forces that existed outside of human agency set many of the basic conditions. The presence of human cultures using hunting and fire also affected the valley and surrounding regions. The reintroduction of the horse to the Americas revolutionized the lives of many Native societies. These peoples seized the opportunities that the horse-bison economy presented. In turn they influenced the grasslands and riparian areas of the Plains. By the 1850s and 1860s the United States began to encroach upon Native lands. Treaty making and wars would follow. By the 1870s the plains of southeastern Montana remained as one of the last refuges for substantial bison herds. The valley of the Little Bighorn was a contested ground both between Native groups and between some of these peoples and the United States.

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the American West, 1846-1890 (Albuquerque: University of New Mexico Press, 1983), and Ostler, *The Plains Sioux and U. S. Colonialism*. Treaty with the Sioux – Brule, Oglala Miniconjou, Yanktonai, Hunkpapa, Blackfeet, Cuthead, Two Kettle, San Arcs, and Santee – and Arapaho, April 29, 1868, 15 Stat. 635; Treaty of Fort Laramie with the Crows, May 7, 1868, 15 Stat. 649.

CHAPTER 2: AN ENVIRONMENTAL HISTORY OF THE BATTLE OF THE LITTLE BIGHRON AND THE GREAT SIOUX WAR OF 1876-77.

This chapter addresses the Battle of the Little Bighorn with two central goals in mind: to provide an environmental context for the engagement as well as the larger struggle over the Northern Plains in the years after the Civil War, and to present a composite historical picture of the ecology and landscape of the battlefield. Environmental history can provide a deeper understanding and fuller context for the conflict. How topography and ecology impacted the course of the actual fight is just one part of the story. The environmental impact of Euro-American expansion was a critical factor in bringing on the Great Sioux War. Moreover, Plains Indian peoples and the U. S. Army engaged the natural world in fundamentally different ways that shaped how, where, and when they fought. Native and soldier accounts of the battle also differ in substantial ways, but taken together they provide a window on the environmental condition of the Little Bighorn battlefield in June of 1876.

I. The Political, Military, and Environmental Context of the "Great Sioux War."

As a singular event, the Battle of the Little Bighorn is the reason for the establishment and existence of the national monument. Yet, no historical event can be fully understood outside of the larger context in which it took place. The "Great Sioux War" of 1876-1877 and the Battle of the Little Bighorn were part of a larger and much longer struggle to control the Northern Plains. Much has been written about the political and military aspects of the conflict, but far less emphasis has been placed on the environmental

issues at its heart. This portion of the report will explore the ways in which environmental changes and the environmental concerns of both Native peoples and white Americans shaped the political and military struggle on the Northern Plains.

A. EURO-AMERICAN EXPANSION AND FEDERAL INDIAN POLICY ON THE PLAINS, 1851-1866.

The decade and a half following the Fort Laramie Treaty of 1851 saw the growing presence of Euro-Americans on the Great Plains and with it came conflicts over land and resources. At the beginning of this period Native hunters vied for control of vast buffalo grounds stretching from modern day Texas to Montana. By the close of the American Civil War, however, the ranges of the great herds were divided and reduced. Intertribal and inter-racial conflicts came to focus on an increasingly limited number of areas. Environmentally, politically, and militarily, the "Powder River country," including the Little Bighorn, became the most important of these contested areas on the Northern Plains.

The overland migration to Oregon and California that had begun in earnest by 1840 exploded with the 1848 discovery of gold in California and peaked i 1852 when 60,000 emigrants crossed the plains in a single summer season. Ultimately, between 1840 and 1860 over 250,000 emigrants driving with them some 1.5 million head of livestock made the overland trek.[124] Although the emigrants passed through only during the summer travel season and remained largely confined to the fairly narrow corridors of the Platte River road east of South Pass, their environmental impact was substantial. The Native

[124] John D. Unruh, *The Plains Across: The Overland Emigrants and the Trans-Mississippi West, 1840-1860* (Urbana: University of Illinois Press, 1979), 119-20.

peoples, including Lakotas, Cheyennes, Arapahos, and Shoshones, who lived closest to the trail felt the greatest impact. While the emigrants killed game and burned firewood, their livestock competed directly with bison and Indian pony herds for forage. Less than three years after the 1851 treaty, violence flared between the Lakotas and the United States over an incident along the trail. After some Lakotas butchered an emigrant's cow that had wandered into their camp, Lt. John L. Grattan led small force from Fort Laramie to arrest the "guilty" parties. The Brulé Lakota leader Conquering Bear attempted to defuse the situation but was mortally wounded when the soldiers opened fire. In the resulting melee Grattan and his entire command were wiped out. The "Grattan Massacre" was the opening act in the so-called First Sioux War. A nominal peace was restored by 1856, but tense relations continued between the United States and Lakota peoples for years to come.[125]

As disruptive and damaging as the overland migration might be, its impact paled in comparison to the effect of gold rushes that brought permanent large-scale Euro-American settlement and intensified the competition for critical resources across the Plains. Three successive gold rushes shaped the struggle between Native peoples and the United States for control of the central and northern Plains that culminated in the Great Sioux War of 1876-77. The discovery of viable placer deposits near what became Denver, Colorado, in the summer of 1858 began the "Pike's Peak" gold rush and led to over a decade of struggle and bloodshed that engulfed Cheyenne, Arapaho, and Lakota peoples. Four years later

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[125] Jeffrey Ostler, *The Plains Sioux and U. S. Colonialism from Lewis and Clark to Wounded Knee* (New York: Cambridge University Press, 2004), 40-43; Robert M. Utley, *Frontiersmen in Blue: The United States Army and the Indian, 1848-1865* (New York: Macmillan, 1967; reprint ed., Lincoln: University of Nebraska Press, 1981), 113-15; Robert Wooster, *The American Military Frontiers: The United States Army in the West, 1783-1900* (Albuquerque: University of New Mexico Press, 2009), 135-38.

similar discoveries sent thousands of Euro-American miners streaming into what was then the northeast portion of Idaho Territory, but would soon become a new territory in its own right, Montana. The most direct route to the Montana mines took prospectors directly through the richest and most contested Native hunting grounds on the Plains. Finally, the Seventh Cavalry's 1874 expedition into the Black Hills confirmed the presence of rich gold deposits and led to an illegal invasion of the Great Sioux Reservation and set the immediate conditions fo the Great Sioux War.

The struggle to control the Plains occasioned by these rushes was as much environmental as it was military and political. Historian Elliott West has ably demonstrated that the Great Plains were not a barren obstacle to be cleared on the way to the mines, but rather, contained strategic and contested resource areas. As outlined in the previous chapter the horse-bison economy of the Plains peoples depended upon a particular set of ecological relationships and the ability to access critical resources at specific times of the year. Plains groups had to remain mobile and pursue the herds from late spring through fall. Conversely, winter demanded that people remain fairly sedentary in sheltered riparian areas where water, wood, and forage were readily available. This demand put Plains peoples and their horse herds into direct competition with the bison herds, but also with Euro-Americans who sought to control the very same areas to facilitate travel and commerce. It was not a coincidence that when violence first flared it was related to struggles to control critical resource areas.[126]

[126] Elliott West, *The Contested Plains: Indians, Goldseekers, and the Rush to Colorado* (Lawrence: University Press of Kansas, 1998).

On the central Plains the rush to Colorado led to growing conflicts and the Sand Creek Massacre of November 1864, which in turn engulfed the central and southern plains i a brutal war for the next five years. It was during these years that the Seventh Cavalry was formed at Fort Riley, Kansas, in 1866, and Lt. Col. George Armstrong Custer took the field for the first time in pursuit of Plains Indians. Custer's regiment participated in "Hancock's War" during the summer of 1867 and in November of 1868 attacked Black Kettle's Cheyenne village on the Washita River.

The attack on Black Kettle's village illustrated a standard, and environmentally rooted, tactic in warfare against Plains peoples. Highly mobile and nearly impossible to catch in summer, Plains villages remained sedentary, and vulnerable, in winter. From the Bear River in Idaho, to Sand Creek, to the Washita, to the Marias River, and eventually the attack on Dull Knife's village in November 1876, military leaders understood the basic ecological fact that Native peoples in the West could be caught and defeated when the season demanded they stay put.

The first gold strikes in Western Montana occurred in the winter of 1860-1861. Word of the find reached the Colorado gold fields and drew many anxious prospectors, including John M. Bozeman. The initial routes to the Montana diggings were circuitous, either ascending the Missouri River by boat or following the Oregon Trail to Fort Hall, Idaho, before turning north toward Montana. Bozeman made his first attempt to blaze a more direct route to Montana from the North Platte River in the winter of 1862-1863 and it nearly cost him his life. After being disarmed and dismounted by Lakotas on the Powder River, he and his partner, John M. Jacobs, wandered barefoot for days before reaching safety. Bozeman then attempted to lead a wagon train over his envisioned route later that

spring, only to be turned back by Lakotas and Cheyennes who had no intention of letting large parties of emigrants cross the coveted buffalo grounds east of the Bighorn Mountains. Most of the party found different routes to Montana, but Bozeman could not be dissuaded. Leading a small party and travelling mostly at night he finally completed the journey along what was initially known as "Jacobs and Bozeman's Cut-off," in May of 1863. During 1864 several wagon trains, two led by Bozeman himself, successfully made the trip along the Bozeman Trail.[127]

As traffic along the trail increased Native resistance grew leading the United States to attempt alternately both military conquest and diplomacy. In the late summer of 1865, Brig. Gen. Patrick Edward Connor led a three-pronged offensive against the Lakotas, Cheyennes, and Arapahos between the Bighorn Mountains and the Black Hills. The only major engagement of the campaign took place at the end of August on the Tongue River near modern Ranchester, Wyoming. There, Connor was able to successfully strike the Arapaho village led by Black Bear. Otherwise, fruitless and frustrating pursuit of an elusive enemy marked the Army's efforts. The Lakotas, Cheyennes, and Arapahos had not been defeated, but rather spurred to greater resistance.[128] It was in this context that the federal government attempted a peaceful resolution to the conflict, inviting the Lakotas, Cheyennes and Araphos to a treaty council at Fort Laramie in the in June 1866. But as treaty commissioner E. B. Taylor distributed presents and argued for new treaty, fresh troops arrived at Fort Laramie with orders to build forts at strategic points along the Bozeman

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[127] Grace Raymond Hebard and E. A. Brininstool, *The Bozeman Trail: Historical Accounts of the Blazing of the Overland Routes into the Northwest and the Fights with Red Cloud's Warriors* (Cleveland, A. H. Clark Company, 1961), 214-21.
[128] Utley, *Frontiersmen in Blue*, 322-32.

Trail. While some Lakotas agreed to a treaty, most, including the soon to be famous Oglala war leader Red Cloud, left in disgust, committed to fight the soldiers and close the trail. Before leaving the council grounds Red Cloud called out the government's deceit, saying, "The Great Father sends us presents and wants us to sell him the road but White Chief goes with soldiers to steal the road before Indian say Yes or No."[129]

B. RED CLOUD'S WAR AND THE FORT LARAMIE TREATIES OF 1867-1868.

From an environmental perspective "Red Cloud's War" is best understood as a "war to save the buffalo." Older historical accounts of the conflict emphasized the struggle to hold back Euro-American expansion and cast the conflict as a territorial war. This approach obscures the environmental reasons behind Lakota, Cheyenne, and Arapaho efforts to close the trail, namely they equated the presence of whites with the decline of the bison herds. As early as the 1850s many Lakota worried that Euro-American hunting was at fault, or that the simple presence of whites "scared off" the bison. At numerous councils Native leaders made it clear that they did not want whites passing through the buffalo grounds and that the Bozeman Trail must be closed principally to preserve their hunts.[130]

The major military actions of Red Cloud's War were aimed at the forts along the Bozeman Trail. Col. Henry B. Carrington led a battalion of infantry north along the trail in June 1866, and at the crossing of the Powder River established Fort Reno on the site of a

[129] Utley, *Indian Frontier*, 99-102.
[130] Dan Flores, "Wars Over Buffalo: Stories versus Stories on the Northern Plains," in Michael E. Harkin and David Rich Lewis, eds., *Native Americans and the Environment: Perspectives on the Ecological Indian* (Lincoln: University of Nebraska Press, 2007), 153-70; Jeffrey Ostler, "'They Regard Their Passing as Wakan:' Interpreting Western Sioux Explanations for the Bison's Decline," *Western Historical Quarterly* 30 (1999): 475-97.

previous post. By mid-July construction began on Fort Phil Kearney at the forks of Piney Creek, near modern Story, Wyoming. One month later, the final post, Fort C. F. Smith was established where the Bozeman Trail crossed the Bighorn River. All of the posts drew the ire of the combined Lakota, Cheyenne, and Arapaho forces, but none more than Fort Phil Kearny, which became Carrington's headquarters and the site of the war's most famous engagement. The stockaded forts were hard targets, but they were not self-contained. In an ecological sense, they needed to consume energy drawn from the local environment in the form of firewood and forage. The small parties of soldiers and civilians who had to leave the forts to obtain these resources became the targets of Native attacks. Short on manpower and resources and thus unable to take offensive action against their enemies, the soldiers soon became virtual prisoners of their own forts. On December 21, 1866 a Lakota decoy party attacked a wood cutting party north of the Fort Phil Kearney. Disobeying explicit orders not to pursue the fleeing Indians once h relived the wood cutting party, Capt. William J. Fetterman led his force of just over 80 men into a trap manned by over 1,500 warriors. None of Fetterman's command survived. What the Lakotas called *Wasicu Opawinge Wicaktepi*, "They Killed One Hundred Whites," became known as the "Fetterman Massacre" among Euro-Americans and shocked the nation. It was not the last major fight in the conflict – the Hayfield Fight near Fort C. F. Smith and the Wagon Box Fight a short distance from Fort Phil Kearny both took place in early August 1867 – but it was the most influential in shaping reactions toward the Indians.[131]

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[131] John H. Monnett, Monnett, *Where a Hundred Soldiers Were Killed: The Struggle for the Powder River Country in 1866 and the Making of the Fetterman Myth* (Albuquerque: University of New Mexico Press, 2010); Utley, *Frontier Regulars*, 93-107; Utley, *Indian Frontier*, 103-06; Hebard and Brinstool, *The Bozeman Trail*, 263-46; Ostler, *The Plains Sioux*

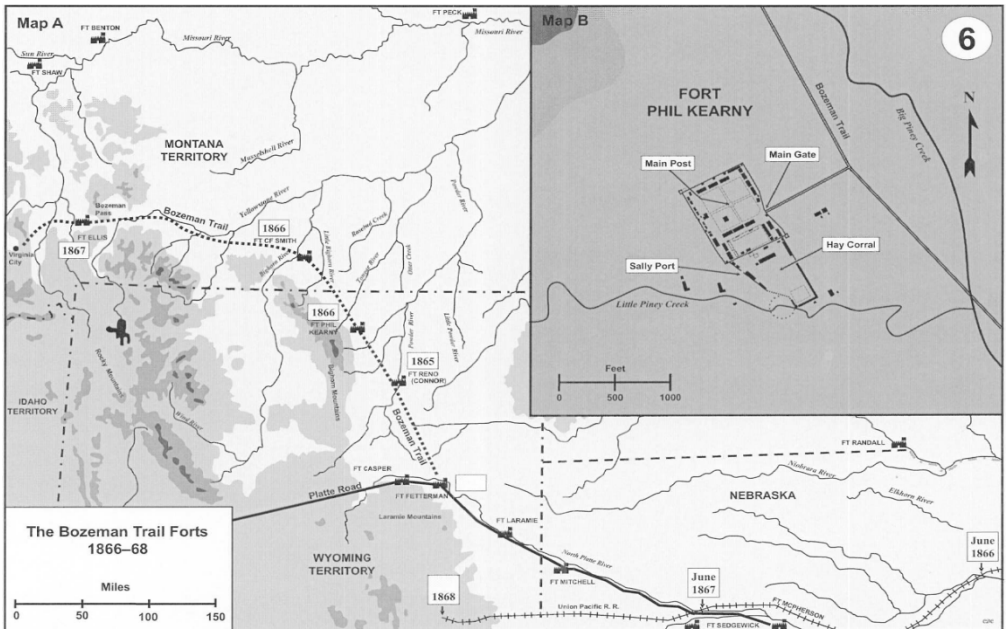

Figure 4. The Bozeman Trail and Forts. Source: *Atlas of the Great Sioux War*.

While Gen. William T. Sherman would have preferred to launch a full-scale retaliatory campaign, the social and political climate in a nation emerging from the Civil War and still questioning the slaughter at Sand Creek simply would not allow it. In fact, two separate investigations laid the blame for the conflict squarely at the feet of the United States and its citizens. Just over a month after the Fetterman fight a joint special committee of Congress chaired by Sen. James R. Doolittle of Wisconsin released its findings in a report titled, "Condition of the Indian Tribes." Formed in the wake of the Sand Creek Massacre, the committee's work was less than popular among Euro-Americans on the Plains. When he

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45-47. Older accounts dating back to Mari Sandoz's *Crazy Horse* have identified Crazy Horse as a leader of the decoy party. Citing the fact that none of the Native accounts of the battle have mentioned the Lakota leader, John Monnett has called these accounts into question.

addressed a gathering in Denver in regard to the "Indian problem" in July 1865, Doolittle was famously shouted down with chants of "exterminate them!" But the committee had support in other quarters away from the frontier. Its findings and recommendations reinforced Eastern ideas of civilian oversight of Indian affairs and reservations. The committee found that conflicts in the west almost always resulted from the "aggressions of lawless white men" and called for secure reservations as the only possible solution to the conflict. The report included proposed legislation to create boards of inspection of Indian affairs" to investigate and root out abuses. Echoing the popular perceptions of the time the committee found that Native peoples on the frontier were "rapidly decreasing" due to numerous factors, not the least of which was contact with disreputable whites. But there was also another, environmental, reason for their decline; the loss of hunting grounds and the buffalo. Beyond identifying the problem, however, Doolittle suggested no course of action to preserve Native hunting. Like nearly all white Americans of his age, whether sympathetic or hostile to Native peoples, he believed that "primitive" Indian ways must necessarily give way in the face of "civilization." While the Doolittle report had no immediate legislative effect, it influenced Eastern humanitarian reformers' shifts in federal Indian policy.[132]

The second report came from a peace commission charged with investigating the specific causes of the Fetterman debacle and answerable to the President and the Secretary of the Interior. Army officers made up the majority of the commission that was chaired by Gen. Alfred Sully. Sully was a fixture on the Frontier who had led troops against the Dakotas

[132] U. S., Senate, "Condition of the Indian Tribes," 39th Cong., 2nd sess., Report No. 156 January 26, 1867; Francis Paul Prucha, *The Great Father: The United States Government and the American Indians* (Lincoln: University of Nebraska Press, 1984), 485-88.

during Little Crow's War in 1862 and later married a Yankton Sioux woman. The Sully commission findings buttressed Doolittle's report. After meeting with Lakota bands the commission determined that the Indian wanted peace, but that the Army's 1867 offensive on the central plains as well as continuing encroachment into prime hunting grounds had led to the hostility. Ultimately the commission recommended that the Bozeman Trail be closed, the posts along it abandoned, and some 80,000 square miles of what is today eastern Wyoming and southeastern Montana be set aside for the tribes.[133] Of course, there were other factors that led the United States to give up the conflict. These included a general desire to reduce the size and cost of the military, the ongoing military occupation of the South during Reconstruction, and a greater value placed on protecting the construction of the Union Pacific Railroad along the Platte.[134]

With the Doolittle and Sully reports as ammunition, Commissioner of Indian Affairs Nathaniel G. Taylor pushed Congress with plans to create a great "Indian Peace Commission." The commission's membership was split between the military, including generals Sherman and Alfred H. Terry (who commanded the Dakota column in 1876), and civilians such as Sen. John Henderson and Commissioner Taylor. The commission negotiated treaties across the West, but its true focus was the Great Plains. The basic strategy was to negotiate a series of treaties that would create reservations both north and south of the main travel corridors of the central plains. The powerful buffalo hunting groups could then be confined to reservations where the work of assimilating them into

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[133] U. S., Senate, *Annual Report of the Secretary of War, 1867*, 40th. Cong. 1st sess., No. 13, 65-68. CHECK THIS; Utley, *Indian Frontier*, 108-09.
[134] Ostler, *Plains Sioux*, 46-47.

American society could begin.[135] After successfully negotiating three treaties with Southern Plains peoples at Medicine Lodge Creek in October 1867, the commissioners turned their attention to the north. They believed that no northern treaty could succeed without Red Cloud's assent, but the rising Oglala leader refused to attend council sessions. The Commissioners did meet, however with the Crow people who remained both allies of the United States, and besieged by the Lakotas and Cheyennes. Like Lakota and Cheyenne leaders, the Crow leaders linked the decline in herds to white encroachment. "Your young men scare away the game and I have none left," said Bear's Tooth, they "have destroyed the young grass and have set the country on fire. They kill the game, not because they want it. They leave it to rot on the roadside." Black Foot added, "The whites have made two branches of a road besides the California [Oregon Trail] and have cut up the best game country we have." While they assured the commission that they would not join the Lakotas i war against the United States, the Crow delegation refused to sign a treaty until after the Lakotas came to an agreement.[136]

The commissioners returned to Fort Laramie in the spring of 1868, and although Red Cloud again stayed away (sending word that he would make peace as soon as the army abandoned the Bozeman Trail forts), treaties were concluded with the greater Sioux nation, the northern Cheyennes and Arapahos, and the Crow Nation. While a complete analysis of the treaties is outside the scope of this report, several treaty provisions that directly

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[135] Prucha, *Great Father*, 488-92.

[136] "Proceedings of the Council with the Crow Indians," November 12, 1867, reprinted in Vine Deloria, Jr. and Raymond J. DeMallie, eds., *Proceedings of the Great Peace Commission of 1867-1868* (Washington, DC: The Institute for the Development of Indian Law, 1975), 87.

impacted the environmental causes and ultimate conduct of the Great Sioux War must be addressed.

The commissioners clearly saw the Sioux treaty as the linchpin of their efforts. The treaty established the Great Sioux Reservation encompassing all of modern South Dakota west of the Missouri River, but it also recognized Lakota control over the coveted hunting grounds that they and their allies had wrested from the Crows over the previous quarter century and fought the United States to keep. Article 16 of the treaty stipulated, "the country north of the North Platte River and east of the summits of the Big Horn Mountains shall be held and considered to be unceded Indian territory." No "white person or persons" were to be allowed to settle or pass through the area without the Lakota consent and within ninety days of the agreement the military posts along the Bozeman trail were to be abandoned and the road closed. In addition, the treaty guaranteed the Lakotas the right to "hunt on any lands north of the North Platte, and on the Republican Fork of the Smoky Hill River, so long as the buffalo may range thereon in such numbers as to justify the chase."[137] The subsequent treaty with the Northern Cheyennes and Arapahos was an adjunct of the Sioux treaty. There was no provision for a separate reservation. Rather, the Cheyennes and Arapahos had the choice of occupying land on either the Great Sioux Reservation or the Southern Cheyenne Reservation (established under provision of the Medicine Lodge Creek treaties). In fact, the treaty included yet a third possibility, as all or part of the groups could "attach themselves permanently" to the Crow Agency as well. The Cheyenne and Arapaho

[137] Treaty with the Sioux, 29 April 1868, 15 Stat.635; 2 Kappler 998.

treaty also included the right to "roam and hunt while game shall be found in sufficient quantities to justify the chase."[138]

The commissioners also met again with the Crows that May at Fort Laramie. The resulting treaty established a substantial reservation bounded by the Yellowstone River on the north and west, the Montana-Wyoming border on the south, and extending east to the 107th meridian. The reservation thus encompassed the Little Bighorn Valley and the Wolf Mountains. Despite these legal boundaries, the Crow Reservation east of the Bighorn River remained a contested ground. The initial Crow Agency was established at the far west end of the reservation on Mission Creek, putting it nearer the Euro-American settlements and making it more secure, but certainly not immune from Lakota and Cheyenne raids. The Crows continued to view the Powder River country as their hunting grounds and the 1868 treaty also contained a provision to hunt on the "unoccupied lands of the United States so long as game may be found thereon."[139]

The Fort Laramie treaties of 1868 became the fulcrum of events that led to the Great Sioux War eight years later. The Lakota treaty had established a large unceded Indian hunting territory on the contested lands of the Powder River Country. The military strength of the Lakota-Cheyenne alliance meant that the boundaries of that contested ground effectively spilled over onto the Crow Reservation as established by the 1868 treaty. From an environmental perspective, the long-standing conflict over these rich bison grounds served as a mechanism to preserve game. By 1876 the bison herds of the southern

[138] Treaty with the Northern Cheyenne and Northern Arapaho, 15 Stat. 655; 2 Kappler 1012.
[139] Treaty with the Crows, 7 May 1868, 15 Stat. 649; 2 Kappler 1008; Frederick E. Hoxie, *Parading Through History: The Making of the Crow Nation in America, 1805-1935* (New York: Cambridge University Press, 1995).

Plains had been all but annihilated. On the Northern Plains the bison's range was shrinking rapidly and one of their remaining refuges had become the southern tributaries of the Yellowstone, including the Powder, the Tongue, Rosebud Creek, and the Little Bighorn.

C. THE CAUSES OF THE GREAT SIOUX WAR.

Between 1868 and 1876 the United States exerted increased pressure on the Native peoples of the Northern Plains to remain permanently on their respective reservations. For the Lakotas this meant one of several agencies, first established on the North Platte River, the Cheyenne River, and the Missouri River. By the early 1870s agencies were established for the influential leaders Red Cloud and Spotted Tail on the White River, near Fort Robinson, Nebraska. While many Lakotas began the adjustment to reservation life, others rejected the reservations and sought to continue their customary lifeways based on pursuit of the bison. This entailed spending most of their time in the unceded hunting grounds of the Powder River country. The Hunkpapa spiritual leader and headman Sitting Bull was the most influential and respected leader of this group although the Hunkpapa Gall and Crazy Horse of the Oglalas also emerged as leaders of the off-reservation peoples. While these bands have been deemed "hostiles" or "militants" in older literature, their desire was not to go to war with Euro-Americans, but rather to pursue their customary ways free of the whites and the reservations. Still, their stance that Euro-Americans must stay out of the Powder River country inevitably led to conflict. In 1873 warriors of the off-reservation

bands engaged Custer's Seventh Cavalry as it escorted surveyor for the Northern Pacific Railroad in the Yellowstone Valley.[140]

Military and economic interests converged by 1874, and both viewed the Black Hills as a potential solution to their respective problems. Lt. Col. Custer had urged a reconnaissance of the Black Hills for some time and in late 1873 Gen. Sheridan approved the expedition. Ostensibly, its purpose was to locate potential sites for a military post that would, in Sheridan's words "threaten the villages and stock of the Indians, if they made raids on our settlements." But most observers, critics and proponents of the mission alike, knew that rumors of gold also motivated the mission. The Panic of 1873 had plunged the nation into an economic depression. An influx of gold bullion was an easy answer. On July 2, 1874, Custer led over one thousand men, including ten troops of the Seventh Cavalry and two companies of infantry, and over one hundred wagons out of Fort Abraham Lincoln. Custer's orders were to blaze a trail to Bear Butte – the sacred mountain that the Cheyenne people call *nóvávóse* – and then explore the country south and southwest of that point. Within three weeks the column had reached the Black Hills. Civilian prospectors who accompanied the expedition found traces of gold in several streams. When the expedition returned to Fort Abraham Lincoln at the end of August word of the discovery spread rapidly. While Gen. Alfred Terry argued that Custer's mission had technically not been illegal as the Fort Laramie Treaty allowed authorized government officials to enter the Great Sioux reservation, no one could defend the wholesale miner's invasion of the Black

[140] Ostler, *Plains Sioux and U. S. Colonialism*; Utley, *Indian Frontier*.

Hills that took place in 1875.[141] Custer's expedition, the miner's invasion, and government attempts to buy the hills aggravated the Lakotas and sent many to join the ranks of the off-reservation bands.

The provisions of the Fort Laramie Treaty demanded that the hordes of prospectors streaming into the Black Hills be evicted, but military efforts were half-hearted at best. Instead, the government unsuccessfully approached Red Cloud and Spotted Tail with an offer to buy the Black Hills in June 1875. Later that summer a delegation led by Sen. William B. Allison was also rebuffed. On November 3, 1875, Pres. Grant decreed that while the standing order prohibiting white citizens from entering the Black Hills would not be lifted, the army would be withdrawn. The decision ensured a flood of white prospectors and violent clashes. Ultimately the goal was war with the off-reservation bands as a pretext to force the reservation peoples to sell the Black Hills. Government officials publicly denounced the "untamable and hostile" bands that "set at defiance all law and authority." On December 3, 1875, Secretary of the Interior Zachariah Chandler issued an order demanding all "hostile Sioux" to return to the reservations. If they did not comply by January 31, 1876, responsibility for ensuring their return would be turned over to the United States Army. On February 1, 1876, Chandler certified all Lakotas and Cheyennes off of the reservations "hostile," and plans were set in motion that would lead to the collision of the "hostiles" and the Seventh Cavalry on the Little Bighorn River that June. [142]

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[141] Brian W. Dippie, "'Its Equal I Have Never Seen': Custer in the Black Hills," *Columbia: The Magazine of Northwest History* 19 (Summer 2005): 18-27; Utley, *Frontier Regulars*, 244.
[142] Ostler, *Plains Sioux and U. S. Colonialism*, 60-62; Utley, *Frontier Regulars*, 246-48.

II. Paths to the Little Bighorn.

It was not inevitable that the greatest engagement of the Great Sioux War would take place along the Little Bighorn River, but neither was it a surprising turn of events. As the army prepared to take the field in the winter and spring of 1876, its commanders knew that the off-reservation Lakotas and Cheyennes could be found somewhere in the Powder River country or the other tributaries of the Yellowstone. It was there that bison still roamed in numbers to sustain the Native peoples way of life. The off-reservation bands were clear in their demands that Euro-American stay out of the area. Moreover, there had already been clashes between Lakotas and the Army several years earlier when survey parties for the Northern Pacific Railroad entered the Yellowstone Valley.

A. THE GREAT COMBINED VILLAGE OF LAKOTAS AND CHEYENNES.

The Little Bighorn Valley, including the area of the battlefield, was a frequent early summer haunt for Lakotas and Cheyennes by the early 1870s. The reliable presence of bison herds as well as other game species was certainly a draw. The Cheyenne warrior Wooden Leg remembered that in June 1872 his people spent most of the month in the valley as they slowly moved downstream while carrying out their "early summer religious devotions." The Cheyennes held two buffalo dances, including one when their camp circle was placed "at the exact spot it where it was located four years later, at the time we killed all of the soldiers."[143] The Cheyennes spent on average four nights in each camp, and their journey culminated with a Sun Dance held on the west side of the Bighorn River across

[143] Thomas B. Marquis, interpreter, *Wooden Leg: A Warrior Who Fought Custer* (reprint ed. Lincoln: University of Nebraska Press, 2003): 19.

from the mouth of the Little Bighorn. Wooden Leg stated that this was the only time "our people as a tribe crossed that river."[144] Still, Cheyenne hunting and war parties regularly ventured west of the Bighorn, lured by the rich buffalo herds to be found deeper in Crow country. In 1874, along with visiting Southern Cheyenne tribesmen, Wooden Leg's people undertook a lengthy hunting trip through the Powder, Tongue, and Little Bighorn valleys. "Many thousands of buffalo, deer, antelope," Wooden Leg recalled, "many skins, much meat, everybody prosperous and in health." Before the large camp divided, the united Cheyennes held their Sun Dance on the Little Bighorn below the mouth of Greasy Grass Creek, today known as Lodge Grass Creek. With the end of the rutting season the buffalo broke into smaller groups and so too did their hunters. Moreover, mobility was traded for the security of sheltered riparian areas. "An early autumn snowstorm put a check on our great summer movements," recalled the Cheyenne Wooden Leg, "separations came again." His band moved to the upper Tongue River where they spent the entire winter amongst herds of buffalo. His fond recollections of winter camp neatly summarized what all Plains peoples needed to survive the often brutal winters: "We had but to kill and eat. . . . That is all anybody actually needs – a good shelter, plenty of food, plenty of fuel, plenty of good water."[145]

Large villages of Plains peoples formed regularly during the summer as the buffalo congregated in large herds and rich warm season grasses provided ample forage for horses, yet the enormous size of the combined Lakota-Cheyenne encampment in 1876 was an anomaly. Its massive size was due not to plentiful resources, but to defensive strategy. By

[144] *Wooden Leg*, 19.
[145] *Wooden Leg*, 25, 33, 35.

early February 1876 word spread through the Lakota and Cheyenne camps in the hunting grounds of the army's upcoming offensive. The first blow of the campaign fell on March 17, 1876, when elements of the U.S. 2nd and 3rd Cavalries commanded by Col. Joseph J. Reynolds struck Old Bear's Northern Cheyenne band while it was encamped on the west bank of the Powder River just above its confluence with the Little Powder (near the present site of Broadus, Montana, approximately one hundred miles east of the Little Bighorn battlefield). The Cheyennes suffered only one killed and one wounded in the fight, but Reynolds' troops were able to capture the pony herd, take the village, and, following standard army tactics, burn everything that could sustain the Indians. Destitute and nearly all afoot, the Cheyennes sought refuge among Crazy Horse's Oglala Lakotas.[146]

The Oglalas shared all they could with their old friends and the leaders of both groups decided they should travel together to Sitting Bull's much larger Hunkpapa camp. As the most revered advocate of living free of the white men and the reservations, Sitting Bull had attracted a substantial following that only grew as winter turned to spring. A large camp circle of Minneconjou Lakotas arrived shortly after the Oglalas and Cheyennes. Then, as the combined camp moved north along the headwaters of the creeks feeding the Powder, came the Sans Arc, Blackfeet, and Brule Lakotas, as well as a contingent of Santee Sioux. As the weeks passed ever more people left the agencies and streamed into the village, including a group of Southern Cheyennes led by Lame White Man. "We supposed that the combined camps would frighten off the soldiers," remembered Wooden Leg, "We

[146] *Wooden Leg*, 164-69; Jerome A. Greene, ed., *Lakota and Cheyenne: Indian Views of the Great Sioux War, 1876-1877* (Norman: University of Oklahoma Press, 1994), 3-14.

hoped thus to be freed from their annoyance. Then we could separate again into the tribal bands and resume our quiet wandering and hunting."[147]

There has never been a consensus on how many native people were in the village at the time of the battle. Estimates by participants and later students, native and non-Native alike, have varied widely. More than one early observer believed that the total population of the village reached fifteen to twenty thousand with upwards of five thousand warriors. Others pegged the number much lower. Col. Gibbon, for instance, believed the Seventh Cavalry had faced 1,200 – 2,500 warriors during the battle. The Santee Sioux physician Charles Alexander Eastman interviewed numerous participants and concluded the entire camp only contained five thousand people.[148] The Oglala warrior He Dog estimated the camp held about 1,800 lodges, with the Hunkpapas in the greatest number and the Minneconjous next. He believed that between these two groups there were 600-700 lodges. The Cheyenne warriors White Bull and Tall Bull both estimated there were 3,000 Cheyennes alone on the camp.[149] The Oglala holy man Black Elk was a boy of twelve or thirteen when his family left the "soldier's town," (Fort Robinson, Nebraska, the site of the Red Cloud Agency) to join the off reservation bands in May, 1876. When they arrived at the great village along Rosebud Creek, he remembered, "we could see the valley full of tepees, and the ponies could not be counted."[150] Today, the National Park Service's official estimate

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[147] *Wooden Leg*, 179.
[148] For a summary of early estimates see, Edgar I. Stewart, *Custer's Luck* (Norman: University of Oklahoma Press, 1955), 309-12.
[149] He Dog Interview, White Bull Interview, Tall Bull Interview in Kenneth Hammer, ed., *Custer in 76: Walter Camp's Notes on the Custer Fight* (Provo, UT: Brigham Young University Press, 1976), 206, 211-12.
[150] John G. Neihardt, *Black Elk Speaks: Being the Life of a Holy Man of the Oglala Sioux* (New York: Pocket Books Edition, 1972), 79.

is that at least 7,000 Native people with a total fighting force of between 1,500 and 2,000 warriors were in the combined camp by the time they arrived in the Little Bighorn Valley.[151]

Getting a realistic estimate of the number of ponies in the combined village herd is even more difficult. Contemporary accounts both Native and non-Native remark on the extraordinary size of the herd and its impact on the grasslands but none ventured actual estimates. Ecological factors imposed limits on the size of horse herds on the Northern Plains. Unlike the relatively warm Southern Plains where the Comanches developed a pastoral economy, the peoples of the Northern Plains had to regularly contend with severe winters that could decimate their herds. A Plains Indian household required a bare minimum of six horses to make mobile bison hunting viable. If there were between 1,500 and 1,800 lodges/households in the combined village at the Little Bighorn, the absolute minimum number of horses required simply to sustain village life would be between 9,000 and 10,800. Estimates from the mid-nineteenth century suggest, however, that the Lakotas were far better off, and possessed roughly twenty horses per household. Using this figure, the maximum herd would have numbered an astounding 30,000 to 36,000 head. But it is unlikely that such numbers held true by the mid-1870s.[152] While the actual size of the herd

[151] National Park Service, *Little Bighorn Battlefield* (map and guide), n.d.; See also, Don Rickey Jr., *History of Custer Battlefield* (Fort Collins, CO: The Old Army Press, 1967), 25.
[152] For considerations of the ecological limits on horses herds see, Pekka Hämäläinen, "The Rise and Fall of Plains Indian Horse Cultures," *The Journal of American History* 90 (3):; Alan J. Osburn, "Ecological Aspects of Equestrian Adaptions in Aboriginal America," *American Anthropologist* 85 (September 1983): 563-91. Contemporary, but very deflated, estimates from Indian agents put the combined herds of all of the Lakota, Yankton, Santee, Northern Cheyenne, and Northern Arapaho bands at less than 22,000.

can never be known, a conservative estimate of a dozen horses per household, then the combined herd in the Little Bighorn Valley likely numbered at least 20,000 head.

Such a congregation of human and animals could not remain in one place for long. The need for mobility that all Plains peoples faced during summer was even more pressing for a village of such size. A campsite might remain viable for two or three days at most until the game and the forage was exhausted. Cheyenne Kate Bighead remembered that as the camp "grew larger and larger, by Indians coming from the Dakota reservations . . . we travelled from place to place as the grass came up."[153] And so the combined camp followed a slow, steady path down the tributaries of the Powder to the Yellowstone River and then west past the lower Tongue River and Rosebud Creek. In 1876, substantial bison herds still roamed the Yellowstone Valley. Though the possibility of attack was ever present, the men and women of the village busied themselves taking and processing bison as they would in any given summer. Indeed, life could not be put on hold waiting for the white soldiers to appear. Wooden Leg reported that large numbers of buffalo were killed all along the Yellowstone from the Tongue River on down as well as in the foothills west of Rosebud Creek. The Cheyennes had a special interest in procuring as many large hides as possible in order to replace the lodges that had been destroyed in March.[154]

In ecological terms Native peoples relied upon energy drawn directly from the land and the living things around them, and for this reason Indian camps left a more obvious impact on the landscape. The simple act of moving the camp had an environmental impact. Wooden leg recalled that, "Our trail during all of our movements throughout that summer

[153] Kate Bighead, "She Watched Custer's Last Battle," in Thomas B. Marquis, *Custer on the Little Bighorn* (Lodi, CA: Dr. Marquis Custer Publications, 1967), 36.
[154] *Wooden Leg*, 184-5, 188.

could have been followed by a blind person." He estimated that the trail ranged from one quarter to one half mile in width wherever the topography allowed. And while family groups generally followed the tracks of the party ahead, "when the party of travelers was a large one there were many of such tracks side by side."[155] And once encamped, the routines of daily life left their mark. Indeed, reports by army officers confirmed that the Indian trail towards the Little Bighorn was very obvious. As the Seventh Cavalry made its way up Rosebud Creek on June 22nd 1876, Lt. George Wallace remembered that, "Every bend of the stream bore traces of some old [Indian] camp, and their ponies had nipped almost every spear of grass. The ground was strewn with broken bones and cuttings from buffalo hides."[156] The most visible impact was of course at camping sites that might be used three or four nights. During Reno's scouting trip the battalion came upon a campsite that was weeks old, yet there was still clear evidence of its inhabitants and their daily routines. The Arikara Young Hawk saw signs of saddle making and knew from what he saw of "hide tanning, meat scaffolds, and arrangement of tepees," that it was a Lakota camp. The large pony herd had trampled the vegetation around the stream, and from the number of fire rings there were about 350 lodges in this single camp.[157] In fact, the combined camp was so large by the time it reached the Rosebud Valley that by one report Custer mistook its remains for a succession of camps of a smaller village rather than a single camping place. By the time his command reached the upper Rosebud the campsites they encountered were

[155] *Wooden Leg*, 207.
[156] Report of Lt. George D. Wallace, 27 January 1877, in ARSW 1877, 1377.
[157] Orin G. Libby, ed., *The Arikara Narrative on Custer's Campaign and the Battle of the Little Bighorn* (reprint ed., Norman: University of Oklahoma Press, 1998), 70.

from one-third to one-half mile across.[158] The visible impact at a camping site might also be intensified by particular conditions on a given day. For instance, it was apparent that heavy rains had soaked the final campsite for the combined village in the Rosebud as the Lakotas and Cheyennes had dug up the sod around their tepee rings as a means of draining water away from the lodges. [159]

As the great combined village moved up the Rosebud Valley two important events took place. First, a great Sun Dance was held near what is today known as Deer Medicine Rocks. It was during this ceremony that Sitting Bull had his famous vision of many soldiers falling into camp. (In June, 2012, Deer Medicine Rocks was designated a National Historic Landmark.) Secondly, George Crook's command crossed into the upper Rosebud. Scouts from the village discovered the troops and although many of the camp leaders counseled against a fight many young warriors slipped away to fight the soldiers. Crazy Horse eventually went with them. On June 17th the warriors engaged Crook in the Battle of the Rosebud. After an all-day engagement Crook was left in control of the battlefield and later claimed victory, but he also withdrew to the south with the strategic effect of removing the Wyoming column from the campaign just as the other columns converged on the Little Bighorn.[160]

After the Rosebud fight the combined village moved into the Valley of the Little Bighorn. Wooden Leg recalled that they spent six nights at the first campsite in the valley where rich grass on the bench lands east of the river and great herds of buffalo to the west

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[158] *Arikara Narrative*, 29, 82.
[159] *Arikara Narrative*, 82.
[160] Neil C. Mangum, *Battle of the Rosebud: Prelude to the Little Bighorn* (El Segundo, CA: Upton & Sons, 1988).

kept the people happy and well supplied. The original plan had been to ascend the Little Bighorn toward the Bighorn Mountains but reports of large herds of antelope west of the Bighorn River led to a change of plans. "Because of this," recalled Wooden Leg, "the chiefs decided we should turn and go down the Little Bighorn to its mouth. From there our hunting parties would cross the Bighorn and get the antelope skins and meat that we now wanted."[161] Another Cheyenne, Kate Bighead also stated that it had been "decided we should move down the Little Bighorn river to its mouth, so our hunters could go across to the west side of the Bighorn and kill antelope in the great herds they had seen there."[162] And so the Cheyennes led a short journey that day, downstream for eight or nine miles and began setting up camp on the West side of the Little Bighorn River a short distance north of what is today Garryowen, Montana.

Black Elk described the village setting: "Along the side towards the east was the Greasy Grass, with some timber along it, and it was running full from the melting snow in the Big Horn Mountains. . . . On the other side of the river there were bluffs and hills beyond. Some gullies came down through the bluffs. On the westward side of us were lower hills, and there we grazed our ponies and guarded them. There were so many they could not be counted."[163]

Much has been made of the placement of the Indian Village at the time of the attack. The immediate topography of the Little Bighorn valley, with steep bluffs along the river's east bank, made approach to the village from the East difficult. Some authors have attributed this to Sitting Bull's strategic genius. Native recollections of the battle do not

[161] *Wooden Leg*, 204-05.
[162] "She Watched Custer's Last Battle," 36.
[163] *Black Elk Speaks*, 89.

support these suppositions. If an attack had been expected camp would have been taken down and preparations for movement under way. Kate Bighead recalled that on the morning of the battle some women had begun to take down their lodges, but simply in anticipation of a move farther down the valley, not because they feared an attack.[164] Noting that they had just defeated the soldiers on the Rosebud a week earlier, Wooden Leg remembered that he had no idea more fighting was imminent. "My mind was occupied mostly by such thoughts as regularly are uppermost in the minds of young men," he recalled, "I was eighteen years old, and I liked girls."[165] The Oglala He Dog also recalled that the battle was not expected. He told Walter Camp that the village "Moved to Little Bighorn third day after Crook fight. Sioux did not want to fight and so when got away off at Little Bighorn thought they would have no more fighting. We had our wives and children with us and had to get buffalo meat for them and wished to be let alone."[166] Sitting Bull himself was reputed to have said, "We are here to protect our wives and children, we must not let the soldiers get them."[167]

B. THE ARMY CAMPAIGN OF 1876.

Army plans called for a three-pronged offensive that would converge on the "hostiles" favored hunting grounds along the Powder, Tongue, and Little Bighorn Rivers. Gen. Philip Sheridan wanted to launch the campaign during the winter in order to engage the off-reservation bands during their least mobile and most vulnerable season, and, just as

[164] "She Watched Custer's Last Fight," 36.
[165] *Wooden Leg*, 214-15.
[166] He Dog Interview in *Custer in 76*, 205.
[167] *Custer's Luck*, 314.

importantly, before more Indians left the agencies in the spring. In early 1876, however, bad weather worked against the army. The attack on the Northern Cheyenne's encamped on the Powder River was the only successful winter troop deployment. It was not until the end of March that the first, and the smallest, of the army columns took the field, when Col. John Gibbon led the approximately 450 men of the "Montana Column" out of Fort Ellis and down the Yellowstone. Six weeks later Gen. Alfred Terry and the "Dakota Column," over 950 men including the entire Seventh Cavalry, and three companies of infantry marched out of Fort Abraham Lincoln. Finally, on May 29th Gen. George Crook with over 1,000 men headed north from Fort Fetterman, Wyoming.[168]

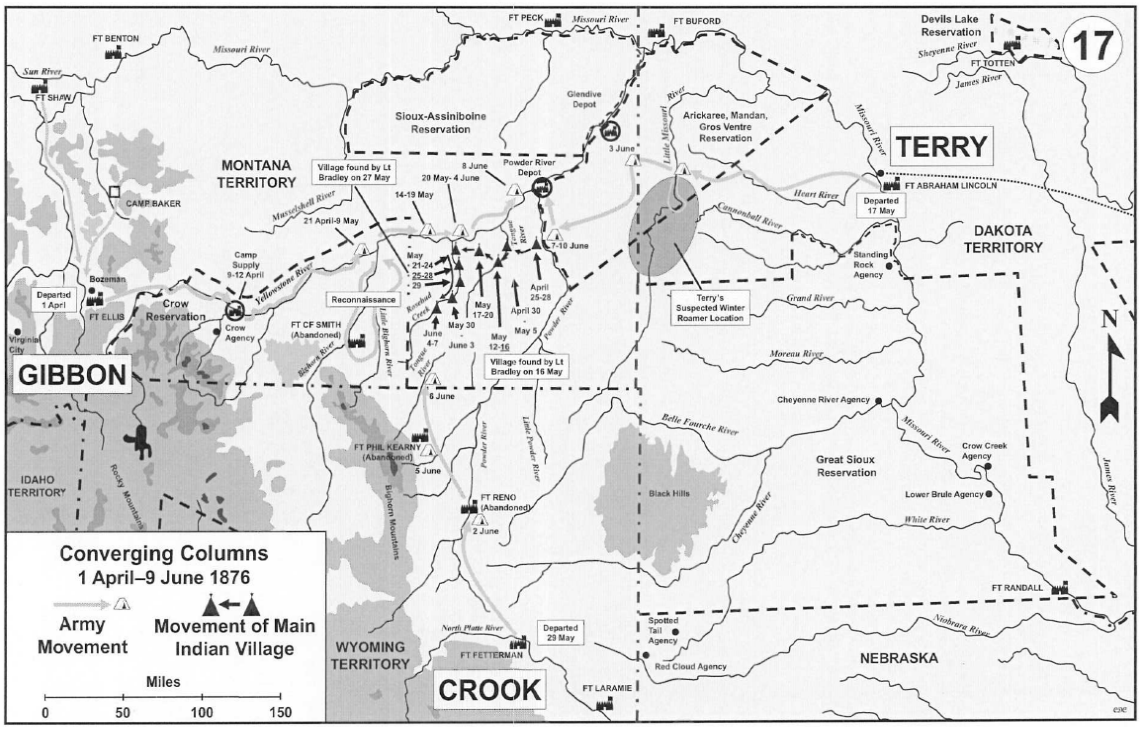

Figure 5. Overview of the Campaign of 1876. Source: *Atlas of the Great Sioux War*.

[168] Utley, *Frontier Regulars*, 248-52.

In an ecological sense an army column mostly consumed energy and resources produced great distances from the site of actual combat. On one hand this factor slowed and complicated army movements as units carried everything, including much of the forage for their livestock, with them. Yet on the other hand, the army could tap an infinitely larger pool of energy than a Native village that relied on the energy drawn from its immediate surroundings. Indian warriors could win victories, as they did at the Rosebud and Little Bighorn, but the army's ability to consume the resources of a large industrial nation, transported across vast distances, ultimately allowed it to overwhelm its Native adversaries.

Getting the troops and their supplies into the field was an enormous logistical undertaking. The Dakota Column marched with a supply train of 150 wagons, with additional supplies being transported upstream on the steamer *Far West*. An advanced supply base was set up first at the mouth of Glendive Creek to coordinate the volume of supplies, and later moved to the mouth of the Powder River. Engineer officers accompanied each column. It was their responsibility to find, or if necessary improve, a path for the wagons. Lt. Edward Maguire was the engineer officer attached to the Dakota Column. His campaign journal is filled with accounts of the difficulties of keeping the wagon train moving across rough terrain and innumerable drainage crossings. Pack trains of mules offered greater mobility, an advantage that Gen. Crook in particular sought to exploit.

Crook's forces had with them 120 wagons and 1,000 pack mules when they began the march north.[169]

While the columns' impact was not always as visible as that of the large combined village, the Army made no attempt to minimize or cover the impact of their passage. The most obvious sign was the bridging work down at stream crossings when no viable ford could be found. For example, Lt. Maguire recalled, "There was not a day that bridging was not necessary; but the journey through Davis Creek to the Little Missouri, through the Bad Lands immediately west of the latter stream, and then the decent into the valley of the Powder demanded almost incessant bridging and roadmaking."[170]

The most common impact, however, was what we might today call littering. Campsites contained fire rings and discarded crates used to carry rations. Another telltale sign the column left behind was the large amount of cast off food to be found along the trail. The Arkiara scouts Red Bear and Red Foolish Bear had no trouble following the Dakota column's trail or subsisting on the abandoned food while bringing mail to the column from Fort Abraham Lincoln.[171]

While soldiers on campaign relied mostly on resources they carried with them, they did draw some energy from their local environments. Whether living at a post or on a campaign, soldiers hunted for sport and to relieve the monotony of field rations that

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[169] Annual Report of Lieutenant Edward Maguire, in *Annual Report of the Secretary of War* 45th Cong., 2nd sess., 1877, Appendix PP, 1339-60; Utley, *Frontier Regulars*, 48-48. 251-53.
[170] Quoted in Michael N. Donahue, *Drawing Battle Lines: The Map Testimony of Custer's Last Fight* (El Segundo, CA: Upton and Sons, 2008), 28.
[171] *Arikara Narrative*, 65.

consisted of salt bacon, hardtack, dried beans, and coffee.[172] Custer was a particularly avid hunter and relished the chase. He even brought greyhounds with him on a previous campaign to pursue antelope.[173] During the 1876 expedition, the Arikara scouts recalled that all along the way "there was plenty of game." They usually established their camp near Custer's, and he often visited at dinnertime, being fond of the scout Young Hawk's cooking.[174] Lt. Maguire recalled that the scout Charley Reynolds killed two bighorn sheep and brought them to camp on June 2, as the troops were going into a snowy camp between the Little Missouri and Powder Rivers. Maguire added that the surrounding land was a "beautiful rolling prairie full of game."[175] Soldiers on campaign killed a much smaller quantity of game than Native peoples because they were simply not reliant on that game. At various times soldiers also gathered other wild foods including wild onions and Lambsquarter. But again, their knowledge and use of such plants was quite limited compared to Native peoples.[176]

Human soldiers were not the only creatures that needed sustenance on campaign. Army horses were noticeably larger and faster than Indian ponies, but their nutritional needs could not be met by grass alone. "American" horses deteriorated quickly without supplemental forage. The army had learned this hard lesson in previous campaigns when weakened horses died by the scores. For this reason each column brought with it feed

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[172] Don Rickey, Jr., *Forty Miles a Day on Beans and Hay: The Enlisted Soldiers Fighting the Indian Wars* (Norman: University of Oklahoma Press, 1963), 220.
[173] George A. Custer, *My Lif on the Plains* (reprint ed., Lincoln: University of Nebraska Press 1966), 79-80.
[174] *Arikara Narrative*, 61.
[175] Maguire Report, 1344.
[176] Rickey, *Forty Miles a Day*, 119-20.

oats.[177] This was particularly important for the Seventh Cavalry when it trailed the huge combined village up Rosebud Creek. Little grass remained after the passage of the massive pony herd. Moreover, the condition of half the regiment's horses after Reno's grueling scouting mission gave the officers even more reason for concern. Trooper Daniel Knipe later reported that the men carried about two gallons of oats in small sacks as a precaution for running out of forage for their horses.[178] According to Lt. Wallace this was only a fraction of the supplemental feed that the soldiers normally carried, the "regular allowance being twelve pounds." "I don't know how the horses of the command were fed," Fred Gerard later testified, "I had a little grain to start with and fed it sparingly to make it last."[179]

Native people understood the both the strength and the limitations of Army horses. For instance, when Reno's battalion charged the south end of the village on June 25th, Black Elk recalled "out of the dust came the soldiers on their big horses. They looked big, and strong, and tall and they were all shooting." But big horses had to be fed and in the aftermath of the battle, the Army brought more supplies up the Yellowstone to keep the cavalry in the field. Black Elk stated that in one case the soldiers left loads of corn piled up on the north bank of the Yellowstone near the mouth of the Tongue River. Then in August 1876, as the great combined village was breaking up, Black Elk's people headed east. "Our people set fire to the grass behind us as we went, and the smoke back there was as wide as

[177] Utley, *Frontier Regulars*, 48-49, 158-59.
[178] Daniel Knipe Interview in *Custer in 76*, 92.
[179] Reno Court of Inquiry, 64-65, 119.

the day and the light of the fire was as wide as the night," he remembered, "This was to make the soldiers' horses starve."[180]

Gibbon's Montana Column was the first in the field and the first to reach the vicinity of the Little Bighorn. Two months before the battle and weeks before the Dakota column got under way, an Army scouting detachment passed directly through parts of the future Little Bighorn battlefield. Two companies of the 2nd Cavalry attached to the Montana Column were tasked with the weeklong scouting mission. Lt. Edward J. McClernand, Gibbon's acting engineer officer, went along and kept the itinerary of march, noting the condition of the lands along and surrounding the Little Bighorn Valley. The detachment's route took them up the Bighorn River to the site of old Fort C. F. Smith, then over high ground to Lodge Grass Creek, down that creek to the Little Bighorn River, which they descended past the future battlefield before climbing out of the valley to the east and descending Tulloch's Fork back to the Yellowstone. Although McClernand's comments on the lands of what is now Little Bighorn Battlefield National Monument are minimal, his account provides a valuable picture of the general landscape and ecosystems and by extension can help us understand the condition of battlefield lands in June 1876.[181]

The troopers departed Fort Pease on the Yellowstone River on April 24th, crossing the river at a ford just upstream of the Bighorn. They then ascended to the "backbone" ridge that separates the Bighorn from the Yellowstone and followed it through "very

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[180] *Black Elk Speaks*, 92, 111.

[181] "Journal of the Marches Made by the Forces Under Colonel John Gibbon, Commanding the Expedition Down the Yellowstone, Between the 1st Day of April and the 29th Day of September, 1876, by Lieutenant E. J. M'Clernand [sic], Second Cavalry, Acting Engineer Officer [hereafter McClernand Report]," in *Annual Report of the Secretary of War*, 45th Cong., 2nd sess., 1877, pp. 1364-67.

broken country" until they camped at a small stream. The following day (April 25th) they descended into the valley of the Bighorn. While McClernand reported that the valley was "poorly supplied with creeks" and that "a portion of it grows sage-brush and cactus," he also reported very abundant wildlife. "Buffalo and antelope are seen in the valley and on the foot-hills," he wrote, and during an afternoon halt to allow the horses to graze, "a band of elk quietly walk in among the horses, and graze with them for several minutes." It was, of course, the presence of these game species that made the area a coveted hunting ground for native peoples. That evening the party passed by the mouth of the Little Bighorn on the opposite bank. McClernand reported that the Little Bighorn came into the Bighorn through "a green and pretty bottom." He continued, "There is a great abundance of cottonwood timber on each stream, but especially on the Bighorn." The soldiers then proceeded farther upstream on the Bighorn and encamped for the night.[182]

The lands along the Bighorn were rich in grass and wildlife. On the morning of April 26th the detachment crossed the Bighorn River to it east bank and travelled southwest through rolling country with the Bighorn Mountains visible in the distance. The lieutenant estimated that at this point the river flowed at about half the volume of the Yellowstone and he lauded the quality of the rangeland, writing "the grass seem to be everywhere good." Once again, he was struck by the abundance of wildlife, and reported "buffalo can be seen feeding in the valley and foot-hills in all directions, in little bands of from ten to thirty." McClernand's account corresponds well with modern understandings of bison ecology. In late April bison still relied on the spring growth of cool season grasses and remained in smaller cow/calf and bull herds. Only later in the season, when warm season

[182] McClernand Report, 1365.

grasses entered their growth cycle would the large herds form for the rut. The presence of so many bison allowed the soldiers to "procure meat with little trouble." Later that afternoon they crossed Rotten Grass Creek, where the grass was "heavy enough to make hay." The column eventually went into camp beyond the mouth of Soap Creek on the Bighorn River. McClernand called these higher reaches of the Bighorn a "magnificent valley." Altogether it is the finest piece of tillable land I have seen in Montana;" he wrote," "not a stone, cactus or sage-brush is to be found in the valley, and water is everywhere abundant."[183]

On April 27th the party visited the ruins of Fort C. F. Smith and then followed the old Bozeman Trail toward higher ground to the southeast. The lieutenant described this area as nothing less than a "hunter's paradise." At first the groups saw many game trails but only one herd of antelope and whitetail deer. In a short time, however, the command encountered "buffalo, elk, deer, and antelope . . . in great numbers." "The belt of country we are now travelling in is as fine a grazing district as can be found anywhere, combining hills and valleys, with everywhere a perfect mass of the most nutritious grasses." McClernand's glowing appraisal of the area is strikingly similar to one that Montana pioneer cattleman Granville Stewart made four years later.[184]

After camping on the upper reaches of Rotten Grass creek the soldiers descended the ash and cottonwood lined Lodge Grass Creek ("The Indians call this Long Creek" wrote McClernand), to the Little Bighorn, which they reached at 6 p.m. on the 28th. From their

[183] McClernand Report, 1365.
[184] McClernand Report, 1366; Granville Stewart, *Forty Years on the Frontier: As Seen in the Journals and Reminiscences of Granville Stewart* (Cleveland: The Arthur H. Clark Company, 1925), 117-18.

"pleasant and strong camp" on a bend of the Little Bighorn the lieutenant surveyed his surroundings and wrote,

> On the opposite side of the river are high and broken sandstone bluffs, but on this side is a beautiful and extensive valley more than a mile wide. In the soil, like that in the upper valley of the Bighorn, not a pebble is found; it has a gentle slope to the river, and is everywhere covered with good grass. The river water is clear and cold, a fact that renders it very agreeable, as the day has been warm. Ash timber grows along the banks in great abundance.[185]

The next morning the detachment moved downstream, passing over the very ground that less than two months later became the site of one of the most controversial and storied battles in American history. Along the way the troops passed the site of a Lakota village used the previous year. While McClernand did not comment on the vegetation in the vicinity of the battlefield, he did remark on the general beauty of the valley and report that the river itself was "about 15 yards wide and 18 inches deep, with a good but not a swift current."[186]

After moving downstream past the future battlefield the scouting column climbed up into the higher ground east of the valley and made its way toward the headwaters of Tulloch's fork during the afternoon of April 29th. The streams were generally dry but large numbers of bison were still present. McClernand remarked on the animals impact: "8:45 p.m. brings us to a miserable little creek . . . in which the buffalo have been recently wallowing, and near which they have eaten off all the grass." The next day as the command

[185] McClernand Report, 1366.
[186] McClernand Report, 1366.

moved down Tulloch's Creek they encountered substantial numbers of bison and deer. After one more camp along the creek bottom the party made a treacherous crossing of the Bighorn River just below the mouth of Tulloch's Creek, re-crossed the Yellowstone and rejoined the main body of troops at Fort Pease on the afternoon of May 1st, 1876. The scout had covered a total of 178 miles and had found no recent evidence of Lakota and Cheyenne presence.[187] The lieutenant's report, however, certainly illustrated why the Little Bighorn valley, abounding in game and grass, was a favored refuge for Native peoples.

On May 17, 1876, the Dakota column began its journey west during what proved to be a wet and cold late spring. The column first followed the Heart River and then struck west across the Little Missouri River, Glendive, and O'Fallon's Creeks. On June 1, as the Dakota column camped along a small creek west of the Little Missouri, rain turned to snow and by morning several inches covered the camp. The weather made travel more difficult and Lt. Maguire noted that the animals suffered from exposure and want of grass." He added, "The little stream of the day before had swollen to quite important dimensions."[188] The Dakota troops reached the Yellowstone at the mouth of the Powder River on June 9th. Meanwhile the Montana Column was encamped on the Yellowstone in persistent rain. Lt. McClernand recorded the river rising six inches on June 8th alone. Then on the 21st a severe hailstorm hit the Montanans' camp at the mouth of Rosebud Creek, with hailstones "half as large as an egg [that] nearly drive the horses frantic."[189]

On June 10th Maj. Marcus A. Reno led six companies of the Seventh Cavalry on a scouting mission through the Powder, Tongue and Rosebud valleys. The terrain was roug

[187] McClernand Report, 1366-67.
[188] Maguire Report, 1344.
[189] McClernand Report, 1369-70.

and the mission was taxing on both men and animals. The difficulty of transporting Gatling guns made travel even more exhausting. On June 17th, the same day that Crook's column was engaged in the Battle of the Rosebud, Reno's detachment stuck the trail of the combined village some forty miles north along the same stream. The day before Reno reached the Rosebud, Custer began to march the other half of the regiment up the Yellowstone over equally rough terrain. The wagons were left behind at the supply base at the mouth of the Powder and all supplies were now carried by the pack train. [190] By June 21st, both wings of the Seventh Cavalry were encamped at the mouth of Rosebud Creek along with the troops of the Montana Column. The unseasonably cold weather had given way to hot, sunny conditions. Maj. Reno and several other officers purchased broad brimmed straw hats from a trader on the Far West as "shelter from the sun."[191]

The following day, June 22nd 1876, the Seventh Cavalry set off up the Rosebud valley on the final march that would take it to the Little Bighorn. The troops were assumed "light marching order." Extra clothing and equipment were left behind, and only rations and 24,000 rounds of ammunition were loaded on the mules. Lt. Col. Custer specified that fifteen days of hardtack, coffee, and sugar, and twelve days supply of bacon be taken along. He told his officers and men to expect to be on the trail for fifteen full days no matter where it led them. Pvt. Dennis Lynch described the pack train: "Mules were pretty well together, never strung out more than 400 or 500 yards. Generally 3 or 4 abreast. Each loaded with about 300 lbs. Box hardtack on each side of the pack with box ammunition on top and between two hardtack boxes. In case of bacon it would be in sacks between two boxes of

[190] Stewart, *Custer's Luck*, 230, 233-37; Utley, *Frontier Regulars*, 256-57.
[191] Reno Court of Inquiry, 509.

hardtack."[192] When interviewed in 1914 George Glenn gave a remarkably complete accounting of what each individual trooper carried: "When we left the Yellowstone each soldier carried on his horse twelve pounds of oats, eighty rounds of ammunition, and two horseshoes, one front and one hind shoe. We overloaded ourselves with ammunition to relieve the pack mules."[193]

Lt. George D. Wallace described Rosebud Creek as "a clear running stream from 3 to 4 feet wide, and about 3 inches deep; bottom gravel, but in many places water standing in pools. Water slightly alkaline." The trail that day "followed the high ground or second bottom, where the soil was poor, the grass thin, and crowded out by sage-brush and cactus." "In the lower part of the valley the soil appeared to be good, the grazing fair, the bottom timbered with large cottonwood," wrote Wallace, "Small willows grew thickly along the banks in many places." Although he saw no game that day, the lieutenant noted "Plenty of fis in the creek."[194]

The next day the regiment crossed the trail of Reno's previous scout and the trail of the great combined village became obvious and easily followed. Pvt. John McGuire later remarked that on the march up Rosebud Creek, the scout Mitch Bouyer had "told him that the Indians had herded buffalo ahead of them and such was the reason for such a big trail which in some places was spread out all over the country."[195] Interpreter Fredric Gerard told Walter Camp, "At forks they could see there had been a gathering of Indians and a tepee, and other signs of ceremonial performances were still in evidence. The grass had

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192 Dennis Lynch Interview in *Custer in 76*, 139.
193 George Glenn Interview in *Custer in 76*, 135; Stewart, *Custer's Luck*, 247.
194 Report of Lt. George D. Wallace, 7th Cavalry, January 27, 1877 in *Annual Report of the Secretary of War*, 45th Cong., 2nd sess., 1877, 1377.
195 John McGuire Interview in *Custer in 76*, 124.

been eaten off for long distances round about." Lt. Wallace also remarked on the signs of Indian campsites and wrote "Grass all eaten up."[196]

The journey up Rosebud Creek and across the divide to the Little Bighorn proved taxing on the soldiers' horses. "There was not much grazing to be had," Wallace later testified, comparing the impact of the great pony heard that had passed before the troops to that of a "lawn mower."[197] Some travelling with the command, however, found ways to augment their horse's sparse food supply. Gerard asserted that his part "Canadian" pony was "tougher" than the average cavalry horse and so better able to endure the exhausting march. More importantly, Girard enjoyed more freedom of movement and that constituted a material benefit for his mount. Unlike the soldiers who rode in order, the scout often left the direct line of march to find better grazing for his horse. "I went whenever I wanted to for grass," he said. Likewise, Dr. Porter remembered the grazing along the Rosebud to be "pretty fair," but added, "I was looking out for my own horse. I would take him out some distance to get good grazing."[198]

In the evening of June 24th the regiment went into camp near the present site of Busby, Montana, but word soon came from the scouts that the trail of the "hostiles" led west over the divide into the Little Bighorn Valley. Custer immediately decided on a night march that put the troops in a position near the divide on the morning of June 25th. Custer and several other officers made their way to the high point known as the Crow's Nest, from which the Crow scouts had sighted the village. Lt. Charles Varnum, who had first accompanied the scouts to the Crow's Nest before dawn, later recalled, "The Crows tried to

[196] Fredric Gerard Interview in *Custer in 76*, 230; Wallace Report, 1377.
[197] Reno Court of Inquiry, 64-65.
[198] Reno Court of Inquiry, 116, 180.

make me see smoke from the villages behind the bluffs on the Little Big Horn & gave me a cheap spy glass but I could see nothing. They said there was an immense pony herd out grazing & told me to look for worms crawling on the grass & I could make out the herd; but I could not see worms or ponies either."[199] Like Varnum, Custer was unconvinced that what the scouts were pointing to in the dim light was really the massive village. According to Lt. DeRudio, upon leaving the Crow's Nest Custer said he had "seen some cloud like objects which the scouts said were pony herds." On the other hand, Interpreter Gerard claimed that he made out the pony herd "on the hills or table land" beyond the Little Bighorn. The mixed-blood Sioux scout Mitch Bouyer also tried to convince Custer that it was the "largest village I have ever known of."[200] At about the same time, however, a small group of warriors was seen riding toward the Little Bighorn. Fearing that his force had been discovered and the element of surprise was lost, Custer scrapped his original plan to keep the regiment hidden and attack the village at dawn on the 26th, and instead decided to press the attack that day.[201]

At noon on June 25th the Seventh Cavalry crossed the divide and began the descent to the Little Bighorn. About a mile from the divide Custer called a halt and it was here that he divided the regiment into three battalions. Companies D, H, and K, led by Capt. Frederick W. Benteen, would scout the rough country to the south to ensure that the Indians could not escape to the left. Maj. Reno took charge of companies A, G, and M. Custer rode with five companies; C, E, F, I, and L. Lt McDougall's company B, which was the last to report ready for march was relegated to escorting the pack train.

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[199] Varnum to Camp, April 14, 1909, in *Custer in 76*, 60.
[200] Luther Hare Interview, in *Custer in 76*, 64; DeRudio Interview, 84. Gerard Interview, 231.
[201] Stewart, *Custer's Luck*, 273-76.

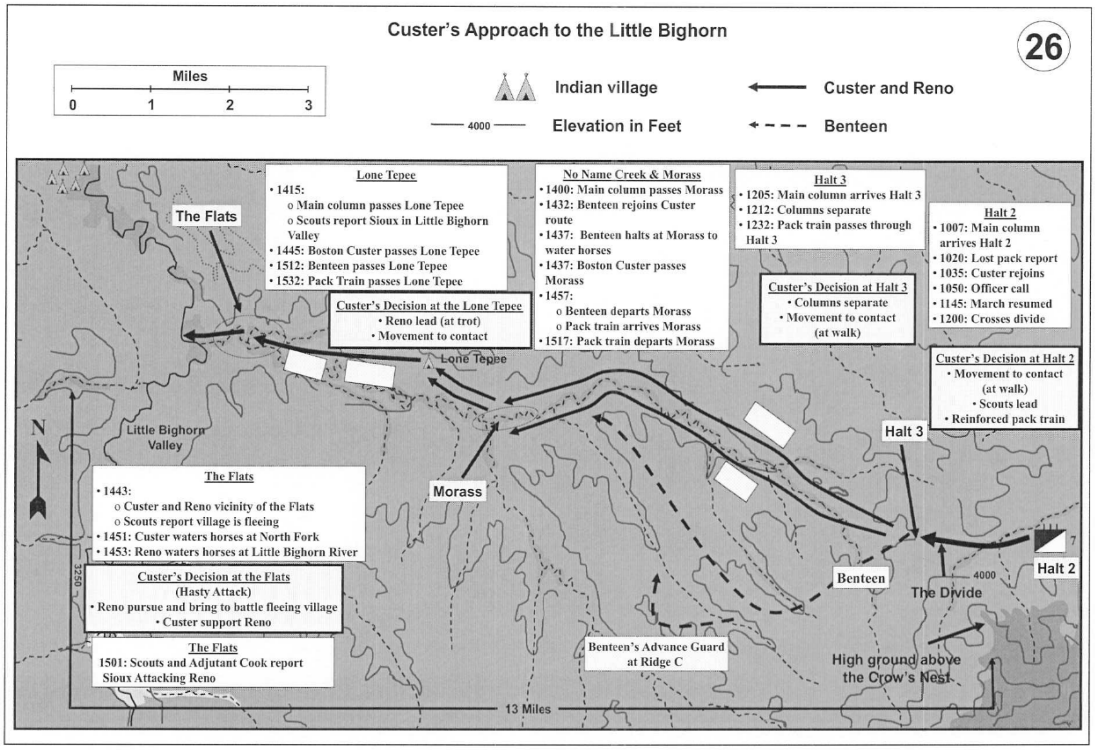

Figure 6. Movements of the Seventh Cavalry, 12:00-3:00 PM, June 25, 1876. Source: *Atlas of the Great Sioux War*.

The regiment then followed the same path down what is today known as Reno Creek, that the great combined village had taken just days earlier. The Crows called Reno Creek "the Creek of Many Ash Trees, or Ash Creek, because the wood is hard."[202] The timber along the creek did not slow the troops advance but the dry earth released clouds of dust that choked the troops. There was still water in the creek, however, and above the site of the lone tepee, the regiment encountered a wetland dubbed the "morass." Here the troops under Benteen watered their horses before moving forward. As the troops approached the river Custer sent his final order to Reno, who was to ford the river at the

[202] Graham, *The Custer Myth*, 12, 23.

mouth of the creek and attack the south end of the village. And so, at just before 3:00 p.m. on June 25th 1876 the Battle of the Little Bighorn began.

III. The Battle of the Little Bighorn.

This portion of the report will address two central questions: first, what were the environmental conditions on the battlefield on June 25, 1876, and second, how did the natural conditions on the battlefield impact the course of the battle? Primary accounts by both Native peoples (who fought both against and with the Seventh Cavalry) and of soldiers can provide a window on both of these questions. Not surprisingly, the evidence concerning environmental conditions in these accounts is found, in most cases, in brief comments scattered throughout larger narratives. Obviously, no one engaged in the life and death struggle that took place that June afternoon paused long to ponder the botanical makeup of the grassland community. Nor did early students of the battle, such as Walter Mason Camp and Thomas B. Marquis, who interviewed participants, ask direct questions about environmental conditions. Still, in interviews, memoirs, and official reports a picture of the battlefield emerges.

Soldier accounts generally provide a richer picture of the landscape during the battle than do those of Native participants. The oral culture and narrative tradition of the Lakotas, Cheyennes, Crows, Arikaras and other Plains peoples emphasized the action and knowledge of the individual. Warriors did not fight as a part of a unit, but rather as individuals. They were less likely to record general conditions that may not have had an immediate effect upon themselves than they were to relate accounts of their own personal actions. Moreover, the traditions of oral cultures generally did not allow for hearsay or

supposition. Individuals reported what they saw and experienced, not what they heard from others.[203] The written culture of the military, on the other hand, emphasized extensive detailed reports of actions. Army officers were trained to pay attention to topography and natural features that might affect the course of battle for their troops and for their larger unit. This was particularly true for the engineer officers who viewed the natural world in terms of advantages and obstacles to be either exploited or overcome. There is a second, equally important, facet of army reports. Nineteenth century army officers consistently viewed lands in terms of economic value. They often remarked on the quality or poverty of lands based on their potential for future economic development. Consequently they described, often in detail, the quality of grazing lands or the flow of rivers in relation to possible irrigation projects.

This account of environmental conditions will be structured by geography and ecosystem, but also roughly follows the chronological course of the battle. This approach allows the merging of Native and non-Native descriptions of specific portions of the battlefield as well as a more coherent analysis of the ways in which natural features and conditions impacted the fight. The section is thus organized into three subsections. The first looks at the Little Bighorn Valley floor and riparian areas, the site of the great combined village and the "valley fight," the opening engagement of the Battle of the Little Bighorn. The second takes as its subject the uplands away from the river where both the "Custer fight," the most famous and controversial phase of the battle that culminated in the "last stand," and the hilltop siege of Reno and Benteen's combined battalions took place.

[203] For an analysis of Lakota oral and narrative traditions see, Raymond J. DeMallie, "'These Have No Ears': Narrative and the Ethnohistorical Method," *Ethnohistory* 40 (1993): 516-38.

These upland areas also make up the majority of the land within the monument's boundaries, while nearly all of the land in the valley/riparian areas where combat took place are privately or tribally owned. Finally, the third section turns to the aftermath of the battle and includes accounts of the relief troops as well as burial and early reburial parties and one Native group that visited the battlefield in the first year following the fight. Removed from the heat of combat, these accounts often present a much more detailed account of the physical condition of battlefield lands.

A. THE LITTLE BIGHORN VALLEY, THE RIVER, AND THE "VALLEY FIGHT."

The opening engagement of the Battle of the Little Bighorn began shortly after 3:00 i the afternoon, when Maj. Marcus Reno's battalion forded the Little Bighorn River and rode down the valley toward the Hunkpapa camp circle at the south end of the village. The "valley fight" that followed is the best-documented portion of the Battle of the Little Bighorn with a wealth of firsthand accounts from both the Native and soldier perspectives. Topography played an important part in the engagement, as did the Little Bighorn River itself.

Maj Reno's battalion crossed the river at a ford just upstream of the mouth of Reno Creek. Today the ford is a dry cut-off meander of the Little Bighorn, but in 1876 (and at least up until at least 1970) there was a steep banked descent to the river. "I don't consider it as easy country to go through when you get to the creek," said scout George Herendeen of the Little Bighorn River, "It is a deep creek; what we call a bad-land creek, with cut banks

and hard to get through unless the Indians or the buffalo had made trails through it."[204] Trooper Thomas F. O'Neill recalled that at the ford, "The trail split and went around a little rise of ground on which some of the Rees [Arikaras] were sitting holding a council and discussing the numbers of Sioux." Lt. DeRudio also described the ford situated "at foot of bluffs which came to a break . . . there was a little hill on river bank on the east side." DeRudio, who had lost control of his horse, unwittingly forded the river first splashing Maj. Reno, who the lieutenant claimed was drinking whiskey. Reno reportedly said, "What are you trying to do? Drown me before I am killed?"[205] According to Lt. Wallace the ford was "about belly-deep to the horses, but a good crossing." In his subsequent survey of the area, Lt. Maquire concurred, finding the general depth of the ford was "about to the stirrups of a horseman." The engineer also reported that that the river ranged in width from thirty to seventy-five yards as it wound its way through the battlefield.[206] By some reports the halt at the river to water the horses was only brief, although Lt. Luther Hare later recalled that the battalion stopped for a full fifteen minutes.[207]

Once across the river, the troops moved through the timbered band that lined the west bank of the river. Lt. Maguire characterized these riparian woodlands as "cottonwood timber of all sizes," with a "growth of underbrush, rose bushes and such things" at the intersection of the river bottom and the bench above. He also noted important breaks in the timber such as the point where the ravine formed by Shoulder Blade Creek met the river;

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[204] Reno Court of Inquiry, 231.
[205] Brust, et. al;. *Where Custer Fell*, 35; *Custer in 76*, 84, 106. DeRudio told Walter Mason Camp about the whiskey and the comment in ??? but made mention of neither in his testimony at the 1879 Court of Inquiry.
[206] Reno Court of Inquiry, 18, 21.
[207] Luther Hare Interview in *Custer in 76*, 65.

"no timber – that is a wash-out."[208] Because the timbered band was not continuous and varied considerably in width at any given point, numerous and divergent descriptions of it exist. Lt. DeRudio estimated that the band was two hundred yards wide at the Reno Creek ford, while Sgt. Stanislaus Roy said it was only fifty. Trooper James Wilbur was not as specific, but remembered that the troops passed through "Considerable timber" just after fording the Little Bighorn.[209] Estimates of the woodlands extent at other points in the valley also varied. Maguire stated that the timbered band was 150 yards wide at the point he believed Reno's original skirmish lined had formed, while Lt. Wallace, who was actually on that skirmish line estimated it was only twenty-five.[210] One thing that most observers did agree on is that the majority of the trees were small and that area was choked with underbrush. Wallace remembered that timber immediately to the right of the skirmish line was "very young," with "no trees as large as a man's body, and it was filled with thick undergrowth." Lt. Luther Hare also stated "There was very little large timber there; it was mostly underbrush." The density of the understory was one reason that Fred Gerard maintained in later years that the bottomland was more defensible than the hilltop defense site. One contradictory account came from Col. John Gibbon, who later testified, "some of the timber was of considerable size."[211]

Beyond the timber, as the battalion reformed into companies and advanced down the valley, the impact of the massive pony herd on the grasslands became readily apparent. Lt. Wallace compared the land south of the village to an "ash-bed a mile or two wide." He

[208] Reno Court of Inquiry, 10.
[209] Get page numbers from below.
[210] Reno Court of Inquiry, 10, 27.
[211] Reno Court of Inquiry, 27, 83, 85, 251, 495-96.

later explained, "it was a broad, level prairie that had been covered with grass, but it was all eaten up by the ponies and the ground cut up by their hoofs."[212] Several accounts indicate that warriors purposely stirred up dust to obscure the troops view of what lay ahead. Chief of scouts Lt. Charles Varnum remembered "quite a large body of Indians," ahead of battalion "running back and forth across the prairie away from us and towards us and in every direction, apparently trying to kick up all the dust they could." The cloud was so thick that Varnum found it "impossible to discover the number of Indians there." DeRudio stated he could only see "shadows of some Indians in that dust." Capt. Myles Molan, Lt. Luther Hare, and Sgt. F. A. Culbertson also described the dense could that stood between them and the village.[213]

On the day of the battle groups of Native women had fanned out toward the bench lands west of the river to dig prairie turnips. The Minneconjou leader Red Horse had ridden out with one of these groups and it was from that vantage point that they first noticed the massive dust cloud rising to the east, indicating Reno's charge toward the south end of the village. She Walks With Her Shawl, a twenty-three year old Hunkpapa, was also digging turnips several miles from the camp when she noticed the cloud. Instead of fleeing with the other women she ran toward the village, where she joined with her father and several warriors and rode towards the battle.[214]

Nor did the people in the village expect an attack and many were enjoying the river that afternoon. Kate Bighead, twenty-nine years at the time remembered that she and an Oglala woman had made their way to the south end of the village near the Hunkpapa camp

[212] *Custer in 76*, 84, 111, 148; Stewart, *Custer's Luck*.
[213] Reno Court of Inquiry, 122, 206, 237, 268, 328.
[214] Accounts quoted in Greene, *Lakota and Cheyenne*, (Red Horse) 33, (She Walks) 42.

circle. “We found our women friends bathing in the river, and we joined them,” she recalled. “Other groups, men, women, and children, were playing in the water at many places along the stream. Some boys were fishing.” It was then that two boys came running and shouting, “Soldiers are coming.”[215] Black Elk remembered the beginning of the battle in a very similar way. On the day of the battle Black Elk was with several other boys guarding the horses as they grazed west of the village. It was a very hot day and when “the sun was straight above . . . we thought we would go swimming.” Leaving one boy the watch the horses the rest made their way to the Little Bighorn. He remembered “Many people were in the water now and many of the women were out west of the village digging turnips.” Eventually the other boy brought the horses to the river to drink, and it was then that a crier in the Hunkpapa camp began shouting “The Chargers are Coming! They are Charging!”[216]

A young Minneconjou, Standing Bear, was in camp when Reno’s battalion began its attack. The Minneconjous’ circle was downstream of the Hunkpapas’ and it was impossible to see what was causing the commotion. Standing Bear crossed the Little Bighorn, which was “breast deep” and climbed up the a hill on the east side of the river which he called “Black Butte”, today known as Weir Point. From this vantage he could see the cavalry moving down the valley. He then hurried back to the camp, but he had to be very careful, as “there was a big bed of cactus there. I had to go slow, picking my way.”[217]

After advancing approximately two miles down the valley, Maj. Reno ordered a halt. The battalion stopped, dismounted, and formed a skirmish line several hundred yards

[215] “She Watched Custer’s Last Battle,” 36-38.
[216] *Black Elk Speaks*, 91.
[217] *Black Elk Speaks*, 95-96.

south of the Hunkpapa camp circle and approximately at the site of the current Garryowen, Montana. As was standard practice, every fourth soldier remained behind the line as a horse holder. The skirmish line formed near a prairie dog town, although the contemporary accounts give little detail to its size. In one report, some of the men used the prairie dog mounds as breastworks.[218]

The valley floor was not perfectly flat, but cut by ravines and gullies, with one in particular shaping the initial combat. Shoulder Blade Creek cut through the bench between the skirmish line and the Hunkpapa camp circle. As the fighting began, Lt. Wallace was unable to determine the "nature or size of it," but stated "coming out of that ravine we could see plenty of Indians." Lt. Hare remembered that it was not until the troopers dismounted and formed the skirmish line that could actually see the ravine and then the warriors who "came pouring out of it as if concealed there and waiting for the soldiers." "As fast as they came out of that cooley [sic]," he testified in 1879, "they opened fire on the command from their horses."[219] During the same inquiry when Maj. Reno was asked if the soldiers could have made it to and cleared the ravine he responded, "The troops would not have got that far. By the time they got within a few yards of it, most of the men would have been dismounted; most of the saddles would have been emptied; and most of the horses killed."[220]

After leaving the ravine some of the warriors fired on the skirmish line from the protection of the timbered bottomlands. Sgt. Stanislaus Roy "saw ravines over toward the hill full of Indians shooting oblique to line." He added, "Some Indians were in timber in

[218] Stewart, *Custer's Luck*, 354; *Arikara Narrative*, 95
[219] Reno Court of Inquiry, 24, 237; Luther Hare Interview in *Custer in 76*, 66.
[220] Reno Court of Inquiry, 526.

advance of right of skirmish line and were firing on skirmish line in oblique direction – toward the southwest." The young Oglala Black Elk was among those warriors. He had taken his older brother's gun to him but instead of returning to camp he stayed to watch the fighting. "There was a brushy timber just on the other side of the Hunkpapas, and some warriors were gathering there," he said. The soldiers were shooting above us so that leaves were falling from the trees where the bullets struck." These accounts, from both the soldiers' and the Natives' perspectives, suggest that the warriors used the ravine and then the timber as sheltered rallying points. Natural processes changed this area of the battlefield sometime before 1910. In his notes for the Hare interview conducted that year, Walter Mason Camp added parenthetically "this has all been cut away by erosion of the river."[221]

Although accounts vary, the skirmish line held less than fifteen minutes until growing warrior pressure led to a redeployment of the line in the adjacent timbered bottomland south of the warriors' position. The area that the troops moved into was lower than the valley floor to the west and in places was the overflow channel of the river. Lt. DeRudio stated that "In the timber was a cleared place of 2 or 3 acres where there had been some lodges,' and there "was dry gravelly bed of a creek or wash from [the] river at high water."[222] Interpreter Fred Gerard believed that the lower ground benefited the troops, protecting them from fire from the west. He recalled, "no firing low enough could be made on the timber from that direction without coming right up to the edge of the bank or within

[221] *Black Elk Speaks*, 92; Stanislaus Roy Interview in *Custer in 76*, 112; Luther Hare Interview in *Custer in 76*, 66.
[222] *Custer in 76*, 85.

ten yards of the edge of the timber."[223] Gerard's comments speak to a long-standing debate over Reno's conduct during the battle. Some participants, including the Arikara scouts, believed that the cut bank at the edge of the timber offered a superior defensive position and that the troops should have remained there. Many others, however, argued that if the battalion had stayed it would only have been a matter of time before they were overrun and wiped out.[224]

Whatever the case, shortly after the Arikara scout Bloody Knife was killed while standing next to Reno, the major ordered the troops to withdraw from the timber. The retreat quickly lost all order. Men who had lost their horses fled on foot or were left behind. As the troops tried to retrace their steps to their original crossing, pressure from an increasing number of warriors cut off their move and forced them toward the river. It was also at this time that fire was first used as a weapon. Trooper John Sivertsen later said that "shortly after got out of timber Indians set fire to it in several places."[225]

Unable to reach the ford at Reno Creek, the fleeing troops desperately sought a way across the river. What became known as the "retreat crossing," was not a regular ford. The west bank was likely five feet high Chaos reigned as the mass of men and horses crashed down into the river. Because of the "considerable disturbance and confusion," Lt. Hare crossed just downstream, jumping his horse "into the stream, off a bank six or eight feet high."[226] Getting out of the riverbed posed an even more serious and potentially fatal obstacle for the battalion. The east bank was higher (Lt. Wallace estimated eight feet),

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[223] *Custer in 76*, 232-33.
[224] *Arikara Narrative*, 12.
[225] *Custer in 76*, 141.
[226] Reno Court of Inquiry, 239.

steeper, and there was no easy way up. [227] Private Roman Rutten of Company M remembered the scene at the retreat crossing:

> When I reached the river, the water ahead of me was full of horses and men struggling to get across. I thought I had better keep out of the muddle and so turned my horse downstream. The opposite bank was high and steep, and men were riding both upstream and downstream trying to find some place to get up. Finally the mob of horsemen made for a narrow trail cut by buffalo in going for water, which cut through the steep bank at a moderate incline. Before I reached it, a horse had fallen exhausted or shot right in this cut and was choking the passage, but he was pulled out. How it was done and so quickly, I did not see nor did I stop to inquire. The run up through this cut was a hard test of horse flesh.[228]

Trooper William E. Morris recalled the exit from the river in less dramatic fashion, but confirmed, "Getting up out of the water there was a ravine or washout going up to the top of the river bank, like a washout after a hard rain. The whole command passed through this."[229]

The Arikara scouts also remembered their retreat crossing (they did not cross at the same point as the troops) as difficult, but pointed out that the wet spring and early summer had both negative and positive implications for their survival. Crossing the river was indeed difficult, with very deep water in places and "the brush grew very thick on the opposite bank and the horses struggled hard before getting to land." Relatively lush

[227] Stewart, *Custer's Luck*, 372; Reno Court of Inquiry, 27.
[228] Roman Rutten Interview in *Custer in 76*, 118.
[229] William Morris Interview in *Custer in 76*, 132.

conditions, however, could also be an ally. Once on the east bank the Arikaras faced a growing number of Lakotas who again tried to use fire to drive the scouts from cover. But as Young Hawk recalled, the grass was simply too green to burn.[230]

While the majority of the battalion made its way up to the bluffs, the valley fight was not over for a handful of soldiers and civilians who found themselves stranded in the timber. For these men, the Little Bighorn River posed a serious obstacle and the accounts of their escapes provide a window on the river's flow and the nature of the riverbed. The meandering course of the river was always shifting and its depth varied greatly depending upon the river's width and its course at any given point. The accounts also suggest that the river remained relatively high, although it had clearly passed its peak runoff for the year. While often waist deep or less, deep holes lurked everywhere. Particularly treacherous was the deep water found along the cutbanks on the east side.

At least one Native source reported the presence of beaver in the Little Bighorn River at the time of the battle, yet another factor affecting its depth. The Hunkpapa Lakota She Walks With Her Shawl, one of the few women to actively participate in the fighting, recalled that in many places the river was very deep. This slowed the escape of some of Reno's troopers who were caught in the river and killed. As the bulk of Reno's men cleared the river and word spread that Custer's battalion was approaching the village to the north, She Walks With Her Shawl's party rode north to meet the new threat. They crossed the Greasy Grass immediately below a beaver dam where the water was shallow.[231]

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[230] *Arikara Narrative*, 98, 100.
[231] Quoted in Greene, *Lakota and Cheyenne*, 44-45.

One stranded group included Lt. DeRudio, Pvt. Thomas O'Neill, Fred Gerard, and scout William Jackson. When the battalion retreated DeRudio had lost his horse and for a time he and Jackson used a buffalo wallow for cover while watching "Indians passing back and forth out in the open." The four men waited for darkness to attempt their escape. The bluffs directly across the river from their position seemed to imposing so they decided to move upstream to the ford at the mouth of Reno Creek. At one point O'Neill, who was on foot, asked the mounted Gerard to ride into the river to check the depth. Gerard refused and so O'Neill waded in a few steps, only to plunge "into a hole up to his neck." The party eventually found a shallower crossing and made their way to a timbered island in the middle of the river. To their surprise a party of Lakotas was at the other end of the island. Gerard and Jackson rode off leaving the other men behind. The channel on the east side of the island was too deep to cross so De Rudio and O'Neill made their back to the west bank under fire and "found trees washed up in a flood against stumps enclosing a triangular space and into this they jumped and decided to try to stand." Fortunately for the men, the Lakotas fired a volley into the stumps but never came after them.[232]

After abandoning O'Neill and DeRudio, Gerard and Jackson searched in vain for a place to cross. Just before daylight they found what they thought was a ford – "My horse waded out some distance and suddenly plunged into deep water and had to swim, followed by Jackson's horse," Gerard told Walter Mason Camp. "He swam straight across and landed against a cut bank, and not being able to touch bottom, he immediately turned and swam back for the other shore." The two horses ran into each other midstream sending both men swimming, losing their carbines in the process. Jackson ended up on the west bank with the

[232] *Custer in 76*, 108-09.

horses and Gerard on the east. Jackson retrieved the horses and the men made their way upstream to the Reno Creek Ford. One again they encountered a war party and quickly hid. "We then went into thick timber and brush and tied the horses where they could graze and withdrew apace and crawled under some willows that had been bent over by flood waters and went to sleep." They were able to rejoin the rest of the command the following day.[233]

Native warriors used fire as a weapon and to produce a screen to obscure the village's movement. Black Elk told of an incident on the morning of June 26th. On the west bank of the river immediately below the bluffs where Reno and Benteen's men were entrenched there was a thicket of bullberry bushes. A Lakota boy had spotted a soldier hiding in the bushes and Black Elk and the other boys began firing arrows in the bushes like they were "chasing a rabbit." They then set fire to the grass around the bushes and the trooper made a run for it, only to be killed by warriors.[234] Fires also threatened DeRudio and O'Neill, but as with the Arikara scouts the previous day, green vegetation saved their lives. As the Native village moved south in the afternoon of the 26th, warriors set fires throughout the bottoms to obscure the soldiers' view. "The woods were on fire at the time all around us," DeRudio testified in 1879, "except a bunch of bullberries, and the grass was green around it, and we had withdrawn into to when the fire came."[235]

[233] *Custer in 76*, 235.
[234] *Black Elk Speaks*, 106-07.
[235] Reno Court of Inquiry, 274.

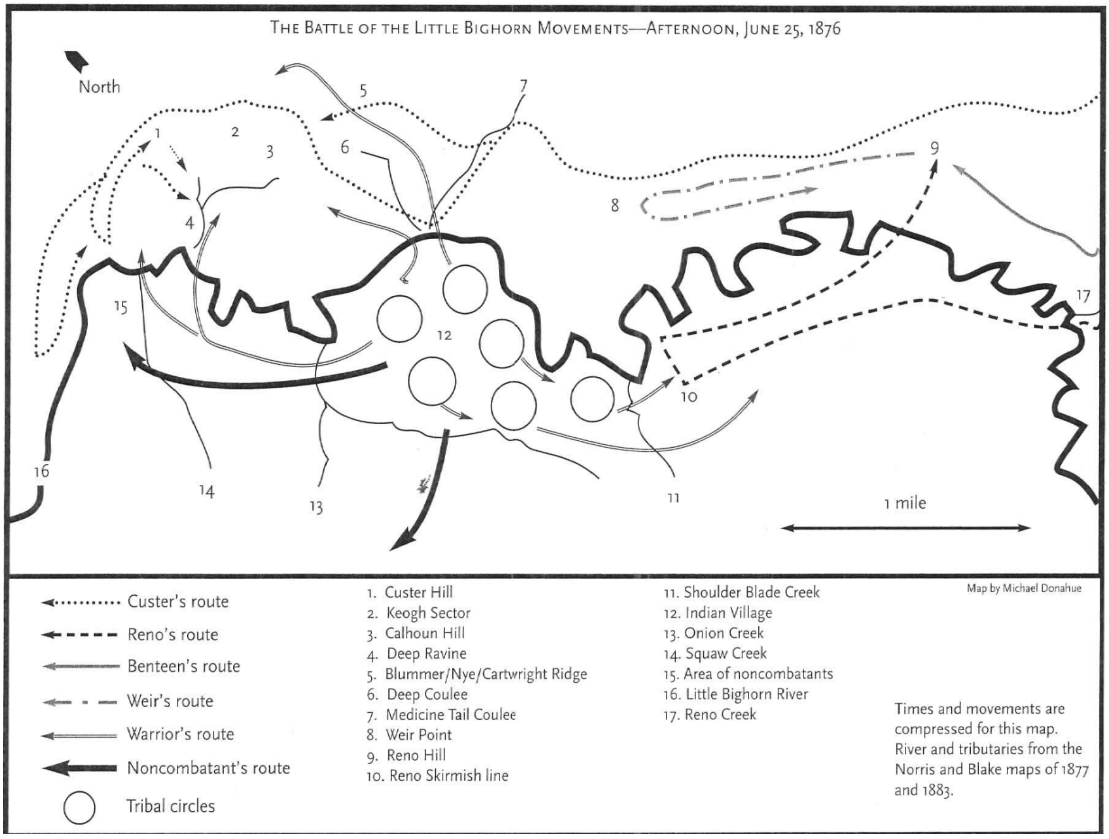

Figure 7. Overview of the Battle of the Little Bighorn. Source: Donahue, *Drawing Battle Lines*.

B. THE UPLANDS: THE CUSTER FIGHT AND THE RENO-BENTEEN DEFENSE SITE.

After separating from Reno's battalion, Custer led the five companies under his command north along the bluffs above the east bank of the river. It was somewhere near the area that became the Reno-Benteen defense site that Custer got his first view of the entire village. Trumpeter John Martin, who was the last man sent back with a message from the doomed battalion, said that there were "children and dogs playing among the tepees but no warriors or horses except few loose ponies grazing around." He remarked that the officers then debated the whereabouts of the warriors and surmised that many might be off

hunting, "recalling that they had seen skinned buffalo along the trail on June 24."[236] But as Native accounts indicate, the village was not quiet. The alarm spread and warriors raced to prepare for battle or get to their ponies. From the ridge Custer led the battalion over Weir Point into Medicine Tail Coulee. It was at this point that Adjutant W. W. Cooke dispatched Trumpeter Martin with a final message to Capt. Benteen; "Come on. Big Village. Be Quick. Bring Packs. P.S. Bring Pack." Martin was one of the last soldiers to see the battalion and after his departure the reconstruction of the battle must rely on Native testimony and archaeological evidence.

The traditional understanding of the Custer fight had the entire battalion moving down Medicine Tail Coulee to the ford on the Little Bighorn. There the troops were repulsed and retreated up to the ridge stretching north to Last Stand Hill. The combat was assumed to be personal and chaotic with soldiers in a desperate fight for their lives. By the mid-twentieth century, however, artifact finds coupled with Native testimony led to a reinterpretation of the battle.[237] Extensive archaeological work carried out after a 1983 wildfire swept over the Custer Battlefield buttressed these views of a far more complex battle and have essentially confirmed many of the Native accounts that for many years had been dismissed as inaccurate.[238]

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[236] Interview with John Martin, *Custer in 76*, 100.
[237] Jerome Green, A. *Evidence and the Custer Enigma: A Modern Study of the Custer's Last Stand Based on Indian Testimony and on Indian and Army Relics Discovered on the Battlefield since 1876* (Revised ed., Golden, CO: Outbooks Inc., 1986).
[238] See, Douglas D. Scott, Richard A. Fox Jr., Melissa A. Connor, and Dick Harmon, *Archaeological Perspectives on the Battle of the Little Bighorn* (Norman: University of Oklahoma Press, 1989); and Richard Allan Fox, Jr., *Archaeology, History, and Custer's Last Battle: The Little Bighorn Reexamined* (Norman: University of Oklahoma Press, 1993).

The movements and deployment of Custer's battalion remains the subject of reinterpretation. In the most commonly accepted view of the battle today, Custer divided his force a second time while in Medicine Tail Coulee. Only companies E and F, commanded by Capt. George Yates, then descended to the ford on Little Bighorn River, before turning and ascending Deep Coulee to the high ground known as Calhoun Hill. The remaining companies proceeded to Calhoun Hill via Nye-Cartwright Ridge.[239] Recent scholarship, however, suggests that all five companies reached the river before withdrawing in two groups; one to Calhoun Hill and the other to Nye-Cartwright Ridge. Soldiers engaged Wolftooth's party of Cheyenne on Luce ridge and the northern end of Nye-Cartwright in two separate actions, before the battalion reunited near Calhoun Hill.[240] There is more general agreement that Custer then rode north with companies E and F to press the attack against the north end of the village, eventually reaching the vicinity of the current National Cemetery and National Park Service administrative buildings. Either repulsed or drawn back by the worsening predicament of the troops on Calhoun Hill, Custer's immediate group moved back up hill, taking up a final position near the top of a narrow hogback ridge. At some point, the men on Calhoun Hill attempted an offensive charge. Its failure and a devastating counter attack led by the Cheyenne Lame White Man resulted in the collapse of the defense at Calhoun Hill. In short order resistance in the Keogh Sector, north of Calhoun Hill where Capt. Myles Keogh's Company I had taken up position, also broke down. Soldiers from these units attempted to reach Custer's position on what is now known as Last Stand Hill; few survived the journey. The remaining soldiers around Custer killed their horses for

[239] Green, *Evidence and the Custer Enigma*; Scott, *Uncovering History*.
[240] Need citation from Michael Donahue to support this.

breastworks but had no chance against the warriors who eventually overwhelmed them. The entire engagement took perhaps two hours.

While there are few direct references to the natural condition of the battlefield in Native sources, there are indications of how the topography and vegetation shaped the fight. The broken nature of the terrain in the Custer Battlefield area provided an advantage to the Native warriors. "Most of the warriors," recalled Kate Bighead, "when they got where they wanted to go, left their ponies back in gulches and hid themselves for crawling forward along little gullies or behind small ridges or knolls." Slowly the warriors moved forward taking advantage of the cover provided by the terrain. Bighead stated that the "old men now say" (she was interviewed in 1927) that this "fighting slowly without much harm to either side," lasted about an hour and a half.[241]

The nature of the vegetation also combined with the sloping topography of the Custer battlefield section to make the bow and arrow, at least in Bighead's estimation, a superior weapon to guns that day. She noted that not all of the warriors owned guns and even those who did rarely possessed an ample supply of ammunition. More importantly, "As the soldier ridge sloped on all sides, and as there were no trees on it nor around it, the smoke from each gun fired showed right where the shooter was hidden." A warrior shooting an arrow, on the other hand could not be detected. Moreover, arrows can be fired on an arc without the necessity of rising to aim at the target. Many arrows would certainly fall harmlessly to the ground, but "a rain of arrows from thousands of Indian bows, and kept up for a long time, would hit many soldiers and their horses." When Wooden Leg revisited the battlefield in the fall of 1876 he found hundreds of arrows still littering the

[241] "She Watched Custer's Last Fight," 38.

ridge top.[242] The lack of trees or large shrubs on the battlefield (big sage was present in the uplands but it was generally too small to be effective cover) made dead horses the best, albeit limited, defensive works. During the "Last Stand" Kate Bighead saw that "the remaining soldiers were keeping themselves behind their dead horses. The Indians could get only some glimpses of the white men, but it was easy enough to see where they were."[243]

Late in the final engagement on Custer Hill a handful of troopers broke from their positions and attempted to escape by running down what is now called Deep Ravine. Their bodies were interred after the battle where they fell but subsequent reburial parties were unable to locate their remains, giving rise to one of the enduring mysteries of the Battle of the Little Bighorn. In 1909, the Hunkpapa Good Voiced Elk remembered the men in fleeing into Deep Ravine. "Those who broke from the end of the ridge and tried to get away by running toward the river were dismounted," he said, "There was a deep gully without any water in it. I saw many jump over the steep bank into this gully in their effort to escape but these were all killed. There were probably 25 or 30 of these."[244] Native accounts generally place the number of men who fled into Deep Ravine at between 25 and 30, the most commonly cited figure from all reports (Native and non-Native) being 28.[245]

With all of the soldiers of Custer's battalion dead, Native warriors turned their attention to the troops suddenly visible to the south. Benteen's battalion and the pack train joined the survivors of the Valley Fight shortly after the latter had made it to the top of the

[242] "She Watched Custer's Last Fight," 38; *Wooden Leg*, 284-85.
[243] "She Watched Custer's Last Fight," 39.
[244] Interview with Good Voiced Elk, Camp Papers, Denver Public Library, fld. 64.
[245] Scott, et. al., *Archaeological Perspectives*, 39.

bluffs. Reno and Benteen consulted but made no rapid movement to the North to join Custer. Frustrated by the inaction, Capt. Thomas Weir, commander of Company D, eventually set out alone toward the high hill to the north that now bears the name Weir Point. Assuming that Weir had permission, Lt. Winfield S. Edgerly followed with the company. Soon the entire battalion was moving north. By the time the troops reached the point the Custer fight was entering its final stages. All that was visible from a distance of over two miles were warriors moving in and out of clouds of dust to the sound of isolated gunshots. Soon the warriors from the Custer fight took notice and moved south to meet this new threat. The onslaught of warriors forced a retreat back to the bluffs. For the rest of June 25th and most of June 26th, the Battle of the Little Bighorn became a siege.

The vegetation at the Reno-Benteen defense site was essentially the same as found father north. Grasslands interspersed with Big Sagebrush offered little cover. Major Reno later testified, "The men threw themselves on the ground . . .There was no protection except a growth, not exactly of sage brush, but it was what is called 'grease weed,' [sic] forming no protection whatever."[246] What Reno meant by "grease weed" is not completely clear. His statement might have been transcribed incorrectly. "Grease wood" is a common colloquial name for the creosote bush (*Larrea tridentata*), but this native of the Great Basin and desert Southwest does not occur in Montana. He may have been referring to young Big Sagebrush plants or to the Silver Sagebrush native to the area. Regardless, with no natural cover the troops piled boxes, saddles, and dead animals up as breastworks. Lt. Thomas McDougall recalled a gruesome but effective use for the dead animals; "As fast as horses or mules were killed they were rolled over on their backs and other horses were tied to the

[246] Reno Court of Inquiry, 507.

legs of the dead ones, thus releasing the horse holders to go up and assist the men on the line."[247] Standing Bear was among the warriors who rushed south. By the time he arrived the soldiers had already withdrawn to a defensive perimeter. "They had their pack mules and horses on the inside and they had saddles and other things in front of them to hide themselves from the bullets, but we surrounded them, and the hill we were on was the higher and we could see them plain." It is likely that the Standing Bear's position was on what is now known as Sharpshooter Ridge.[248]

Heat and sun made the siege conditions worse. "I remember seeing the sun go down as a red ball," Lt. Wallace later testified, "that is about the only fact that impressed itself on my mind." When night fell the attacks let up but troops were dispatched as pickets to guard against any attempts to breach the lines under cover of darkness. Capt. Benteen remembered, "The only thing you could see would be the flash of a gun. They came so close that they threw arrows and dirt over at us with their hands, and touched one of the dead men with a coup stick."[249] Sgt. Roy volunteered for picket duty and spent the night of June 25th "lying in grass and sagebrush." But as the sun rose and firing from Native warriors began anew, the sagebrush offered no safety and the pickets withdrew to the main lines.[250]

On the 26th the heat of the day and the lack of water became enemies for the besieged troopers. Kate Bighead recalled, "The sun was hot that day. I believe there were no clouds, and I know there was not any rain."[251] The troops had a different recollection. Wallace remembered the day as "cloudy and rainy." Sgt. Roy recalled that "A little rain fell

[247] Thomas McDougall Interview in *Custer in 76*, 71.
[248] *Black Elk Speaks*, 98.
[249] Reno Court of Inquiry, 35, 363.
[250] Stanislaus Roy Interview in *Custer in 76*, 113.
[251] "She Watched Custer's Last Fight," 41.

about noon of the 26th, and the men held ponchos to catch some of it but did not get much."[252] A mere twenty miles to the north, however, the troops of the Montana column experienced heavy downpours. Such localized rainfall was, and is, a common pattern during high Plains summers. Roy and two-dozen other troopers volunteered to go to the river and come back with water. For these actions they later received the Medal of Honor.

During the night the soldiers had also done their best to dig rifle pits and trenches using the few tools at hands as well and cups and anything else that might move dirt. On the morning of the 26th Standing Bear recalled, "We were scattered all around the soldiers, with our horses under the hill; but it was harder to hit the soldiers now, because they had been digging in the night. The day was very hot, and now and then some soldiers would start crawling down toward the river for a drink. We killed some of these and then the others would run away. Maybe some got water. I do not know."[253] Late that afternoon the warriors stared to slip away as the village prepared to move south, up the Little Bighorn Valley. As the firing ceased, the Battle of the Little Bighorn had come to an end.

C. THE AFTERMATH OF BATTLE: NATIVE MOVEMENTS, RELIEF FORCES, BURIAL PARTIES, AND EARLY MILITARY VISITORS.

After the battle, culture, crisis, and resources all influenced the movements of the combined camp. On the afternoon of June 25th the entire camp moved a short distance downstream and to the Northwest. Lakota and Cheyenne mourning traditions dictated that the people could not spend the night in a camp where death had occurred. Kate Bighead

[252] Reno Court of Inquiry, 35; *Custer in 76*, 114.
[253] *Black Elk Speaks*, 99.

recalled, “New camp spots were chosen, all of them back from the river and down the valley.” Few of the big lodges were set up that evening. “Instead, the poles and skins for them were packed for moving away quickly if necessary,” she stated. “The women gathered willow wands and built little dome shelters, or the people slept that night without any shelter except robe bedding.”[254] While women shuttled belongings, water and wood from the original campsite warriors continued to besiege the Seventh Cavalry survivors entrenched at the Reno-Benteen Defense Site.[255]

There was another reported use for willows in the native village following the battle: counting sticks. In a 1909 interview with Joseph K. Dixon, the Cheyenne leader Two Moons said that after the fighting concluded, “we gathered at the river bottom and cut willow sticks, [and] then some Indians were delegated to go and throw down a stick wherever they found a dead soldier.” The willow sticks were then collected and counted to determine the number of dead enemy. The count yielded, at least in Two Moon’s recollections thirty-three years after the battle, a wildly inflated number of 488 dead soldiers. (Only 263 were actually killed and of those only 212 on the Custer Battlefield area.)[256]

Late in the afternoon of June 26th Native scouts reported the approach of the Terr – Gibbon column from the north. While the young warriors itched to take on another fight, Sitting Bull and the other council chiefs decided to continue with their original plan and avoid conflicts whenever possible. The presence of infantry among the relief troops may

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[254] “She Watched Custer’s Last Fight,” 40.
[255] *Wooden Leg*, 252-55.
[256] Two Moons Interview with Joseph K. Dixon, 1909, in Richard G. Hardorff, ed., *Cheyenne Memories of the Custe Fight: A Source Book* (Spokane: Arthur H. Clark Company, 1995), 133.

also have been a factor. The Lakota Red Horse later said, "The coming of the walking soldiers was the saving of the soldiers on the hill. Sioux cannot fight the walking soldiers, being afraid of them, so the Sioux hurriedly left."[257] Hasty preparations for movement followed and the entire village moved southwest and ascended to the bench lands west of the Little Bighorn via Shoulder Blade Creek. Crazy Horse and other warriors set the prairie ablaze to create giant smokescreen and hopefully mask their movements from the soldiers. [GET SOURCE ON FIRE]. DeRudio and O'Neill, still stranded near the river, watched the massive village pass. The lieutenant estimated that the procession "lasted several hours before they all passed."[258] The people travelled late into the night, rested in the open for several hours, and then continued south and went into camp just north of the present site of Lodge Grass, Montana. The Lakotas and Cheyennes only stayed one night at that camp and moved the next day upstream to camp near present Wyola, Montana.[259]

Life became more difficult for the combined camp. Like many young men, Wooden Leg spent a good deal of time away from the main body hunting. Buffalo proved scarce along the line of travel, so deer, elk, and antelope were the staples. With soldiers nearby the hunters could not travel too far from camp and with only one night spent in each camp, meat supplies began to dwindle. As the days passed hunger became a constant.[260]

In the two weeks following the battle, the combined camp moved from the Little Bighorn to the valley of Rosebud Creek, descended that stream past the modern town of Lame Deer, and then crossed over to the Tongue and then arrived on the Powder River, not

[257] Greene, *Lakota and Cheyenne*, 37.
[258] Reno Court of Inquiry, 274.
[259] *Wooden Leg*, 275.
[260] *Wooden Leg*, 276.

far from where the Cheyennes had been attacked the previous March. While grass and game proved more plentiful, the demands of the large village could no longer be sustained and, according to Wooden Leg, the decision was made to split up. "By travelling separately, or in small bands, more meat could be taken by each tribe or band. The horses all could get more grass when scattered. Everybody agreed it was best to separate."[261] Bighead's account agrees with Wooden Leg. She recalled that the village remained intact for 16 nights after the battle, and that it was on the Powder River that "the six tribes separated, each tribe to go its own way."[262] Another Cheyenne, Tall Bull, recalled that the village stayed together longer, however, travelling down the Powder down to its mouth, over to north side of Black Hills, then back across the Little Missouri the Powder and up Crazy Woman's fork where they broke up.[263]

The troops with the relief forces left extensive and important descriptions of the battlefield area. The engineer officer Lt. Maguire marched to the battlefield along with Gibbon's troops. After a dry and exhausting twenty-two mile march up Tulloch's fork and over the divide between it and the Bighorn on June 25th, the soldiers reached the Bighorn River, which Maguire declared, "beautiful and refreshing." "The river at this point was about 200 yards wide, with a swift current of clear, cool water. It contained islands which like those of the Yellowstone, were thickly timbered, and had a carpeting of most excellent grass." The infantry camped a short time later on a "thickly timbered bottom," but the cavalry pressed on. The following day the column crossed the Little Bighorn about nine miles above its mouth. Here they first encountered a party of Lakotas or Cheyennes who

[261] *Wooden Leg*, 280.
[262] "She Watched Custer's Last Fight," 42.
[263] Tall Bull Interview in *Custer in 76*, 213.

kept their distance. They camped at 9pm on the 26th about nine miles below the Reno-Benteen defense site and five miles from the Custer battlefield. Here Maguire recorded, "This valley is about 1 ½ miles wide; the soil is good and the grass very fine. There is but little cactus or sage. The stream varies in width from about 30 to 75 yards. The current is rapid; the bottom a fine gravel, and the water beautifully clear and sweet. It is well lined with timber, much of it being of large size." The next day they moved down to the relief of Reno and camped on the river below the defense site.[264]

The other engineer officer with the column, McClernand, presented a more mixed picture of the Bighorn and Little Bighorn Valleys that suggests the grasslands became richer and cactus and sage less prevalent as one proceeded upstream. When the troops arrived at the Bighorn on the 25th he wrote, "The hills around us are barren and broken, growing little else but cactus." Yet the next day after the infantry and cavalry were reunited he recorded "a halt is made on the Little Big Horn, in a pretty spot covered with fine grass, and surrounded with beautiful groves of cottonwood and ash. The river is about 20 yards wide, and 2 ½ feet deep. . . . Passing along the west bank of the Little Big Horn, our route lies through a beautiful valley carpeted with fine grass."[265] On the evening of the 26th, McClernand reported that one officer looking through field glasses saw "something on the hills to the left looking like buffalo lying down." The next day they reach the battlefield and the grim reality set in, "What the officer saw yesterday looking like buffalo lying down are dead comrades and their horses." Perhaps he was overcome by the sight, for McLernand, like Maguire, left no description of the battlefield lands themselves. But on the 29th as the

[264] Maguire Report, 1348-49.
[265] McClernand Report, 1370.

troops evacuated the wounded toward the confluence of the Bighorn and Little Bighorn and marched across the high ground dividing the two rivers McClernand noted, "This plateau grows large cactus, and as the night is dark, it is very annoying to men and horses."[266] The annoyance could add insult to injury. Lt. McDougall remembered that during this night march to the Far West, the wounded Saddler Mike Madden was dropped out of his litter onto a cactus bush.[267]

Another source of evidence are the maps drawn by the engineers in the relief column. Between 1876 and 1881, Lt. Maguire produced or oversaw the production of at least eight different maps of the battlefield. Lt. McClernand actually began mapping the battlefield but was relieved of this duty by Maguire who was the senior of the two engineers. Plats were drawn and measurements and notes hurriedly taken on June 27th and June 28th, the dead were buried and the wounded readied to be moved. The first map Maguire drew was a rough sketch. It was revised and redrawn as a map dated July 2, 1876.[268]

[266] McClernand Report, 1371.
[267] *Custer in 76*, 73.
[268] See, Donahue, *Drawing Battle Lines*, 27-56.

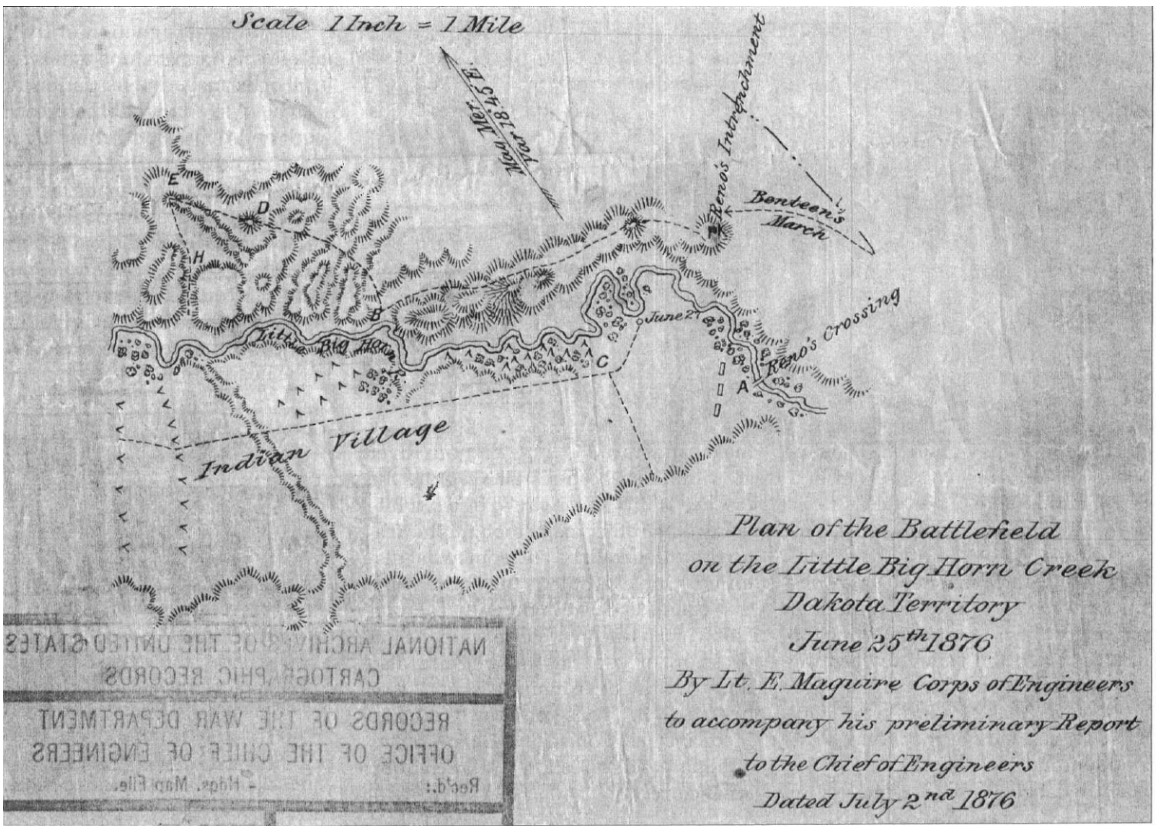

Figure 8. Maguire Map, July 2, 1876. Source: U. S. National Archives.

Although not to accurate scale, the map indicates several features of interest in an environmental history. While timber is indicated at the Reno Creek ford, Maguire shows none at the retreat crossing. Secondly, Maguire emphasized the ravine of Onion Creek running through the Indian Village and toward the river below Last Stand Hill.

Sgt. James F. Wilson, who was attached to Maguire's battalion of engineers, steamed up the Bighorn River on the Far West. While he did not see the battlefield itself, his report contains important descriptions of the rivers as well as notations of abundant wildlife. Wilson reported that the Bighorn was approximately "150 yards wide at its mouth with a depth of from 3 to 8 feet." The fact that the Far West could ascend the Bighorn was an indication that the spring runoff had not finished. Wilson's comments from the day of the

battle confirm both this fact, and the engineer officers' assessment that the quality of the grass and timber improved higher up the valley. He wrote,

> The current of the Big Horn is much swifter than that of the Yellowstone, with a depth varying from 3 to 8 feet; 5 ½ feet of water at Josephine Island. Rapid water was encountered on two occasions during the day's travel. The country as we advance becomes richer, the hills on the right bank close gradually in, and the left bank is low, thickly timbered, and well grassed. Game appeared to be abundant in the valley, as we saw a herd of 8 elk on the right bank in the afternoon. Passed many old Indian encampments. Heavy rain fell during the night. Pine timber was obtained at the point where the boat was tied up. Maximum thermometer, 91˚; minimum thermometer, 63°.[269]

On the following day the sergeant recalled that the narrowing channel was also deeper and easier to navigate. He calls the country "extremely rich and fertile." The heavy rains that fell the previous night and later in the day kept temperatures a full twenty degrees lower. Of course, these rains fell too far north to help the men besieged at the Reno-Benteen defense site.[270] On June 27th the Far West reached the mouth of the Little Bighorn. Just below the confluence, Wilson noted fifteen mountain sheep on the ridge to the east. "The valley of the Little Big Horn is well timbered," he wrote, "and about 1 ¼ miles wide at this point. Near the mouth of the stream are many dangerous quagmires." On June 28th Wilson and the Far

[269] Report of Sgt. James F. Wilson Report in ARSW 1877, 1378.
[270] Wilson Report, 1379.

West remained at the mouth of the Little Bighorn, where he recorded, "Elk and deer killed here. Good fishing."[271]

While Wilson was enjoying his time on the river, the survivors of the Seventh Cavalry, with the assistance of some of the relief troops, turned to the gruesome task of burying their dead. Nearly three days of 90 degree heat had sped decomposition and the smell on the battlefield was nauseating. A shortage of shovels made digging difficult. The burials were rudimentary. Soldiers were generally buried where they fell, although the dead at the Reno-Benteen defense site were gathered into trenches. In many cases graves were not dug but rather earth piled up over the bodies. "As we had but few spades, the burial of the dead was more of a pretense than a reality," Lt. McClernand later wrote, "A number were simply covered with sagebrush." Pvt. William White of the 2nd Cavalry agreed and called the burials "respectful gestures" with most covered over with sage brush and scraped up dirt."[272] The burial of officers generally received more attention but even in these cases the conditions on the field prevented true burials. Jacob Adams related how he circumvented Lt. Gibson's order to move Lt. McIntosh's body from the valley to the top of the bluff for burial. "The fire [set by warriors on the 25th] had run through the grass and scorched," McIntosh's body. Adams "disliked" his assigned task, and told Gibson "I knew no way to pack it." The lieutenant relented and allowed Adams to bury the remains in the valley.[273] Modern archaeological evidence indicates that burial pits were dug only 12 to 14

[271] Wilson Report, 1379-80.
[272] Quoted in William A. Graham, *The Custer Myth: A Source Book for Custeriana*. (Harrisburg, PA: The Stackpole Company, 1953), 365.
[273] Jacob Adams Interview in *Custer in 76*, 122.

inches deep.[274] As a result of the hasty burials exposed human remains became a common sight on the battlefield in later years, even after the reburial effort of 1881 that interred most of the troopers' bodies in a mass grave atop Last Stand Hill.

In one instance the actions of the burial parties resulted in a change to the battlefield's landscape. This was in Deep Ravine, where two-dozen or more soldiers had fled near the end of the Custer fight. Contemporary accounts suggest that the men became trapped and died at a steep "headcut" in the gully. The burial party found the remains too putrid to move, and instead buried them in the ravine by caving in the walls. At this point the geomorphology of Deep Ravine came into play. Excavations in the 1980s (discussed in Chapter 4) indicate "The recent history of Deep Ravine has been characterized more by an accumulation of sediments than by severe erosion." The actions of the burial party may have affected the process of erosion and sedimentation and as a result, the remains in Deep Ravine are probably buried very deeply under sediments.[275]

As the soldiers of the Seventh Cavalry buried their dead, they also traversed the battlefield and described important sites of combat, perhaps none more critical or controversial than Medicine Tail Coulee Ford. In 1879 Lt. Wallace testified,

> It had all the appearances of a ford on our side – on the side we approached it [east]. There were pony tracks by the hundred where they came into the stream but I saw no place on the other side where they went out. The stream was not over two feet deep and the bottom was apparently sandy or gravelly. On the other side there was grass growing along the stream and it had the appearance of being soft, with some

[274] Scott, et. al., *Archaeological Perspectives*, 21-23.
[275] Scott, et. al., *Archaeological Perspectives*, 41, 224-26.

> few tracks on the other side. Whether it was a ford or not I don't know. It had not been used a great deal but there had been some horses across it.[276]

Scout Fred Gerard called it a "watering place." He conceded that it might have been used as a crossing but asserted that "the right shore was gravelly and the Indians used it as a watering place."[277]

One of the first groups to revisit the battlefield was a group of Cheyennes that included Wooden Leg. The young men had set out on a war party to Crow country in the late in the fall of 1876, and on a cold, clear day they walked over the battlefield, remembering their deeds and the warriors who had been killed. Wooden Leg described the scene this way:

> Dirt and Sagebrush mounds now were at the places where had been the dead soldiers. In a few places we could see some parts of their bodies exposed. But mostly the graves were good, except they had no stones piled over them. At one end of many different ones of the graves was a straight board stuck into the ground, to stand up there. They were straight boards, not crosses. Dead horses were lying in decay here and there among the graves. Wolves had been eating at the horses. I did not notice any place where it appeared that the wolves had been at the graves.[278]

[276] Reno Court of Inquiry, 29.
[277] Reno Court of Inquiry, 88.
[278] *Wooden Leg*, 284.

They found "many hundreds of arrows" lying on the ridge. They scoured the battlefield for cartridges, finding several entire boxes. On their way home they followed the familiar trail up Reno Creek and over the Wolf Mountains.[279]

Col. Michael V. Sheridan, younger brother of the commander, led the exhumation and first reburial party to the battlefield just over one year after the fight. Sheridan's report is brief and focused on his assigned task. Arriving at the battlefield on July 2, 1877, the party immediately set about locating and disinterring the remains of most of the Seventh Cavalry officers. With the exception of Lt. John Crittenden, whose body was reburied where he fell according to his family's wishes, and the remains of four officers that could not be identified, the remains were placed in coffins for transport east. Lacking the lumber for more coffins, Col. Sheridan sent burial parties out across the battlefield to rebury the enlisted dead "who had been partially exposed by the ravages of coyotes." With their grim tasks complete the party retuned to Post No. 2 late on July 4th.[280]

Although denied the opportunity to travel with the Sheridan reburial party, John H. Fouch, the first camp photographer at Fort Keogh made his way to the battlefield within days of the Sheridan party's departure. Fouch became the first person to photograph the battlefield. Evidence suggests that Fouch commercially produced at least two images of the battlefield, yet only one has been discovered.

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[279] *Wooden Leg*, 284-85.
[280] Col. Michael V. Sheridan to Gen. Philip H. Sheridan, 20 July 1877, reprinted in Graham, *The Custer Myth*, 373-75; Greene, *Stricken Field*, 22-24.

Figure 9. "Where Custer Fell" - John H. Fouch, July 1877. Source: Collection of James S. Brust.

"Where Custer Fell" was taken from the summit of Custer Hill and looks west toward the Little Bighorn River.[281] It is an eerie photograph dominated by the skulls of cavalry horses in the foreground. But it is also an important environmental historical document that illustrates the condition of the battlefield just over one year after the fight and before great ecological changes came took place. The photo illustrates that the dominant vegetative

[281] James S. Brust, Brian Pohanka, and Sandy Barnard, *Where Custer Fell: Photographs of the Little Bighorn Battlefield Then and Now* (Norman: University of Oklahoma Press, 2005), 19-20, 130-33

pattern in upland section of the battlefield was that of northern mixed grassland interspersed with substantial amounts of big sagebrush (*Artemisia tridentata*). The height of the sage, however, is not great, perhaps 1 to 2 feet. Because Big Sagebrush is not fire tolerant and requires a substantial period for re-growth after a fire, the photo suggests that while fire had certainly swept the battlefield in the past, it could have been two or more decades since the last severe fire in the immediate area. Wooden stakes, marking cavalrymen's graves, are visible. In the distance the Little Bighorn River flows around a bend with a substantial band of timber in evidence.

Later in July, 1877, Gen. Philip Sheridan himself visited the battlefield as part of an extensive inspection tour. In his summary account of the trip north from the Union Pacific line in Wyoming he extolled the quality of the grasslands found in the vicinity of the battlefield. From the vantage point of Post No. 2, soon to become Fort Custer, he described the Bighorn and Little Bighorn drainages generally as "a scenery of undulating valleys watered by mountain streams fringed with timber, the soil being excellent, hillsides and valleys covered with bunch, buffalo, grama, blue, and other grasses, intermixed with wild flowers." Sheridan went on to describe the valley of the Little Bighorn in even more glowing terms; "The valley of the Little Horn, at this season, was almost a continuous meadow, with grass nearly high enough to tie the tops from each side across a horse's back." The general remarked that the valley was only a year removed from being the "country of the buffalo and the hostile Sioux," but that "there are no signs of either now." He also foresaw the coming cattleman's invasion of the region, noting that compared to the central and southern Plains, the "cattle-range here . . . is superb." He attributed the

superiority of the range to climate. “In the latter part of the summer and fall the climate is so dry that the grass makes hay without being cut.”[282]

Sheridan’s daily journal of the march north provides even more detail on the environmental conditions found in the Little Bighorn Valley. After striking the Little Bighorn, the Sheridan party followed the east bank of the river and encamped at Lodge Grass Creek on July 20th. Of the day’s march Sheridan recorded: “Wood abundant; water good; grass, numerous varieties, excellent.” The following day, July 21st, the party descended the Little Bighorn and camped in the midst of the midst of the previous year’s battlefield at the site occupied by the combined Lakota-Cheyenne village. Above the battlefield Sheridan found “rich and excellent grasses, such as bunch, g[r]ama, and blue, with the wild rye and pea-vine, covered hill and valley.” At the site of the battlefield, however, the general found good timber but “grass only fair, owing to a recent hail-storm, which had almost completely destroyed all vegetation.” Leaving “Seventh Cavalry” camp the next morning the expedition made its way to Post No. 2, mostly traversing the high ground west of the river. Echoing earlier reports that the quality of the grasslands decreased as one descended the Bighorn Valley, Sheridan wrote “The valley of the Little Bighorn is covered with most excellent grass to its junction with the Bighorn, but on the highlands, as the new post is neared, the grass become very short and thin, and is almost entirely eradicated by the prickly pear.” And once again Sheridan predicted the change that would come. He wrote, “No portion of our western country can boast of a more beautiful

[282] Philip H. Sheridan to AG, 29 September 1877, in *Reports of Inspection made in the Summer of 1877 by Generals P. H. Sheridan and W. T. Sherman* (Washington: Government Printing Office, 1878), 4-5.

and well-watered grazing region." "Nowhere does a greater variety of luxuriant, rich and nutritive grasses grow."[283]

In the Sheridan party were a number of officers assigned to record and report on the region's natural history. Assistant surgeon J. H. Patzki detailed the botanical resources encountered along the expedition's course. He was particularly impressed with the "fertility of the valley of the Little Bighorn which may well promise rich wheat crops in a time not far distant." Patzki provided a thorough description of the community of grasses found on both slopes of the Bighorn range. "The most nutritious species of the grasses, as the buffalo-grass (*Buchloe dactyloides*), gama [sic] grass (*Bontclona oligostuchya* and *B. cartipendula*) bunch grass (*Festuca*), he wote, "Several specie of *Muhlenbergia, Foa Andropogan, Bromus*, & c. form a dense turf." In addition to these species he also found "several species of wild rye (*elymus*), barley (*hordeum*), oat-grass (*danthmia*), blue joint (*Triticum repens*)," in the Little Bighorn Valley. The lush grasses of the valley caused the surgeon to wonder if "the river owes its Indian name 'Greasy Grass' to this marked fertility." Patzki provided an equally valuable description of the riparian vegetation found along the river's course. He wrote, "The timber along the Little Bighorn consists of fine cottonwood trees and box-elder (*Negundo aceroides*). The underbrush is formed by willows, roses, dog-wood, (*Comus pubescens*), *Lymphoricarpus, Prunus Virginiana* (cherry), buffalo or bull-berry (*Sheperdia Argentea*), black currant (*Ribes auratum*), gooseberries (*Ribes aureum* and *R. irrignum*)." [284]

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[283] *Reports of Inspection Made in the Summer of 1877*, 10.
[284] J. H. Patzki to Gen. P. H. Sheridan, 14 August 1877, in *Reports of Inspection Made in the Summer of 1877*, 20-21.

Despite the work of the younger Sheridan's burial party human remains were visible across the battlefield, and so General Sheridan detailed Maj. George A. Forsyth of his personal staff with a detachment of sixty men and three officers to survey battlefield and rebury any exposed human remains. The major reported optimistically that the graves were "in as good a condition as, under the circumstances and considering the extreme lightness of the soil and the entire absence from it of clay, gravel or stones, could have been expected." The party did find two graves on the high ground east of the river that "wolves had dug for prey," as well as several more west of the river that had been "disinterred by wolves." The greatest disturbance to the graves came not from wildlife, however, but from topography and the nature of the soil. In one ravine the men found several exposed skeletons that had washed out of the steep slope. Forsyth remarked that the earth there was "as easily washed out as so much ashes." In all the party discovered and reburied all or parts of seventeen skeletons.[285]

Other observers, including Lt. John Bourke and a correspondent for the *New York Sun*, who were on the field at the same time, painted a very different picture of the battlefield, with many bodies still unburied. In August of 1877, Maj. Alvarado Fuller visited the battlefield from nearby Fort Custer and recalled, "the dead had been dug up by wolves, and the bones were scattered in every direction. In some cases we found the feet still in the boots, money in men's clothing, tobacco, etc." Lacking proper tools, Fuller and his men improvised and used the thighbones of horses to scoop out makeshift graves.[286] A visit by a

[285] George A. Forsyth to Gen Philip H. Sheridan, 8 April 1878, reprinted in Graham, *The Custer Myth*, 371.
[286] Alvarado Fuller to Walter Mason Camp, 30 September 1911, Walter Mason Camp Papers, Denver Public Library.

military party led by Lt. Col. Albert G. Brackett in September 1877 also found the remains of many soldiers exposed.[287]

Another early, account of the battlefield's condition came from Ami Frank Mulford, a trumpeter assigned to Company M of the reconstituted Seventh Cavalry in the wake of the battle of the Little Bighorn. In his memoir, published shortly after he left the army in 1878, Mulford recounted a trip to the battlefield "About fourteen months after 'Custer's Last Charge,'" placing his visit in August or September 1877. Mulford did not name the officers in command but it is possible he was part of Brackett's party. Hi account is often lurid and clearly partisan. He i highly critical of Reno's actions for instance. Still, he offers two intriguing insights into the plant and animal communities found at the battlefield.

First, Mulford argued that continual use by Native peoples had denuded the timber along the Little Bighorn. He wrote that the "thin growth of timber" along the river "at one time extended all over the bottom," but that tree cutting to "secure the bark for food for ponies during the winters, had left the central portion of the strip almost barren." Tree bark, especially that of cottonwoods, was indeed a crucial source of winter forage for Native ponies. Still, Mulford's account stands out as an anomaly. No other sources report such a visible impact along the Little Bighorn and there is little evidence that the village site from 1876 was used habitually as a winter camp. It is probable that Mulford saw evidence of this practice in other places during his years on the Plains and simply assumed that this was the case for the Little Bighorn, or perhaps, the impact that he reported was the result of the unprecedented size of the combined Lakota and Cheyenne camp. Whatever the case not all of the timber was equally impacted. Mulford recalled that at the south end of the

[287] Greene, *Stricken Field*, 27.

village site "we passed through a dense brushy grove, covering three or four acres." The trumpeter erroneously believed that this grove was the hiding place of the women and children throughout the battle.[288]

Second, Mulford's party spent a restless night camped in the midst of the village site near Medicine Tail Coulee Ford. It was not fear of attack or an eerie sense of the place that kept the men awake, but wildlife. One source of disturbance was "coyotes and wolves [that] kept up their horrid din, as though angry at being deprived of their accustomed nightly hunt for scraps of muscle and flesh on bones scattered about." Noisy canids proved to be the least their worries as soon one of the men leapt up after what he assumed to be a snake crawled over him. The troops quickly mobilized to hunt the "unwelcome intruders." Instead of snakes, however, they found "lizards, hundreds of the slimey green things, and the slaughter continued until the last one found was dead." A short time later the lizards were back and "another slaughter of lizards" commenced. So shaken by the experience the hardened troops "lay and sat around until morning dawned." [289] Mulford's account may seem exaggerated, but twentieth century accounts and studies indicate that reptile populations at Little Bighorn can be very volatile depending on the season. Two species of lizards and one salamander occur at Little Bighorn. The lizards – the Greater Short-horned Lizard (Phrynosoma hernandesi) and the Sagebrush Lizard (Sceloporous graciosus) – are

[288] Ami Frank Mulford, *Fighting Indians in the 7th United States Cavalry* (Corning, NY: Paul Lindsley Mulford, 1878), 146.
[289] Mulford, *Fighting Indians*, 147.

upland species, and it is unlikely that either was the soldiers' scourge. It is possible that the culprit was the Tiger Salamander (Ambystoma tigrinium) that inhabits riparian areas.[290]

The next day Mulford and his companions examined the battlefield itself. His brief account of the landscape is generally accurate, if lacking in detail; "The ground is covered with sage brush, course grass, prickley [sic] pears, and is destitute of rocks and timber." Near the summit of Last Stand hill he reported that remains of eighteen troopers were found uncovered, stacked in six piles with a piece of tepee pole marking each. On one post hung a bullet torn "white sombrero" that had belonged to an unfortunate cavalryman. Nearby they found a rusted and blood stained axe, doubtlessly used in the "frenzied mutilation" of the dead. According to Mulford the bones of men and horses lay scattered nearly everywhere.[291] Yet his visit came about one month after Michael Sheridan's party had removed the remains of most of the officers and Forsyth's detail had reported the graves to be in generally good condition with few reburials needed. Perhaps, Mulford mistook the large quantity of exposed horse bones for soldier's remains, or perhaps he misremembered the date of his visit and actually saw the battlefield before the arrival of the reburial parties. It is also possible that his grotesque description of the battlefield was an accurate picture of its condition, one that Gen. Sheridan did not want to reach the public.

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[290] National Park Service, *Prairie Wildlife: Nature Guide and Checklist*, Little Bighorn Battlefield National Monument.
[291] Mulford, *Fighting Indians*, 148-49.

IV. The Little Bighorn Battlefield, June 1876.

As the accounts above illustrate, the descriptions left by battle participants and observers and the very earliest visitors to the battlefield are essential for understanding the environmental conditions on June 25th and 26th, 1876. Combined with scholarly studies carried out in the nearly century and a half since the battle, these accounts provide a picture of the historic landscape and ecology of the area. The following section summarizes the evidence presented above and suggests a snapshot of the battlefield in terms of the vegetative communities and wildlife present, as well as the nature and impact of fire, weather, and the Little Bighorn River on the battle.

A. GRASSLAND AND RIPARIAN VEGETATION.

In a 1987 study, Jane and Carl Bock argued that historically the grasslands of Little Bighorn were a fairly rich northern mixed grass prairie at the interface of sagebrush steppe country. The historic evidence presented above tends to confirm this assessment. Because the vast majority of nineteenth century sources lack reference to specific species, and because no surveys of the vegetative communities at Little Bighorn took place until the late twentieth century, it is impossible to determine the exact makeup of grassland species on the day of the battle. Still, by comparing historic accounts, such as the valuable list provided by surgeon J. H. Patzki in 1877, with modern vegetation studies it is safe to assume that the dominant species were the native grasses still found on the battlefield today. The dominant native grasses today at the park are Bluebunch Wheatgrass (*Agropyron spicatum*), Thickspike Wheatgrass (*Agropyron dasystachyum*), and Alkali Bluegrass (*Poa juncifolia*), with Junegrass (*Koeleria macrantha*), and Needle and Thread also being very abundant.

Bluebunch Wheatgrass, was the most common species, accounting for over 30% of the total vegetation in the park.[292] While the species composition of native grasses was very likely similar to today, the grasslands of the valley on June 25th and 26th certainly exhibited the effects of grazing by the enormous pony herd of perhaps 20,000 head. Although Native accounts only specifically mention the collection of prairie turnip, it is a reasonable assumption that the many herbs and forbs detailed in chapter one of this report were also being collected and used.

While specific species of grasses and forbs generally went unidentified in historic sources, larger shrubs and plants are much easier to identify with certainty. In both Native and soldier accounts the two plant species mentioned most often were sagebrush and cactus. It is apparent that Big Sagebrush was quite common across the entire battlefield, including the valley floor and the uplands. Other species of sage were certainly present, but the historical accounts do not distinguish between them. Big Sagebrush provided cover, albeit minimal, during the fighting at the Custer Hill and the Reno-Benteen site. Most of the historic accounts simply refer to "cactus" although judging by size and the annoyance factor involved, almost all of the accounts certainly refer to prickly pear (*Opuntia polyacantha*).

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[292] Bock and Bock, "Vascular Plants," 9-10; Bock and Bock, "Effects of Fire," Part IV," 6-7; "Little Bighorn Battlefield," in An Identification of Prairie in National Park Units in the Great Plains, NPS Occasional Paper No. 7, Section Two: Identification of Prairie in National Park Units, 13. The other native grass species found at Little Bighorn in 1986 were Wild Ry (*Elymus trachycaulus*), Redtop (*Agrostis giganteum*), Canbys Bluegrass (*Poa canbyi*), Fowl Bluegrass (*Poa palustrus*), Sandberg Bluegrass (*Poa sandbergii*), Green Needlegrass (*Stipa viridula*), Big Bluestem, Sideoats Grama, Blue Grama, Prairie Sandweed (*Calamovilfa longifolia*), Plains Muhly (*Muhlenbergia cuspidata*), Alkali Sacaton (*Sporobolus airoides*) and Sand Dropseed (*Sporobolus cryptandrus*), Northern Reedgrass (*Calamagrostis inexpansa*), Switchgrass, and Common Reed (*Phragmmites australis*).

In the riparian areas of the battlefield then and today the most visible species was cottonwood (*Populus deltoides*). Cottonwood trees provide firewood for native peoples and their bark served as an important source of supplemental forage during winter. Interestingly, one account (Mulford's) suggests that cottonwood bark was also being used as forage during the summer. This may have been a misperception or it could have reflected the extraordinary needs of the combined village's pony herd. Willows, most likely Peachleaf Willow (*Salix amygdaloides*) and Sandbar or Coyote Willow (*Salix exigua*), were the most commonly mentioned riparian tree. Their thick growth provided some cover for Reno's troops and Native women used them to construct temporary wickiups on the evening of June 25th. Many other mentions exist of unidentified shrubs and bushes along the river. It is likely that they were the dominant native species that still exist today. These include Alderleaf Buckthorn (Rhamnus alnifolia), Silverberry (*Eleagnus commutata*), Golden Currant (*Ribes cereum*), and Buffaloberry (*Sheperdia argentea*).

B. WILDLIFE.

An absolute wealth of wildlife was present on and in the immediate vicinity of the battlefield in 1876. This is not surprising as wildlife – more specifically large grazing game species – was at the heart of regional conflicts, both between Native groups and between Natives and Euro-Americans. For decades the Little Bighorn Valley and the other southern tributaries of the Yellowstone such as the Powder and Tongue Rivers, were the center of a contested Native hunting ground. Through the first half of the nineteenth century the Lakotas and their allies the Cheyennes and Arapahos had expanded into the "Powder River Country" at the expense of the Crows. Yet these conflicts created a sort of game preserve in

the area. By the mid-1870s the country surrounding the Little Bighorn was one of the last on the Great Plains where substantial bison herds could be found.

Both Native and Army accounts indicate the presence of large bison herds along the path that the great combined village followed and in direct proximity to the battlefield. Bison might have been the principal reason for the combined village's presence in the Little Bighorn valley, but it is clear other important game species were present. Cheyenne accounts indicate that large antelope herds were spotted downstream of the battlefield and this was the reason that village leaders decided to move down the valley. Numerous Army accounts also mention the presence of bison and antelope as well as elk, both mule deer and whitetail deer, and even one mention (Wilson's) of bighorn sheep.

Only a few descriptions of small non-game species exist in the historic record. Of these species wolves and coyotes are mentioned most, and always in relation to disturbing graves after the battle rather than actual sightings. Two small mammals are also mentioned in the record. She Walks with Shawl reported the existence of beaver dams on the Little Bighorn. Several accounts mention the existence of a prairie dog town at the point that the original skirmish line was formed during the valley fight. Although there is no mention of black-footed ferrets in any of the historical accounts, it is reasonable to assume that a population of the small mammals existed in relation to the prairie dog colony given their common presence in the region. With the exception of Mulford's account of being overrun by "lizards," there are no mentions of the myriad of other small mammals, reptiles, amphibians, or birds that are found on the battlefield today. The lack of historical references to small species is more a reflection of the observers' interests than an

indication that they were absent. Simply put, both Native and non-Native observers tended to remark on large species that they relied upon or that impacted their lives.

C. WEATHER.

The conditions during the Campaign of 1876 and the Battle of the Little Bighorn illustrated the variability and volatility of weather on the Great Plains. Up to the middle of June, 1876 had been a relatively cold and wet year. Severe weather had delayed Gen. Sheridan's plans to begin the campaign in late winter. Once the Dakota column got under way in mid-May, it experienced persistent rains, punctuated by a notable snowstorm, which made travel slow and difficult. At the same time the troops of the Montana Column camped in damp conditions and noted rising rivers. The cold, wet weather was likely a boon to the great combined village as it promoted the growth of early season cool season grasses that fed both their ponies and the bison herds.

By the time the Seventh Cavalry began its march up Rosebud Creek, however, a warm, dry weather pattern emerged. The day of the battle was hot and clear. On the steamer Far West the temperature was measured at 91° Fahrenheit on June 25th. The 26th was just as hot on the battlefield. Trapped on the bluffs, away from the river and with no shade, the heat experienced by the troops at the Reno-Benteen site was even greater. Yet, heavy localized rains, a typical summer pattern, were falling only twenty miles north of the besieged troops and keeping temperatures in the immediate area substantially lower. The weather, it could be said, proved to be a natural ally of the Lakotas and Cheyennes, and a natural enemy of the Seventh Cavalry at the Little Bighorn.

D. THE LITTLE BIGHORN RIVER.

Weather was clearly an important factor influencing the immediate condition of the Little Bighorn River. The weight of the historical evidence suggests that on the day of the battle the Little Bighorn was flowing strong, perhaps higher than average. The cold spring had delayed snowmelt in the Bighorn Mountains and the river probably peaked later than normal. The evidence, such as soldiers' accounts of willows laying flat from previous floodwaters, indicates that the river had peaked some time shortly before the battle. The depth of the river was always variable. It was shaped as much by the river's course and underlying geology as flow, but on the day of the battle the higher water certainly made crossings more difficult.

Longer-term natural processes of erosion and deposition were also occurring and helped to shape the nature of the battlefield. The meandering river, shallow and gravelly in places, but filled with deep holes and rimmed by steep cutbanks proved an obstacle for Reno's men. Its timbered bottoms, in many cases 3 to 5 feet lower than the larger valley floor, provided cover and were the site of intense combat during the Valley Fight. The same cutbanks that provided shelter, however, also became death traps as the troops tried to re-cross the river and escape to the bluffs. Once entrenched and besieged, the same river became the only viable source of water for the troops and again became the scene of valor and death.

E. FIRE.

As illustrated in chapter one of this study, fire, both natural and anthropogenic, was a regular part of all Great Plains ecosystems. The site of the Little Bighorn battle was most

certainly shaped by fire, as it was by other natural forces and human-animal interactions. Still, the spring of 1876 had been wet and cold and there is no evidence of natural – i.e. lightning strike – fires in the vicinity of the battlefield before or at the time of the battle. Nor is there any mention of human ignited fires before the day of the battle. Indeed, the presence of big sagebrush across the battlefield indicates that the actual battlefield area had not experienced a serious burn in some time.

Once the battle began, however, it is clear that Lakota and Cheyenne warriors used fire as an offensive weapon, and that when the village moved off to the south after the battle, fires were set as a defensive screen. Most notably, warriors set, or attempted to set, fires as a means of forcing Reno's men out of the timbered areas along the Little Bighorn River. As the great combined village moved away from the battlefield more fires were set to screen the movement. And as Black Elk's account suggests, as the bands moved east, fire continued to be used as a defensive weapon to deny forage for the pursing soldiers' horses.

The Little Bighorn Valley in 1876 was not a pristine wilderness, but a landscape shaped by both natural and historical forces. Still, the ecology of the valley and the battlefield had remained essentially intact since the advent of the horse-bison economy a century and a half earlier. The plant and animal species, with the great exception of the horse, were native to the region. In the decades after the battle, however, and as the following chapter illustrates, great and relatively rapid changes came to the Little Bighorn Valley and all of southeastern Montana.

CHAPTER 3: THE LITTLE BIGHORN BATTLEFIELD UNDER WAR DEPARTMENT MANAGEMENT, 1877-1940.

The events of June 25 and 26, 1876, transformed the low hills, bluffs, and meandering course of the Little Bighorn River from a typical, yet unexceptional, example of a high plains landscape into a *place* imbued with deep historical and cultural meaning. In a physical and ecological sense nothing differentiated the lands where the battle was fought from the miles of riparian bottoms and hilly uplands lining the Little Bighorn valley. Yet in order to commemorate the battle and honor the dead, the federal government reserved two small parcels of the larger battlefield. The creation of the Custer National Cemetery, which later became Little Bighorn Battlefield National Monument, set the federally reserved lands on a separate management course. Still, apparently firm monument boundaries marked by barbed wire fences were in many cases permeable.[293] Thus, larger environmental changes visible in the Little Bighorn Valley and southeastern Montana deeply affected the monument. In short, policy goals and decisions could set monument lands off on a different course from surrounding lands, but they could not prevent all change. This chapter will examine the period between 1877 and 1940 when the War Department had jurisdiction over the battlefield and differing land use practices and policies led to increasingly different environmental conditions on lands within and outside the monument boundaries.

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[293] On the concept of mobile nature and human boundaries see, Mark Fiege, "The Weedy West: Mobile Nature, Boundaries, and Common Space in the Montana Landscape," *Western Historical Quarterly* 36 (Spring 2005): 22-47.

I. Early War Department Management, 1877-1893.

The War Department managed the battlefield lands as a cemetery with the central purpose of honoring the fallen soldiers of the Battle of the Little Bighorn as well as the Indian Wars and the Nation's other conflicts. Consequently, neither interpreting the battle for a public audience nor understanding and managing the environmental conditions of the battlefield were central concerns during this period. The unofficial War Department management of the battlefield dates to July 1877 with the arrival of the reburial party led by Lt. Col. Michael V. Sheridan described in the previous chapter. That summer the army also began construction of Post No. 2, designated Fort Custer in November 1877, at the confluence of the Bighorn and Little Bighorn Rivers. The construction of the post had its own impact on the Little Bighorn Valley which was "almost denuded of timber to furnish lumber."[294] Between 1877 and the appointment of the first cemetery superintendent in 1893, custody of the battlefield and cemetery effectively fell to the post commander at Fort Custer. Soldiers were not a constant presence at the battlefield in these first years. Rather, details from the fort visited regularly to rebury human remains that washed free of the shallow graves and to maintain the monuments placed on the field.

A. CREATING THE CEMETARY AND MEMORIALIZING THE DEAD.

The cemetery's original boundaries had long lasting consequences for the environmental history of the later monument. In January of 1879 the secretary of war authorized the creation of a National Cemetery at the site of the battle. On August 1st of that

[294] Edward S. Godfrey, "Custer's Last Battle," in John M. Carroll, ed., *The Two Battles of the Little Bighorn* (New York: Liveright, 1974), 79.

same year, General Orders No. 78, issued from the Headquarters of the Army under the command of Gen. William T. Sherman, officially established Custer Battlefield National Cemetery. The National Park Service recognizes this latter date as the establishment day for Little Bighorn Battlefield National Monument.[295] General Orders No. 78 did not specify the exact tract of land to be reserved nor was there any recognition of the fact that the cemetery lands would necessarily be taken from the Crow Reservation. The order simply stated that the boundaries of the national cemetery would be "announced" after the completion of a survey. Lieutenant Edward Maguire, who had served on Gen. Terry's staff and produced the first maps of the battlefield, subsequently surveyed a six by three mile tract that would have encompassed practically the entire battlefield as the cemetery reservation. The Crow Nation and the Office of Indian Affairs both objected vehemently to the size of the proposed takings. While the Crows opposed the cessions based on the loss of tribal lands, the Indian bureau had its own motives rooted in the federal government's assimilation program.[296] Private property ownership was touted as a "civilizing" influence and so the partition of communally held reservation lands into individual allotments became the cornerstone of federal assimilation policy. Allotment began on the Crow Reservation in October 1885. The Crow families that had settled on the bottomlands of the Little Bighorn near the agency proved the friendliest toward the policy, and as a result,

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[295] Don Rickey, Jr., *History of Custer Battlefield* (reprint ed., Fort Collins, CO: The Old Army Press, 1998), 29-30; Jerome A. Greene, *Stricken Field: The Little Bighorn Since 1876* (Norman: University of Oklahoma Press, 2008), 30.

[296] Greene, 34-35; Rickey, 29-30. See, Frederick E. Hoxie, *A Final Promise: The Campaign to Assimilate the Indians, 1880-1920* (Lincoln: University of Nebraska Press, 1984), 147-87; Francis Paul Prucha, *The Great Father: The United States Government and the American Indians* (Lincoln: University of Nebraska Press, 1984), Vol. 2, 659-86.

much of the historic battlefield was allotted.[297] With individual Crow families living on the land and the weight of influential citizens and policy makers firmly behind allotment, it became apparent that the original plan to withdraw eighteen square miles for the national cemetery had become untenable. The secretary of war conceded the point and requested the reservation of one square mile for the national cemetery. On December 7, 1886, President Grover Cleveland issued an executive order establishing the boundaries of the cemetery as requested.[298] While the Crows lost far less land than originally proposed, they would not be compensated for the lands taken until 1930.[299] In effect the 1886 reservation created the first of two small "islands" of federal management in the midst of the Crow Nation.

Among the Army's first goals was to raise a fitting monument for the Seventh Cavalry dead. Continuing reports of exposed remains and desecrated graves were an embarrassment. In October 1878, Gen. Alfred Terry first suggested that all of the bodies be removed to a secure mass grave covered by a "high cone or pyramid of loose stone . . . so as to protect the remains from any future depredations by wild animals." Terry also suggested that the best location for the grave would be "the highest point of the ridge, just in the rear of where General Custer's body was found."[300] In April of 1879, the task fell to Capt. George K. Sanderson, who led a detail from Fort Custer to police the battlefield. The men collected all of the horse bones they could find and placed them inside a cordwood pyramid built atop the last stand hill. The remains of several troopers found exposed were also reburied

[297] Hoxie, *Parading Through History*, 146-47.
[298] Executive Order, 7 December 1886, 1 Kappler 858.
[299] "An Act Providing compensation to the Crow Indians for Custer Battle Field National Cemetery," 15 April 1930, 46 Stat. 168.
[300] AAG to Buell, 29 October 1878, quoted in Greene, *Stricken Field*, 28.

under the makeshift monument. Sanderson's men then went about tending to individual graves in need of repair. The captain's visit marked the first of many by Fort Custer troops.[301]

Two years later another detachment from Fort Custer, led by Lt. Charles F. Roe, raised the permanent granite obelisk on top of Last Stand Hill. The army contracted with the Mount Auburn Marble and Granite Works of Cambridge, Massachusetts, to build the memorial engraved with the names the military dead. It was completed in the summer of 1879, but did not reach Fort Custer for nearly a year, following a circuitous journey by water and rail. Hauling the thirty-eight thousand pound monument to the top of Last Stand Hill posed a final challenge. The post commander opted to wait until February 1881, when it could more easily be dragged by sledge across the snowy landscape and the frozen Little Bighorn River. The final raising of the obelisk's three sections did not take place until July. At the same time, the detail, led by Lt. Charles F. Roe, collected the together the remains of 220 Seventh Cavalry troopers and reinterred them at the base of the memorial.[302]

The actions of Roe's detachment, as well as those of earlier and later parties, radically changed the topography of Last Stand Hill. Michael Sheridan, who visited the battlefield in 1877, characterized the prominence as "a rough point or narrow ridge, not wide enough to drive a wagon on." The following summer Captain J. S. Payne of the 5th Cavalry surveyed the battlefield. His testimony before the Reno Court of Inquiry included a valuable description of Last Stand Hill that serves a baseline for understanding the drastic transformation of the site. The captain testified, "Extending from the point where Gen.

[301] Greene, *Stricken Field*, 29-30.
[302] Greene, *Stricken Field*, 30-33; Rickey, *History of Custer Battlefield*, 60-63.

Custer's body was found, in a south-westerly direction, is a "back-bone," as we call it on the plains; very narrow, and I think about six hundred yards long. To the right and toward the upper end of this "back-bone," the country falls away into slight ravines and depressions, and more or less little knolls." Over time this narrow, hogback ridge was flattened and widened. The re-interment of dead from other frontier cemeteries magnified the changes to the hill's summit.[303]

Fires had always been a part of the ecology of the Northern Plains, yet there are no direct accounts of fires on the battlefield lands until 1908. There are, however, accounts of fires on lands surrounding the area as well as circumstantial evidence that fires occurred on the battlefield and were of concern to the army. As detailed below, the Montana pioneer Granville Stewart described the effects of a recent range fire in the vicinity of the battlefield i 1880. Two years later during an inspection tour Maj. William W. Sanders recommended that the Seventh Cavalry monument atop Last Stand Hill should be protected from vandals by a fireproof fence. He further suggested that the wooden stakes that currently marked the places where soldiers had fallen should be replaced with iron posts as "these sticks are destroyed by prairie fires and cattle." In 1884, an iron fence was built around the memorial. In August of 1889 Lt Col. George D. Dandy visited the battlefield, which had been declared a National Cemetery three years earlier and found "no semblance of a cemetery at this place." He suggested a twenty-five acre area be enclosed on the battle ridge with a fireproof fence high enough to keep out animals and vandals.[304] In 1922, Thomas H. Irvine, who stated that

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[303] Neil Mangum, "Under Siege: Last Stand Hill in the Face of Change," *Ghost Herder: The Journal of the Friends of the Little Bighorn Battlefield* 1 (2011) 4-14; Reno Court of Inquiry, 234, 490.

[304] Greene, *Stricken Field*, 33, 38, 39.

he first visited the battlefield in 1879, wrote to then general Edward S. Godfrey concerning the location of Lt. Sturgis's grave. Irvine had seen it marked with a wooden stake on his visit but had not returned since the granite markers were put in place. He feared that the gravesite (a controversial one) had been over looked because the stake had been "removed or burned by prairie fire."[305]

While fires clearly remained a concern and might have struck the battlefield, the several decades following the battle were apparently free of major fires. The photographic evidence examined later in this chapter seems to bear out this conclusion. The increasing prevalence of big sagebrush on the battlefield indicates a lack of fire, as intense fires, such as the one that stuck the monument in 1983, produce 100% mortality for big sagebrush that then takes many decades to recover. The question then becomes, why were fires less common in this era? The answer was likely tied to the agricultural transformation of the area combined with chance. As evidence presented in chapter one suggested, the end of Native burning practices during the reservation era and the expansion of agriculture on the plains generally resulted in fewer fires and greater fire suppression.

With the passage of years and the continued efforts of reburial parties from Fort Custer the appearance of disinterred remains became less frequent. Moreover, the reserve began to operate more as a true national cemetery as the War Department intended. Beginning in October of 1888 the Custer Battlefield National Cemetery began receiving remains from closed post cemeteries from the across the region. The first group of 111 bodies came from Fort Phil Kearny and included the dead from the famed Fetterman

[305] Thomas H. Irvine to Edward S. Godfrey, 1 May 1922, Thomas H, Irvine Papers, Collection 106, Montana Historical Society.

Massacre of 1866. Reburial took place not on the site of the current cemetery but on Last Stand hill just south of the Seventh Cavalry memorial. Soon, the larger Custer Battlefield also took on the appearance of a cemetery. In the spring of 1890 a detachment of the 25th infantry under the command of Capt. Owen J. Sweet replaced the decaying original wooden grave markers with the iconic white headstones that dot the battlefield today. Sweet's men faced great difficulty in finding the former graves. They ended up digging wherever they encountered the "slightest semblance of a grave, or spots where the grass was much greener and more luxuriant than in other places."[306] That same year forty bodies from the abandoned Fort Sisseton were brought to the cemetery, but were reburied on the flat below, a tradition that would be followed with all future burials.[307]

One of the Army's earliest, and most important, management decisions was to fence cemetery lands and prohibit grazing. The first formal survey of the reservation took place i October, 1889 and, in May of the following year, while Sweet's men were installing the stone grave markers, another crew from Fort Custer competed a second survey of the federal reservation boundaries. A barbed wire fence soon enclosed 455 of the total 640 acres. The fence did not enclose much of the riparian bottomlands and only reached the river at its southwest corner. In 1893, Lt. W. H. Owen reported that the omission had occurred due to the difficulty posed by "deep arroyos." The failure to fence the bottoms left them open to unregulated grazing and set a precedent, as it was these same acres that were later grazed under permit. Owen reported "the fence is an excellent one of the kind, well-lined, strong and substantial." At the time of his visit there was a single twelve-foot gate

[306] Quoted in Greene, *Stricken Field*, 40.
[307] Greene, *Stricken Field*, 39, 42-43.

located about midway on northwest fence line. A previous entrance located at the northeast corner had been closed.[308] The installation of the fence did not immediately solve all problems with grazing trespass. Officers at Fort Custer charged that local Crows cut the fence or broke down the gate to allow their livestock to roam freely across the battlefield. Their concern was not with the ecological impact of the grazing but with the damage the livestock might do by trampling gravesites and headstones.[309]

Nor could the fence control the effects greater changes. In agricultural production fences were meant to separate and organize plants and animals, while for the monument, the fence was intended to restrict the use of a memorialized space. Yet, both were similar in that in neither case could they restrict the travel of any but the largest grazing animals. In a sense the barbed wire fence served as a "biological sieve" restricting the passage of large, mostly domesticated, organisms, but posing no obstacle to airborne seeds of dandelions or any other number of weeds. Still, the relative absence of large grazers from the cemetery reservation was a critical factor that would effect the composition of plant communities and fire regimes in the decades that followed.[310]

B. THE STANLEY MORROW PHOTOGRAPHS AND GRANVILLE STEWART'S ACCOUNT.

During the earliest years of army management, it appears that the ecology and landscape of the battlefield remained largely as they did in June of 1876. Capt. Sanderson's reburial mission was also important because photographer Stanley J. Morrow accompanied

[308] W. H. Owen to Quartermaster General, 3 August 1893, copy in LIBI White Swan Library.
[309] Greene, *Stricken Field*, 39, 41-42.
[310] Fiege, "The Weedy West," 25.

the detachment and created the earliest series of photographs of the battlefield.[311] Morrow's photographs documented the reburial party's work on and around Last Stand Hill and include important images of the Keogh sector of the battlefield, Deep Ravine, the bluffs of the Little Bighorn, and the riparian area where the Sanderson detachment camped. The best description of the battlefield during these years came from pioneer Montana cattleman the Granville Stewart and his account can used to interpret Morrow photographs.

In the spring of 1880, slightly over one year after the Morrow photographs were taken, Stewart and a small party scouted the lands surrounding and including the Little Bighorn Valley as prospective cattle ranges. The group ascended the Tongue River valley and retuned to Fort Custer via the Bighorn and Little Bighorn Rivers. Stewart painted a glowing picture of the upper Little Bighorn. On May 4, 1880, in the area above modern Wyola, Montana, he recorded "plenty of green grass about three inches high everywhere." Stewart also remarked on the dense stands of timber – ash, box elder, cottonwood, and willow – that lined the banks of the river as well as the abundance of game: "lots of deer here."[312] While surveying the Bighorn River and its tributaries Rotten Grass and Soap Creek Stewart remarked on both the thick vegetation found in the riparian areas and the effect of a recent range fire. Wild plum bushes filled every "sag and ravine" and plum thickets lined the streams. The uplands away from the streams were generally hilly and covered with the "finest grass," due in part to a range fire that swept all the way down to the Bighorn River

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[311] Brust, et. al., *Where Custer Fell: Photographs of the Little Bighorn Battlefield Then and Now* (Norman: University of Oklahoma Press, 2005), 20-21.
[312] Granville Stewart, *Forty Years on the Frontier: As Seen in the Journals and Reminiscences of Granville Stewart* (Cleveland: The Arthur H. Clark Company, 1925), 117-18.

during the fall of 1879, resulting in lush growth and abundant wildlife; "Deer and antelope in sight all the time and a great number of prairie chickens everywhere."[313]

On May 6, 1880, Stewart and his party rode back to the Little Bighorn to visit the site of the storied battle. He recalled that the two river valleys were divided "high bad land hills . . . generally well grassed but with considerable sage." That afternoon they visited the Reno-Benteen Defense site, and after picking up some "mementoes," went into camp on the river about halfway between the Reno-Benteen site and Last Stand hill. It was here that Stewart provided a particularly valuable early description of the Little Bighorn River and the battlefield:

> The river is about fifty or sixty yards wide and about thirty-eight inches deep on an average and very swift. Considerable timber in clumps but not much underbrush. There is some very good ash and box elder and fine grass. The green grass is six inches high. Long slopes and ridges on west side of Little Horn between it and the Big Horn river well grassed and somewhat broken country on east side extending back to Rosebud mountains only tolerably grassed and with much short stunted sage and short-cut bank coulees extending back a short distance from the river. Cloud peak and most of Big Horn mountains visible from this camp. Elevation 3200 feet.[314]

While Morrow did not photograph the river around Medicine Tail Coulee Ford he did make two images that show the riparian areas of the battlefield. Figure 1 below shows the bluffs that line the river northwest of Last Stand Hill. Modern photographs taken

[313] Stewart, *Forty Years on the Frontier*, 118.
[314] Stewart, *Forty Years on the Frontier*, 119.

from the same vantage point reveal that substantial erosion and cliff recession have taken place in the 136 years since the battle.[315]

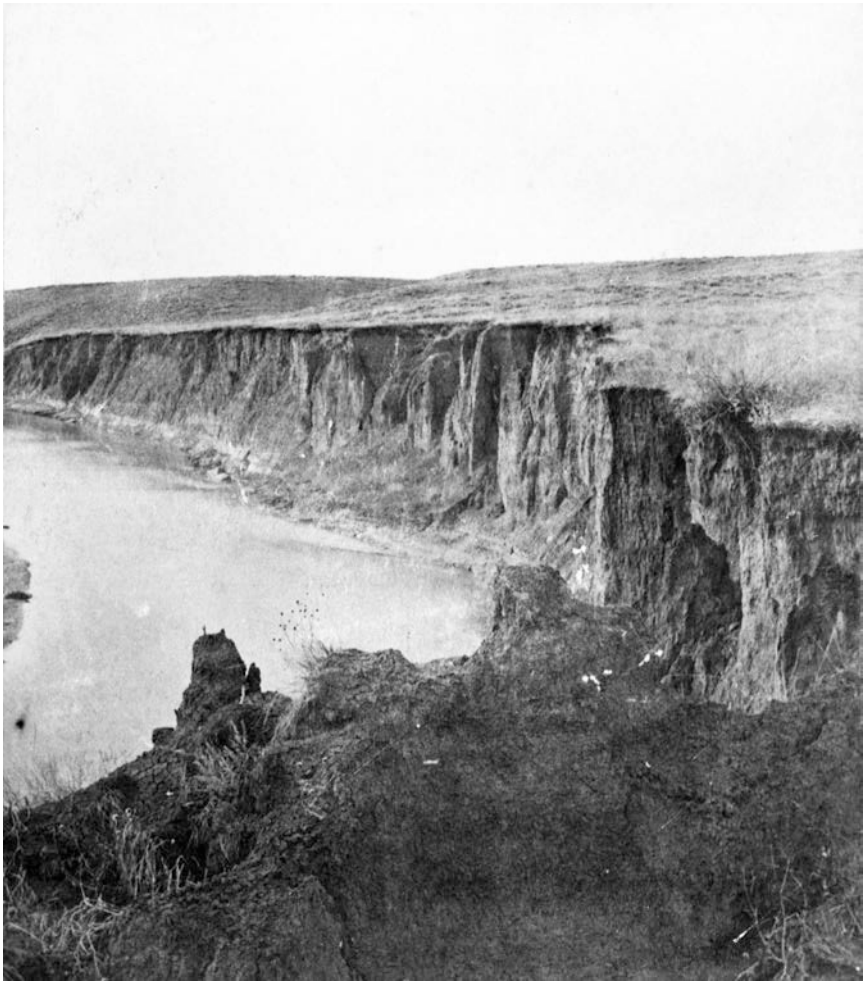

Figure 40. Bluffs Lining the Little Bighorn Northwest of Last Stand Hill. Morrow 1879. Source: Montana Historical Society.

The second image that Morrow made of the riparian area of the monument shows the area where Capt. Sanderson's detachment camped, on the east bank of the river just upstream of the bluffs in Figure 1.[316] In the image the only trees visible are the cottonwoods that line

[315] Brust, et. al., *Where Custer Fell*, 120-21.
[316] Brust, et. al., *Where Custer Fell*, 121-22.

the river. The image reveals none of the extensive understory growth that appears in modern images. Also absent is Russian Olive that now grows in the area.

Figure 11. Campsite along Little Bighorn River. Morrow 1879. W.H. Over Museum. Copied from Brust, et. al., *Where Custer Fell* p. 122.

On May 7, 1880, Stewart and his companions examined the northern half of the battlefield while making their way to Last Stand hill. At "the place where Custer tried to cross the river and was driven back," presumably Medicine Tail Coulee Ford, Stewart cut several canes from the ash trees on the riverbank. All along the way the trail of human and animal remains served as their battlefield guide. Short grasses and sagebrush are the only vegetation that Stewart mentioned on this part of the battlefield. He wrote, "Keogh and his men were killed in a sage on the north side of [Battle] Ridge," and continued "This ridge is covered with short grass and low stunted sage and a person can gallop a horse over nearly any part of it." Morrow's 1879 photograph of the Keogh Sector (Figure 3) of the battlefield bears out Stewart's description. In the photograph, Capt. Sanderson contemplates the large wooden memorial to Capt. Myles Keogh and the troops of who fell in the sector. In the background members of the reburial party tend to the graves of other soldiers. Very little sage is evident in the area, and none immediately surrounding the Keogh marker. Considering Stewart's account of recent range fires in the area and the prevalence of sagebrush in the uplands west of the river as well as modern studies of fire regimes and the reestablishment of sagebrush at Little Bighorn, it is probable that the area burned recently enough to prevent the reestablishment of larger sage.[317]

[317] Stephen V. Cooper, Peter Lesica, and Greg M. Kudray, "Post-fire Recovery of Wyoming Big Sagebrush Steppe in Central and Southeast Montana," *Natural Resources and Environmental Issues* 16 (January 2011): 79-87.

Figure 12. The Keogh Sector of the Battlefield. Morrow, 1879. Source: Montana Historical Society.

Also absent in the photograph are yucca and prickley pear, two species common on the battlefield today as well as evidence of any invasive species.

Atop Last Stand Hill the party visited the Sanderson's makeshift cordwood memorial "surrounded by a ditch" filled with horse bones. Stewart pronounced the battlefield a "ghastly sight."[318] It was here that Morrow had produced three famous images the previous year. The first was taken from a nearly identical vantage point as Fouch's 1877 photograph,

[318] Stewart, *Forty Years on the Frontier*, 119-21.

looking to the northwest toward an oxbow in the Little Bighorn River (Figure 4) where Sanderson's men had collected all of the horse bones in immediate area. This grim evidence of the battle dominates the image.

Figure 13. View from atop Last Stand Hill toward the Little Bighorn River. Morrow 1879. Source: Montana Historical Society.

The general appearance of the field beyond the bones is similar to that of the Keogh Sector with native grasses and scattered, small clumps of sagebrush visible. The grasses appear

lower than in Fouch's photograph but this is likely due to the earliness of the season – Morrow visited in April while Fouch had taken his photograph in July. The second Morrow image from atop Last Stand Hill is equally famous if less revealing. It was shot to the north and shows the finished cordword monument with the horse bones interred inside and out of sight. The ground surrounding the monument has been trampled and picked clean (Figure 5).

Figure 14. View to North with Temporary Monument. Morrow 1879. Source: Montana Historical Society.

Subsequent visitors to the site apparently continued to collect horse bones and place them at the base of the memorial. This would explain the discrepancy between Morrow's image and Stewart's description only one year later. Figure 6 below is a third Morrow image taken on Last Stand Hill. His vantage point looks south and would be within the modern fence that encloses the Last Stand groups of gravestones.

Figure 15. Graves of Unknowns. Morrow 1879. Source: Montana Historical Society.

Like the previous photographs it shows little evidence of large established sagebrush. The final Morrow image included here is of the spurious grave for Lt. James G. Sturgis (Figure 7).[319] The view is to the southwest and the vantage point located several hundred yards below the top of Last Stand Hill. Short sagebrush appears prominently in the foreground of the photograph and extends toward Deep Ravine.

Figure 16. Sturgis Grave and view to Southwest toward Deep Ravine. Morrow 1879. Montana Historical Society.

[319] Brust, et. al., *Where Custer Fell*, 115-16.

C. THE D. F. BARRY PHOTOGRPAHS.

Besides bringing large numbers of visitors to the monument, battle anniversaries produced a wealth of photographic evidence. The first widely attended commemoration marked the tenth anniversary of the battle in 1886. It was a noteworthy event both for the presence of Seventh Cavalry survivors and for the valuable photographs of D. F. Barry. While Morrow's 1879 series focused on the area around Last Stand Hill, Barry produced landscape views illustrating both the riparian and upland areas of the larger battlefield, including the area of the Valley Fight and the Reno-Benteen Defense Site.

Figure 17. Seventh Cavalry Survivors atop Last Stand Hill, 25 June 1886. Barry, 1886. Source: Little Bighorn Battlefield National Monument.

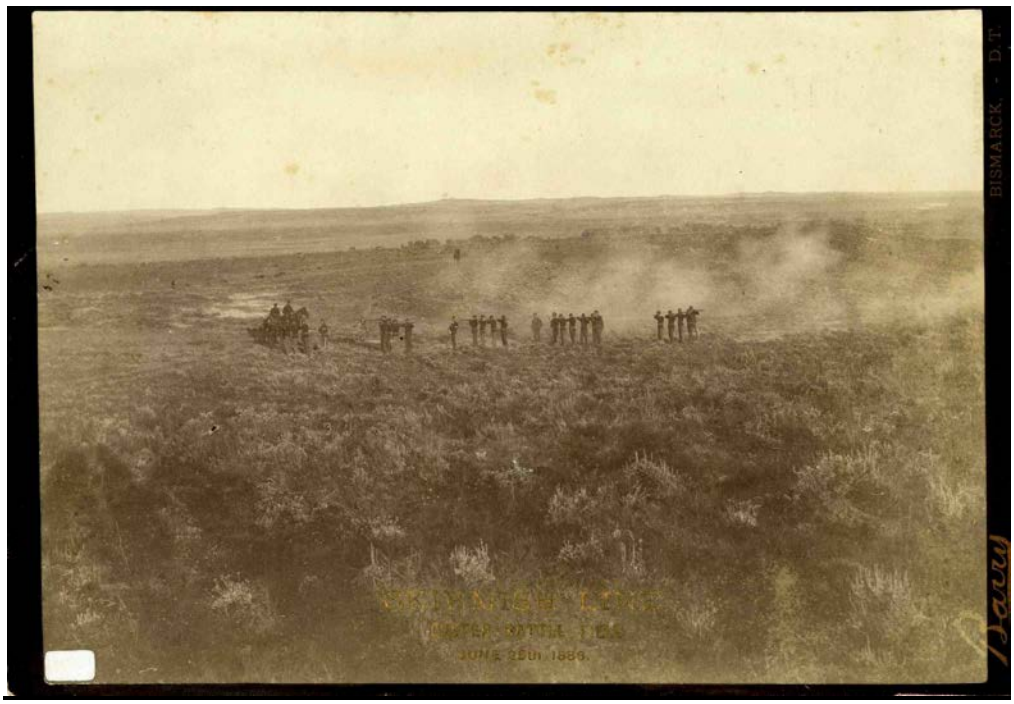

Figure 18. Skirmish Line to the Northwest of Last Stand Hill. Barry, 1886. Source: Little Bighorn Battlefield National Monument.

In figure 8, veterans of the battle, including Frederick Benteen, are seen posing along the iron fence that encloses the Seventh Cavalry Memorial. Clumps of short grass are visible, but the impact of heavy visitation is most evident in tramples and bare ground. This type of impact is common is most of the historical photographs. The second Barry image from Last Stand Hill, taken several hundred yards down the Northwest side (Figure 9) presents a different picture. Soldiers from the Fifth Infantry form a skirmish line. The growth of sagebrush since Morrow's 1879 photos is clearly evident. Farther downhill from the memorial on the plateau now occupied by the National Cemetery, Barry again photographed the soldiers in formation. The most striking elements of the photograph are the complete lack of sagebrush and the nearly flat expanse of the area (figure 10). The

latter characteristic was an important factor in locating the National Cemetery on the plateau.

Figure 19. Skirmish Line on Plateau below Last Stand Hill. Barry 1886. Source: Little Bighorn Battlefield National Monument.

Barry did not focus on the Custer Hill section alone but attended and photographed events in the valley and at the Reno-Benteen Defense Site. Figure 11 below presents important visual evidence of the Reno's retreat crossing on the Little Bighorn. It corroborates soldiers' accounts that there were no large trees and little underbrush at the crossing site.

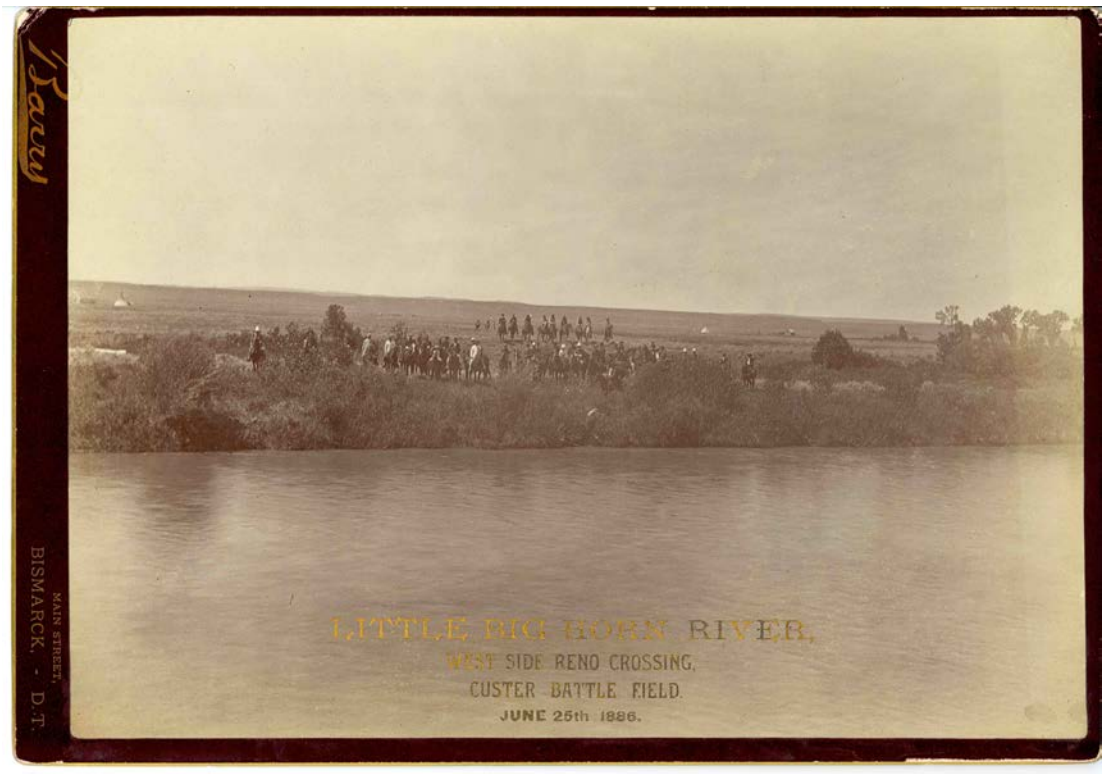

Figure 20. Reno's Retreat Crossing on Tenth Anniversary of the battle. D. F. Barry photo. Source: Little Bighorn Battlefield National Monument.

Three of Barry's views illustrate the Reno-Benteen defense site (Figures 12, 13, 14). Substantial sagebrush is apparent in all the photos. In all three cases the land appears very similar in condition to the Custer Battlefield area. Neither area had been fenced at this point and both equally subject to grazing by cattle and horse herds.

Figure 21. Reno-Benteen Defense Site. Source: Little Bighorn Battlefield National Monument.

Figure 22. Reno-Benteen Defense Site - Eastern End. Source: Little Bighorn Battlefield National Monument.

Figure 23. Reno-Benteen Defense Site - West End. Source: Little Bighorn Battlefield National Monument.

II The Agricultural Transformation of Southeast Montana.

The environmental history of Little Bighorn Battlefield National Monument cannot be understood simply by focusing on the lands within the monument's boundaries. During the decades following the Battle of the Little Bighorn the natural and cultural landscape of southeastern Montana was remade. Up to the early 1880s the lands south of the Yellowstone River were truly Indian country. The Euro-American population of Montana was largely confined to lands West of present day Bozeman. Likewise, agriculture and cattle ranching had left no mark in southeast Montana.[320] With the exception of military

[320] Michael P. Malone and Richard B. Roeder, "Agriculture: 1876 in Field and Pasture," *Montana: The Magazine of Western History* 25 (Spring 1975), 28-35.

personnel and overland travelers few non-Natives saw the country surrounding the Little Bighorn Valley. Then, a rapid series of events transformed the region. The end of the Northern Plains Wars meant the growth of Euro-American settlement. The end of conflict also saw the movement of the Crow Agency to its modern location and the sustained residence of Crow people in the Little Bighorn Valley. The extension of railroads into Montana promised even greater changes. Congress issued a charter for the Northern Pacific Railroad in 1864, but it was not until September of 1883 that the Northern Pacific was complete and with it came a range of environmental changes.[321] The railroad facilitated the final slaughter of the bison. It contributed to the expansion of the cattle industry. It served as a conduit for the expansion of numerous invasive weeds. And ultimately it made the expansion of the homestead frontier, and all the changes brought with it, possible.

A. THE RESETTLEMENT OF THE CROW PEOPLE IN THE LITTLE BIGHORN VALLEY.

While the Little Bighorn Valley had long been identified as Crow territory, divisions within the tribe, federal policy, and the long-standing conflict with the powerful Lakota-Cheyenne alliance, meant that permanent Crow settlement in the area did not occur until the 1880s.[322] With the Fort Laramie Treaty of 1868, the federal government established the first Crow Agency far to the west on Mission Creek near present day Livingston, Montana. The agency was moved east to the Stillwater Valley in 1875 but still remained far to the

[321] Malone, et. al., *Montana*, 172-78.
[322] For an ethnographic summary of the Crows see, Fred W. Voget, "Crow," in Raymond J. DeMallie, ed., *Handbook of North American Indians, Volume 13: Plains, Part 2*, pp. 695-717. Treaty of Fort Laramie, 1851, 11 Stat.749. See also, Frederick E. Hoxie, *Parading Through History: The Making of the Crow Nation in America, 1805-1935* (New York: Cambridge University Press, 1995).

west of the Little Bighorn. So while conflict pushed many Crows away from the Little Bighorn in these years, the agency's location also pulled them west.[323] The growing Euro-American population of western Montana, however, served as a counter force, and called for cessions of reservation lands and resettlement of the Crow people to the east. Land cessions in 1882, 1891, and 1904 eventually reduced the Crow Reservation to its current dimensions. More importantly for the environmental history of the Little Bighorn Valley, the end of intertribal conflict meant that the Little Bighorn Valley became a safe place for permanent residence. The federal government moved the agency from Stillwater to its current location at Crow Agency, Montana, just three miles from the Little Bighorn battlefield in 1884. From that time on the valley experienced constant human occupation as well as agricultural development and commercial grazing.[324]

The construction of irrigation canals was among the most important environmental changes that came with the relocation of the agency. Indeed, the Little Bighorn Valley, including battlefield lands, saw some the earliest irrigation works in the region. Crow Reservation superintendent Henry Armstrong was an ardent assimilationist who viewed irrigation as an utmost necessity if the Crow people were to be transformed from hunters to agriculturalists. "We must have irrigating ditches," he declared in the summer of 1884. Armstrong suggested using tribal funds and Crow labor to put water on the arid land. The Indian bureau adopted both ideas and in 1885 the Indian Irrigation Service began construction of the Reno Ditch, which would draw water from the Little Bighorn in the very midst of the 1876 battlefield near modern Garryowen, Montana. A half a dozen other

[323] Hoxie, *Parading Through History*, 96-100. The Lakotas raided both the Crow Agency on Mission Creek in 1872 and its successor on the Stillwater in 1875.
[324] Hoxie, *Parading Through History*, 122-126.

projects followed along the Little Bighorn and its tributary streams. These early works were crudely engineered, and while they could not substantially diminish the flow of the river they proved to be perfect avenues for the advance of weeds.[325]

The 1890s saw a major expansion of the irrigation works on the Crow Reservation. Funded with proceeds from yet another land cession, the Indian Bureau dispatched Walter H. Graves to oversee the construction. Graves envisioned a grand project drawing water from both the Little Bighorn and Bighorn rivers and watering thousands of acres. Between 1892 and 1896 much of Graves' plan came to fruition, including an expansion of the Lodge Grass Ditch system and an eight-mile ditch that paralleled the Little Bighorn between Crow Agency and Fort Custer. The centerpiece of Graves' design, a thirty-five mile canal running from the mouth of the Bighorn Canyon to Fort Custer, was finally completed in 1905.[326]

The irrigated fields of the Crow Reservation were mostly sown in hay. In 1894, some 5,100 tons of hay was produced on the reservation. The following year, Graves reported that bluejoint (*Calamagrostis canadensis*) and timothy (*Phleum pratense*) were the principal crops on lands just downstream of Crow Agency. Later reports from Crow agents indicate that alfalfa accounted for perhaps half of the agricultural production in the vicinity of the battlefield by the 1920s.[327]

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[325] Megan Benson, "The Fight For Crow Water, Part 1: The Early Reservation Years Through the Indian New Deal," *Montana: The Magazine of Western History* 57 (Winter 2007), 27 Hoxie, *Parading Through History*, 274.
[326] Benson, "The Fight For Crow Water, Part 1," 27; Hoxie, *Parading Through History*, 274-76.
[327] *Annual Report of the Commissioner of Indian Affairs*, 1894, 166-67. [ADD OTHER SOURCES]

B. THE EXTINCTION OF THE BISON AND THE STOCKMAN'S INVASION.

The years that saw the resettlement of the Crow people in the Little Bighorn Valley also witnessed the final slaughter of the great northern bison herds. Once the dominant grazing species from Texas to Alberta, market hunting by both Native peoples and Euro-Americans had led to visible declines in bison numbers by the mid-nineteenth century. It was the insatiable demands of industrializing America, however, which pushed the herds toward oblivion. Industrial machinery depended upon leather belting and the demand for cowhides far outstripped domestic supplies. The invention of a new tanning process in 1870 allowed the production of industrial leather from previously unusable bison hides. The demand for unprocessed bison hides soared (before 1870 nearly all bison hides entered the market as Native processed robes). The extension of railroads onto the plains and widespread availability of accurate big bore rifles such as the Sharps allowed commercial hunting outfits to commence a slaughter that would not end until the last of the herds was gone.[328]

The presence of powerful Native groups and the lagging development of railroads on the northern Plains meant that eastern Montana became the last refuge of the herds in the United States. The expanding Euro-American stock growing operations to the east and south posed another threat. The bison had previously migrated east when sustained droughts occurred, but the presence of domestic herds cut off this safety valve. In addition to drought, other environmental hazards also took their toll. The blizzards of 1880-81 left

[328] Andrew C. Isenberg, *The Destruction of the Bison* (New York: Cambridge University Press, 2000), 130-32; Francis Haines, *The Buffalo: The Story of the American Bison and Their Hunters from Prehistoric Times to the Present* (Norman: University of Oklahoma Press, 1970), 189-90, 196.

bison carcasses scattered across the northern plains.[329] The Montana herds were already weakened when the end of Native resistance and the extension of the Northern Pacific's tracks into the Yellowstone Valley set the stage for commercial hunting. The first big wave of hide hunters arrived in 1880. Some focused on the herds surrounding the emergent shipping hub of Miles City, Montana, but thousands of hunting outfits fanned out across the territory. The bison herds were obliterated in just three years. By the spring of 1884, what was once the most abundant large mammal in North America was all but extinct.[330]

The agricultural transformation of eastern Montana began with a "stockgrower's invasion." Just as bison had once filled an ecological niche left vacant due to the Pleistocene extinctions, domestic cattle filled the niche left by the bison. According to the 1880 census, there were slightly less than 430,000 cattle and 280,000 sheep in Montana Territory. Nearly all of these animals grazed in the western reaches of the territory. By 1882, however, large cattle concerns with headquarters as far away as Nevada, Texas, and New Hampshire, drove tens of thousands of head into the Bighorn, Rosebud, Powder, and Tongue valleys.[331] They overstocked the open range and unlike smaller operations, the big companies did not put up hay for winter-feeding. Miles City, which had sprung up at the confluence of the Tongue and Yellowstone Rivers after the founding of Fort Keogh, became the de facto center of the stockman's invasion. Granville Stewart, himself a founder of the Montana Stockgrower's Association, recalled the enormity of the change:

> It would be impossible to make persons not present on the Montana cattle ranges realize the rapid change that took place on those ranges in two years. In 1880 the

[329] Isenberg, *Destruction of the Bison*, 141-43.
[330] Haines, *The Buffalo*, 203-205.
[331] Malone and Roeder, "1876 in Field and Pasture," 33.

> country was practically uninhabited. One could travel for miles without seeing so much as a trapper's bivouac. Thousands of buffalo darkened the rolling plains. There were deer, antelope, elk, wolves, and coyotes on every hill and in every ravine and thicket. In the whole territory of Montana there were but two hundred and fifty thousand head of cattle . . . In the fall of 1883 there was not one buffalo remaining on the range and the antelope, elk, and deer were indeed scarce. In 1880 no one had heard tell of a cowboy in 'this niche of the woods' and Charlie Russell had made no pictures of them; but in the fall of 1883 there were six hundred thousand head of cattle on the range.[332]

B 1886, the number of cattle in Montana had risen to 664,000, where they shared the range with nearly one million sheep.[333]

The lands of the Crow Reservation in and around the Little Bighorn battlefield were extensively grazed beginning in the 1880s. Herds of Texas Longhorns were later followed by "tremendous flocks of sheep ranging north from Wyoming."[334] Some of the cattle belonged to the Crows, but the majority was the property of white herders who used reservation lands both legally and illegally. Government officials viewed stock raising as a possible path to economic self-sufficiency for the reservations. Shortly after the agency was moved to the Little Bighorn in 1884, the government distributed cattle to Crow band leaders. The Crows in response simply allowed the animals to graze extensively on the unfenced range, which included the nearby battlefield. The tribally owned herds, however,

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[332] Stewart, *Forty Years on the Frontier*, 187-88.
[333] Michael P. Malone, Richard P. Roeder, and William L. Lang, *Montana: A History of Two Centuries* (Seattle, University of Washington Press, 1976), 154-56, 160.
[334] Rickey, *History of Custer Battlefield*, 3.

were dwarfed by those of the commercial white cattlemen who drove their herds across the reservations to reach the Northern Pacific rail line, or simply let their cattle graze for an entire season in trespass on the reservation (and the battlefield). Crow frustration with grazing trespass turned to resignation by the end of the 1880s and the tribe made extensive leases with Euro-American cattlemen. In 1888, for example, Samuel Hardin and two other cattlemen made leases with the tribe. Hardin had the personal endorsement of Old Dog, a leader of the Lodge Grass District upstream of the battlefield. Leaders like Old Dog welcomed the money that leasing brought the tribe as well as the employment opportunities they brought for young Crow men. Regardless of the leases, the Crows continued to maintain their own herds, which around the turn of the twentieth century averaged 4,000 head of cattle and 25,000 horses.[335]

The prevalence of grazing in the arid and semi-arid Western United States has generally led to changes in species composition as well as the functioning and structure of ecosystems. These impacts are most pronounced in riparian areas, where streamside vegetation, channel morphology, water quality, and stream bank soil structure are all subject to transformation through intensive grazing.[336]

Both the grazing habits of cattle and the management systems that the stockmen employed shaped the environmental changes that occurred as domestic herds replaced the bison. Cattle and bison are in many ways analogous grazers. They are both large ungulate herbivores and exhibit a high degree of dietary overlap. Both species prefer graminoids such as the dominant blue grama, and both exhibit forage selectivity, preferring specific

[335] Hoxie, *Parading Through History*, 175, 282.
[336] Thomas L. Fleischner, "Ecological Costs of Livestock Grazing in Western North America," *Conservation Biology* 8 (Sept. 1994): 631, 635.

species out of proportion to their availability. Yet there are also important differences between the two grazers. Cattle are generally more selective. Their dietary niche is broader and they consume a higher percentage of forbs and browse (between 10 and 20% of their total diet) than bison (less than 10%). While the general diet quality of bison is lower, they digest native cool season and warm season grasses more efficiently. Just as importantly, cattle dedicate a higher percentage of their time to grazing while bison allocate relatively more time to non-feeding behaviors such as aggression, play, wallowing, grooming, and intrasexual competition. As cattle spend more grazing time to seek out higher quality forbs and woody species, they increase the breadth of their dietary niche while reducing the diversity of forage species. Bison, on the other hand, graze far more intensively on dominant graminoid species reducing their relative abundance, while their wallowing and pawing helped to create microenvironmental heterogeneity and greater species diversity. The generalized ecological impact of cattle grazing on shortgrass prairies such as those at Little Bighorn, therefore, was most often characterized by an increase in the relative cover of dominant grasses and succulents like prickly-pear at the expense of forbs and shrubs, and an overall decrease in plant cover and species diversity.[337]

At larger scales, bison and cattle exhibited different preferences in habitat selection that also shaped the prairie ecology. Bison migrated nomadically according to the season and changing patterns of rainfall and fire. The size of bison herds as well as their preferred diet fluctuated according to the season. The largest herds congregated on gently rolling plains during the summer breeding season. Warm season grasses provided the bulk of the

[337] D. C. Hartnett, A. A. Steuter, and K. R. Hickman, "Comparative Ecology of Native and Introduced Ungulates," in Fritz B. Knopf and Fred B. Samson, eds., *Ecology and Conservation of Great Plains Vertebrates* (New York: Springer, 1997), 77-80, 83-85.

bison diet at this time. As summer turned to fall and warm season grasses went dormant the great herds split up and smaller groups of animals moved into more broken topography where they ate cool season grasses. Some ecologists have also argued that cycles of drought and fire "imposed a deferred rotation" that prevented migratory bison herds from grazing the same land year after year. This may have been a crucial factor in "promoting vegetation-herbivore stability in the Great Plains grasslands." Cattle do not exhibit the same migratory patterns, but rather "have a more variable group size and use both wooded and open habitats opportunistically."[338]

As important as the evolutionary and behavioral differences between cattle and bison were, the management techniques of commercial ranching could lead to even more profound change. Ranchers generally fit their herd to the range based upon forage conditions, ownership considerations, and marketing needs without regard to larger ecological concerns. Fencing restricts animal movement and thus reoriented plant-animal relationships in both spatial and temporal terms. Ranchers also added artificial watering points in the form of tanks and stock ponds. The habitual congregation of cattle around these points had impacts including defoliation, feces accumulation, soil compaction, and the disturbed bare earth necessary of the colonization of ruderal plant species.[339]

The replacement of bison with cattle also affected the non-ungulate animals of the high plains in different ways. Some experienced little or no impact. The various species of dung beetles, for instance, simply shifted to consuming cattle dung. The diversity of birds, small mammals, and insects all generally decreased as grazing intensified. Jackrabbits, for

[338] Hartnett, et. al., "Comparative Ecology of Native and Introduced Ungulates," 81-82.
[339] Hartnett, et. al., "Comparative Ecology of Native and Introduced Ungulates," 90-91.

example, rely upon shrubs for cover on the shortgrass prairie, which decrease with grazing pressure. The reduction of woody vegetation and shrubs also results in a general decline in numbers and diversity of bird species, due both to the loss of breeding habitat and the decline in available food – i.e. insects.[340]

The open range boom of the 1880s came crashing down with the legendary winter of 1886-87. Repeated storms and temperatures plunging to 60+ degrees below zero destroyed entire herds. The large corporate ranches that generally did not put up winter hay suffere the worst. Territory wide the losses reached well over 350,000 head and accounted for perhaps 60% of Montana's cattle. The disaster did not completely end the open range industry but it did lead to several changes. Smaller Montana-based ranches that produced winter feed fared best and consequently ownership of the industry returned to local interests. The overreliance on the open range that characterized the corporate interests also gave way to a greater emphasis on raising forage. During the 1890s the total acreage devoted to hay in Montana nearly tripled. Finally, sheep survived the harsh winter far better than cattle and in aftermath of the winter of 1886-87 there was a marked turn toward sheep ranching in Montana. By 1900 Montana was the Nation's leading wool-growing state. One of the largest sheep outfits, that of Charles M. Blair, was based in part in Hardin, Montana, less than twenty miles north of the Little Bighorn Battlefield.[341]

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[340] D. G. Milchunas, W. K. Lauenroth, and I. C. Burke, "Livestock Grazing: Animal and Plant Biodiversity of Shortgrass Steppe and the Relationship to Ecosystem Function," *Oikos* 83 (October 1998): 65-74; Hartnett, et. al., "Comparative Ecology of Native and Introduced Ungulates," 88-89.

[341] Malone, et. al., *Montana*, 165-67.

C. WEEDS IN SOUTHEASTERN MONTANA.

Along with the cattleman's invasion came a weed invasion. Weeds are opportunistic plants that thrive in bare or disturbed soils where they out-compete native vegetation as well as economically desirable cultivated species. As pioneer Montana botanist J. W. Blankinship wrote in 1901, weeds thrive in consort with the "operations of man and his domestic animals . . . and occur but rarely removed from these conditions."[342] Weed species exhibit great variability, but share some physiological characteristics (rapid growth, ability to regenerate from root fragments, wide spreading leaves and low branches that crowd out other plants, and high, sustained seed output) that make them hearty survivors. Weed species labeled "noxious" are those that are both extremely difficult and/or expensive to eradicate as well as exhibit a pronounced detrimental impact on an ecosystem, often through their ability to depress the growth and reproduction of native and/or desirable plants. The federal government as well as each state maintains noxious weed lists as well as programs aimed at their control. The State of Montana enacted its first weed control law in 1895.[343]

The weeds that came to infest Montana in the last decades of the nineteenth century, like all weeds, traveled via three principal natural mechanisms. Some depended upon the wind. Many, such as dandelions, produce feathery or winged seeds capable of being blown long distances. Others like Russian Thistle, were tumble weeds that when gone to seed broke free of the ground and rolled across the open country scattering their seeds as they

[342] Blankinship, "Weeds of Montana," 5.
[343] Blankinship, "Weeds of Montana," 5-7; Herbert G. Baker, "The Evolution of Weeds," *Annual Review of Ecology and Systematics* 5 (1974): 1-24; Federal Noxious Weed Act - Public Law 93-629 (7 U.S.C. 2801 et seq.; 88 Stat. 2148), enacted January 3, 1975; Fiege, "The Weedy West," 33.

went. Water was the second principal means of weed distribution. With light, waterproof coverings that allowed them to float long distances, nearly all weeds could be spread via flowing water. Animals provided the third basic means for transporting weeds into new areas. Some weeds produce seeds with impervious coverings enabling them to survive the passage through an animal's digestive track, while others have barbed or sticky seeds that attached themselves to feet or fur of passing hosts.[344] In addition, to these natural mechanisms of transmission some weeds were purposely introduced

The spread of non-native weeds into southeastern Montana also depended on the expansion of Euro-American transportation networks and agriculture. Weeds first appeared along watercourses, trails, roads, and railroad lines. Railroad construction crews broke open the ground, creating an ideal weed habitat along the entire course of a railroad right of way. The trains that followed carried weed seed with them in their cars and in and on the livestock they carried. The development of irrigation canals was yet another factor. Canals added hundreds, even thousands, of miles of new avenues to the region's natural watercourses. Moreover, they delivered that water to newly cleared lands where weeds could thrive.[345]

A study of weed migration patterns in five northwestern states found two principal paths of colonization. Some first appeared on the Pacific Coast in the vicinity of Portland, Oregon, spread through Washington and Idaho, before moving into Montana and finally Wyoming. The second major weed migration path moved east to west beginning in central Montana, both in the grazing districts around Billings and the grain growing region around

[344] Blankinship, "Weeds of Montana," 7-9; Fiege, "The Weedy West," 29.
[345] Fiege, "The Weedy West," 29.

Great Falls. Montana was, of course, not the absolute point of origin for these weed species, but first place they were reported within the study area. Their presence indicated the spread of weeds from "adjacent states and Canada."[346] The arrival of a particular weed species in a given area could go unnoticed for years and therefore almost certainly predated the time that it was first reported.

Of the thirty-eight introduced/invasive species found at Little Bighorn Battlefield National Monument in 2006, fifteen were weed species that first appeared in Montana before 1900 as a result of agricultural expansion (largely grazing in this era). These species include Chicory (*Cichorium intybus*) Canada Thistle (*Circium arvense*), Prickly Lettuce (*Latuca serriola*), Salsify (*Tragopogon dubius*), Peppergrass (*Lepidium perfoliatum*), Jim Hill Mustard (*Sisymbrium alltissimum*), Pennycress (*Thlaspi arvense*), Catchfly (*Silene conoidea*), Lambsquarter (*Chenoposidum album*), Russian Thistle (*Salsola kali*), Field Bindweed (*Convolvulus arvensis*), Rye Brome (*Bromus secalinus*), Cheat Grass (*Bromus tectorum*), Curly Dock (*Rumex crispus*) and the ubiquitous Dandelion (*Taraxacum officinale*).[347]

III. Managing the National Cemetery, 1893-1940.

Until it was transferred to the National Park Service in 1940, the Department of War administered Custer Battlefield National Cemetery. By the 1890s management became

[346] Frank Forcella and Stephen J. Harvey, "Patterns of Weed Migration in Northwestern U.S.A.," *Weed Science* 36 (March 1988): 194-201.
[347] Jane H. Bock and Carl E. Bock, "A Survey of the Vascular Plants and Birds of Little Bighorn National Battlefield," Final Report CESU Task Agreement CA-1200-99-007, July 2006; Blankinship, "Weeds of Montana." Blankinship identifies Jim Hill Mustard with the common name Tansy Mustard, and refers to Field Bindweed by the common name Wild Morning Glory. He also identifies the Salsify present in Montana as *T. porrifolius* and catchfly as *S. noctiflora*.

more intensive. The War Department's principal goals were to protect the monuments already on the field and to create a memorialized space. It was during these decades that the formal military cemetery on the plateau below Last Stand Hill took shape. Meanwhile, great environmental changes were taking place in southeastern Montana, including the Little Bighorn Valley. The agricultural transformation that began with the extinction of the buffalo intensified. A short-lived homesteading boom in the early twentieth century brought more invasive/introduced species to the area and pushed other native species to the brink of extinction.

A. FORMAL MANAGEMENT COMES TO THE CEMETERY.

In July of 1893, Andrew N. Grover became the first superintendent of the national cemetery. It was during his tenure that much of the physical layout of the modern cemetery took shape. Shortly after Grover's appointment, W. H. Owen arrived to survey a permanent cemetery site within the 640-acre reservation. The lieutenant's official report provides a snapshot of the area's ecology and economy as well as insight into plans for the cemetery's development. Owen characterized the battlefield as "an open prairie country, without timber, other than cottonwood, small ash, willow and other underbrush on the river bottoms, and yellow pine on the hills and mountains, six miles and more distant." Owen was struck by the area's aridity, but clearly foresaw a cemetery landscaped in a traditional Eastern fashion compete with sod, shrubs, and trees. Based on the success of gardens and farms at Fort Custer and the Crow Agency, he believed that irrigation could overcome this most obvious of environmental obstacles. "I know no reason why any deciduous or evergreen tree, indigenous to that latitude, should not do well if irrigated," he wrote,

"Certainly there is no reason why the native pines and cedars which flourish on the bare mountain tops of that region should not do well in the cemetery under the influence of water." While he suggested that native tress be used in the landscaping he also argued that "lawn grass" should cover the actual cemetery grounds.[348]

Citing aesthetic, historical and environmental reasons, Owen surveyed the cemetery site on the plateau below Last Stand hill. He felt the higher "Custer" ridge was too exposed and the growth of "trees, shrubbery, and the cultivated grasses" there would be too difficult. Instead, he argued that "as a matter of sentiment and historical fitness," the battlefield should be left "intact," in its natural state and as the resting place only for "those who fell in the Custer fight." The plateau thus offered the best location for the National Cemetery. It offered a more sheltered location, a good building site, better soils, and was "covered with a good growth of native grass." Moreover, well over five hundred burials had already taken place on the plateau and locating the cemetery there would only necessitate to removal and reburial of the Fort Phil Kearney remains from Last Stand Hill. These advantages notwithstanding, placing the cemetery on the plateau still meant that water, an estimated ten thousand gallons a day, would have to be pumped up from the Little Bighorn River. Sinking wells at the cemetery site would be wholly inadequate. Owen reported that wells drilled at Crow Agency on ground only fifteen feet above river level had failed in past summers. He also doubted that windmills placed at river level could produce the necessary pressure to lift the water two hundred feet in elevation and three thousand feet in total distance from the river. His preferred solution was to build a pump house at the river and

[348] W. H, Owen to Quartermaster General, 3 August 1893, copy in LIBI White Swan Library; Greene, *Stricken Field*, 44-46.

install a steam engine with sufficient power to produce the necessary pressure.[349] In many ways Owen's vision for the cemetery would come to pass. Construction of the Superintendent's Lodge took place in 1894. And by the time Grover left his position in 1906, well over 1,200 burials had taken place in the cemetery.[350] Still, decades would pass before water adequate to supply the envisioned landscaping would reach the cemetery.

Two years after Grover's departure the only documented large fire to strike the battlefield during the War Department era took place. On July 31st, 1908, a fire burned through the cemetery that was quickly put out. The fire's origins were unknown but the previous year a lightning strike had destroyed the wooden flagstaff in the cemetery.[351] For the next seventy-five years, the Custer Battlefield section of the monument would be spared the ravages of fire. In that interim big sagebrush became well established across the battlefield. At the same time a substantial litter layer developed on the ground that likely increased the intensity of the fire that swept the battlefield in August of 1983.

B. THE F. JAY HAYNES, CHRISTIAN BARTHELMESS, AND LEE MOOREHOUSE PHOTOGRAPHS.

In 1894 F. Jay Haynes made one of several visits to photograph the Little Bighorn battlefield. These photographs essentially illustrate the conditions that Lt. Owen saw the previous year. What is most notable in all of the photographs is the widespread growth of sagebrush across the battlefield surrounding Last Stand Hill. The sage is far more

[349] Owen to Quartermaster General, 3 August 1893.
[350] Ibid., 47-49.
[351] Greene, *Stricken Field*, 51.

numerous and larger than in previous photo sets. Yucca is also evident at the bottom of Figure 24.

Figure 24. View of the Custer Group and Seventh Cavalry Memorial. Haynes, 1894. Montana Historical Society.

Figure 25. View of Last Stand Hill. Haynes, 1894. Source: Montana Historical Society.

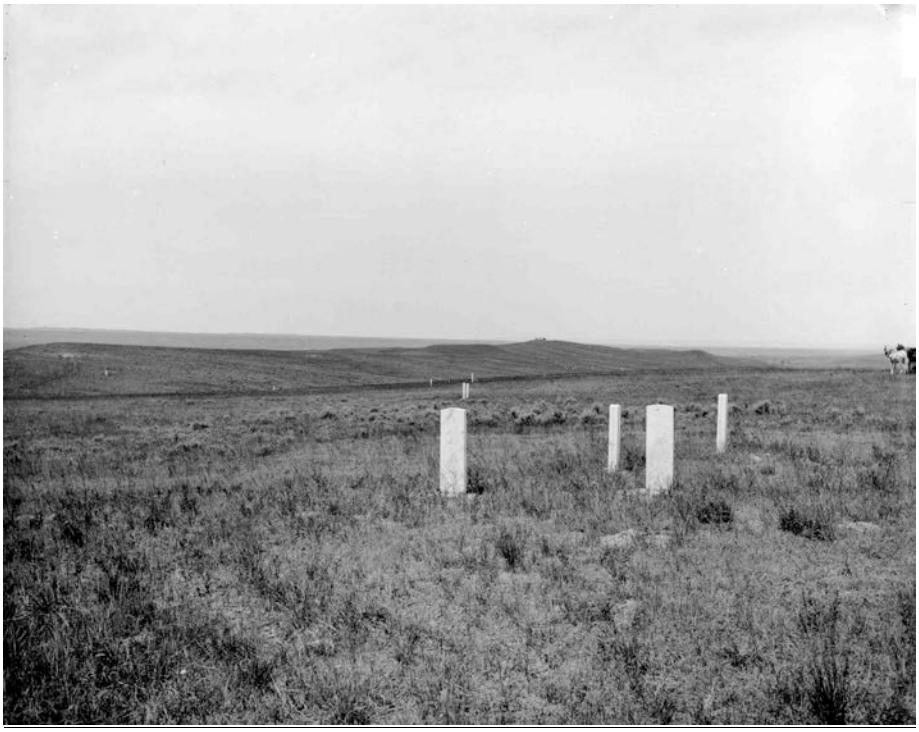

Figure 26. Looking North toward Last Stand Hill. Haynes, 1894. Source: Montana Historical Society.

Figure 27. View Northwest from Last Stand Hill, Haynes, 1894. Source: Montana Historical Society.

Figure 27 above is taken from a similar vantage point as Fouch's and Morrow's images taken some fifteen years earlier. The growth of the sage is more evident when compared with these earlier photographs. The expanding National Cemetery is also visible in the upper right hand portion of the photo.

Two years after Haynes, Christian Barthelmess produced a series of images that included more detailed views of the cemetery as well as the more commonly photographed sites on the battlefield. Figure 28 shows short grasses and little sage surrounding the Fort C.F. Smith memorial. In this respect it appears that little had changed since D. F. Barry photographed the cemetery area a decade earlier. The shadow of the stone house and the photographer atop are visible at lower right.

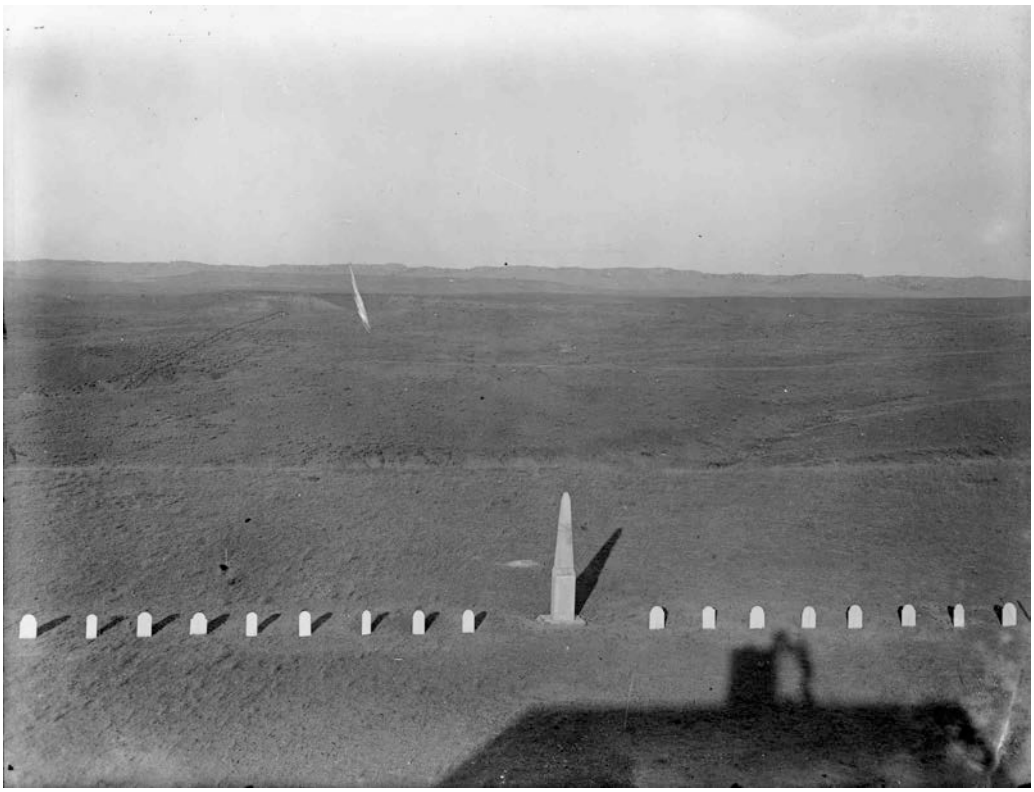

Figure28. Cemetery and Fort C. F. Smith Memorial. Barthelmess 1896. Source: Montana Historical Society.

Barthelmess also photographed Last Stand Hill from the vantage point of the cemetery. Deep wagon ruts leading up to the Seventh Cavalry Memorial are clearly visible. Judging by the angle of the photograph it is likely that Barthelmess also took this image from atop the Stone House. Two more views taken from Last Stand Hill show the Seventh Cavalry Memorial from the north with little sagebrush evident (Figure 30), and Fort Phil Kearny graves immediately south of the memorial (Figure 31).

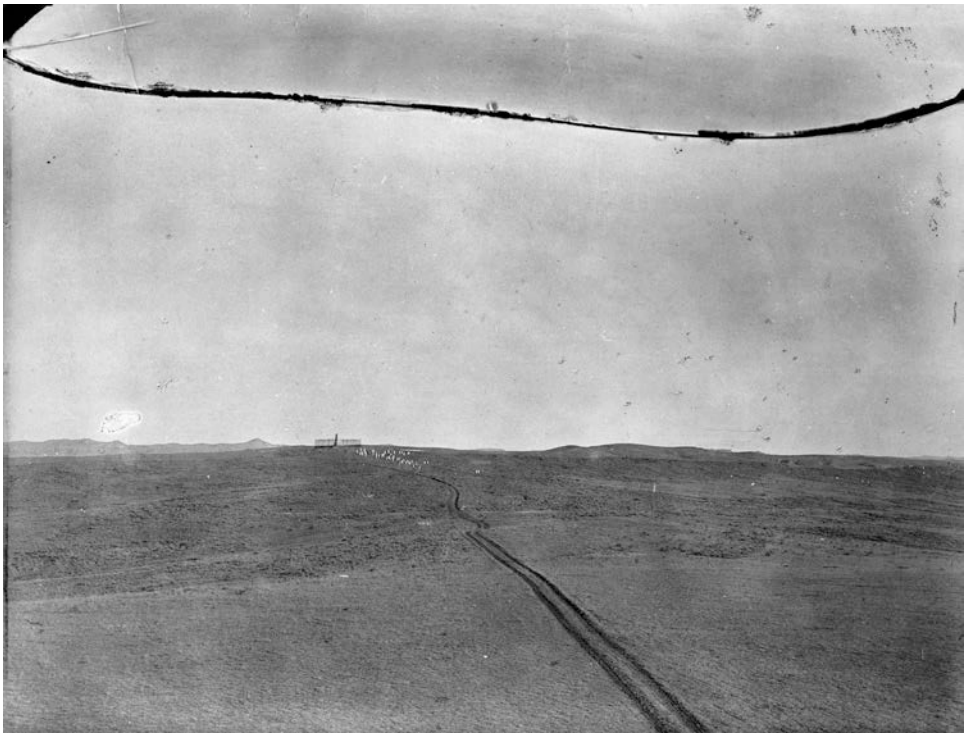

Figure 29. View from Cemetery toward Last Stand Hill, Barthelmess, 1896. Source: Montana Historical Society.

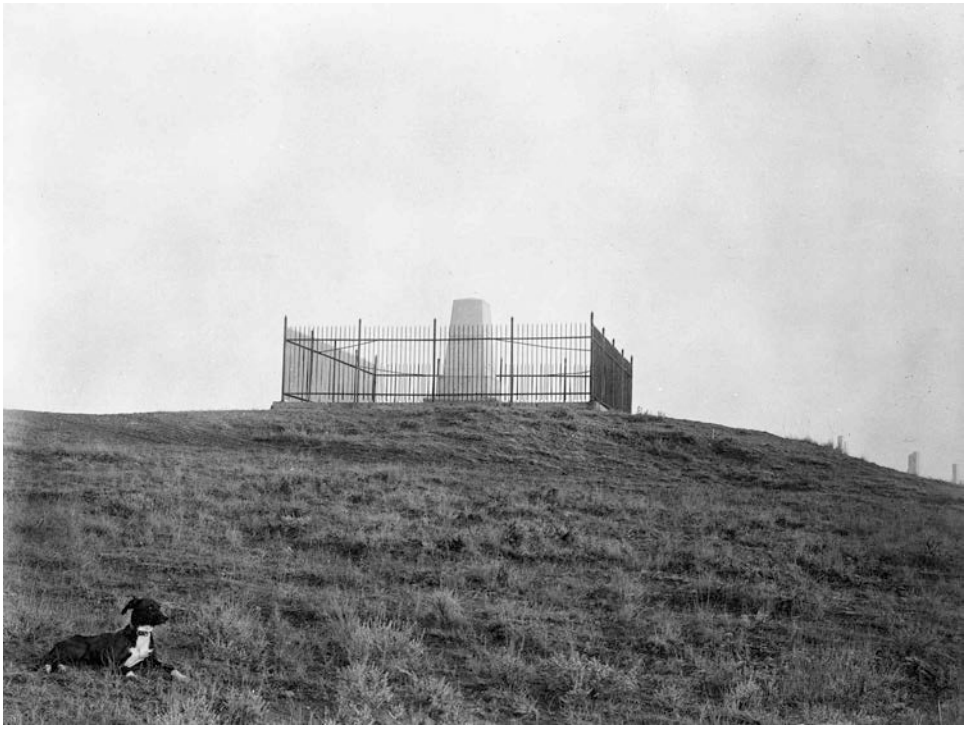

Figure 30. Seventh Cavalry Memorial. Barthelmess, 1896. Source: Montana Historical Society.

Figure 31. Fort Phil Kearny Graves. Barhelmess, 1896. Source: Montana Historical Society.

Figure 32 is Barthelmess's image of the Keogh Memorial. The photograph is very reminiscent of Morrow's 1879 photograph. Heavy visitation has obviously trampled the ground around the marker, but sage is clearly more prevalent in the surroundings.

Figure 32. Keogh Sector. Barthelmess, 1896. Source: Montana Historical Society.

In September of 1901 Oregon photographer Lee Moorhouse visited the battlefield and produced a series of fine quality photographs. Moorhouse's image of the cemetery and Fort Smith memorial show native grasses thriving in the cemetery (Figure 33). A decade after fencing, with minimal grazing trespass, the growth appears lush at summer's end. Moorhouse's photo of Last Stand Hill with the cemetery in the background, however, presents a different picture. With the exception of clumps of grass and some small sagebrush the ground is bare in many places. This was undoubtedly due to heavy visitor impact as the vandalism to Lt. Col. Custer's wooden grave marker attests (Figure 34). Still,

this impact is apparently localized around the Custer group of markers that remained unfenced in 1901.

Figure 33. View of National Cemetery. Moorhouse, 1901. Source: University of Oregon.

Figure 34. View to Northwest from Last Stand Hill. Moorhouse, 1901. Source: University of Oregon.

Moorhouse's images of the southern sectors of the battlefield, including the Reno-Benteen defense site, help to illustrate the impact of the Army's decision to fence the cemetery reservation. Unfenced, these lands were clearly subject to heavy grazing, both legal and illegal, and show a clear reduction in growth of grasses and forbs. Figure 35 looks southeast and shows evidence of a more heavily grazed landscape. Piles of horse bones are scattered about the defense site. Figure 36 was taken from a vantage point outside the modern park service unit. The view is to the southwest down a ravine toward the Little Bighorn River. The mistaken marker for Surgeon James DeWolf, which has since been moved, appears prominently in the foreground. Importantly the photograph shows that the

trees that now line the river below were not present in 1901.[352] The extent of bare earth also seems to indicate heavy grazing in this area. The final photo in the series, Figure 37, however, taken from the Reno-Benteen Defense Site and looking down the ravine toward the retreat crossing shows less grazing impact and also confirms the lack of large trees at the crossing.

Figure 35. Reno-Benteen Defense Site. Moorhouse, 1901. Source: University of Oregon.

[352] Brust, et. al., *Where Custer Fell*, 57-58.

Figure 36. Little Bighorn River and former DeWolf Memorial. Moorhouse, 1901. Source: University of Oregon

Figure 37. Reno's Retreat Crossing. Moorhouse, 1901. Source: University of Oregon.

C. THE HOMESTEAD BOOM, 1909-1919.

The Homestead boom of 1909-1919 accelerated environmental change in southern Montana and was another factor that shaped the environmental history of Little Bighorn Battlefield National Monument during the War Department period. The great homestead boom had three basic causes. The first was a series of federal laws and local conditions that allowed the acquisition of large tracts of land. The Enlarged Homestead Act of 1909 provided for initial 320-acre claims and between 1909 and 1923 homesteaders filed 114,620 claims on 25 million acres in the eastern part of the state. Montana had 22% of all entries filed nationwide in 1910 and that number rose to 30% of all entries in 1913. The railroads were also avid partners in the boom. The Northern Pacific, which had received the largest land grant in the Nation's history, sold off over ten million of its remaining thirteen and a half million acres of Montana land between 1900 and 1917.[353] The second necessary condition for the boom was a shared belief that agriculture could actually prosper on the semi-arid high plains. While some looked to promise of irrigation after the passage of the Newlands Reclamation Act of 1902, water projects in general proved to be too expensive for most farmers. Rather, it was a new system of dry farming championed by Hardy Webster Campbell that seemed to promise an inexpensive and sure way to turn the plains into a garden. The "Campbell System" was based solely on preparation of the soil to retain natural moisture and enjoyed great popularity throughout the West between 1902

[353] Malone, et.al., *Montana*, 232-38; K. Ross Toole, *Twentieth-Century Montana: A State of Extremes* (Norman: University of Oklahoma Press, 1972), 32-28; Paul W. Gates, "Homesteading in the High Plains," *Agricultural History* 51 (January 1977): 125.

and 1914.[354] The final reason for the boom was a public relations campaign mounted by the railroads, the state of Montana, and local boosters that touted the quality of Montana farmlands and efficacy of the Campbell System of dry farming. The fact that Montana was experiencing above average rainfall between 1910 and 1917, coupled with booming commodity prices due to the onset of World War I, seemed to confirm the boosters' claims.[355]

Yet the homestead boom collapsed as quickly as it began, falling victim to the environmental realities of the high Plains and the economic uncertainties of a world market. The rains failed in northern Montana in 1917 and by 1918 drought affected all of eastern Montana, including Bighorn County and the Little Bighorn Valley. As crops failed farmers began defaulting on their debts. Then, the end of World War I brought plummeting demand and prices to the commodity markets. The price of wheat was cut in half and farm bankruptcy skyrocketed. For many the only choice was to seek a better life elsewhere. The exodus from the eastern plains began as early as the fall of 1917 and peaked by 1919. Of the estimated 70,000 to 80,000 people who had rushed to Montana between 1909 and 1918, 60,000 left before 1922. Ultimately over eleven thousand farms, twenty percent of the state total, were abandoned to nature.[356] The environmental impact of the bust was as important as that of the boom. As thousands of farms and millions of acres lay abandoned across eastern Montana the effects of droughts and winds created massive dust storms.

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[354] Malone, et. al., *Montana*, 236-37; Toole, *Twentieth-Century Montana*, 39-41; Hardy W. Campbell, *Campbell's 1907 Soil Culture Manual: A Complete Guide to Scientific Agriculture as Adapted to the Semi-Arid Regions* (Lincoln, NE: The Campbell Soil Culture Company, 1907).
[355] Malone, et. al., *Montana*, 238-44; Toole, *Twentieth-Century Montana*, 45-51.
[356] Malone, et. al., *Montana*, 283; Toole, *Twentieth-Century Montana*, 70-96.

Meanwhile the fields, stripped of their native sod became the perfect breeding ground for weeds.

Numerous introduced/invasive species were first noted in Montana after the turn of the twentieth century and spread rapidly because of the homestead boom and bust. The species likely fitting this profile found on the Little Bighorn battlefield include Russian Knapweed (*Centauria repens*), Alyssum (*Alyssum allyssoides* and *A. desertorum*), Tansy Mustard (*Descurania sophia*), Leafy Spurge (*Euphorbia escula*), St. Johnswort (*Hypericum perforatum*), Quackgrass (*Agropyron repens*), several species of brome grasses (*Bromus hordeaceus, B. inermis, B. japonicas*), and Butter-and-Eggs (toadflax) (*Linaria dalmatica*).[357]

In addition to the natural or accidental transmission of species, other plants that are today considered invasive "weeds" were purposely introduced to the agricultural landscape. Russian thistle, for instance, likely made its way to North America in contaminated flax seed that Russian immigrants brought to South Dakota in 1873. Ranchers, however, facilitated its spread across the American West then they actively pastured Russian thistle as a drought resistant forage crop. Numerous grasses were also introduced as forage crops. Crested wheatgrass (*Agropyron cristatum*), another Russian native, was first introduced in the United States in 1898. In 1915 it began to be grown commercially across the northern Plains as a mean of improving range forage. Today it remains a persistent problem at Little Bighorn Battlefield.[358]

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[357] Bock and Bock, "Survey of Vascular Plants and Birds"; Blankinship, "Weeds of Montana." The lists provide in these two sources were compared in order to estimate the date that introduced species first appeared at Little Bighorn.
[358] John T. Schlebecker, *Cattle Raising on the Plains, 1900-1960* (Lincoln: University of Nebraska Press, 1963), 36-37, 112-13, 131.

The agricultural transformation of southeastern Montana was also disastrous for at least two small mammalian species: the black-tailed prairie dog and the black-footed ferret. The expansion of cropland came at the expense of prairie dog towns that were most often situated on fairly level plains. At the same time ranchers perceived the small rodents as a direct threat to their livelihood. On one hand they feared the loss of horses and cattle that might step into burrows and break legs, while on the other they believed that prairie dogs posed direct competition to livestock for available forage. Although the extirpation of prairie dog colonies began in some areas as early as the 1880s, large populations continued to exist into the early twentieth century in Montana. The largest colony existing at the time of the Northern Pacific Surveys, 1908-1914, was estimated to have covered over 23,000 acres south of the town of Hathaway (Rosebud County).[359]

It was with the homestead boom in the mid-1910s, and government involvement, that the concerted effort to eradicate prairie dogs began in earnest. Various means were employed to kill prairie dogs. Shooting them was legal but impractical for reducing their numbers. In some areas plowing and drowning were used. The most pervasive and effective control measure was poisoning. Private ranchers often spread strychnine-laced grain across colonies. Arsenic and potassium cyanide were also widely used, while toxic fumigants such as carbon bisulfide could be pumped into burrows. The poisoning campaigns began with individuals but soon gained government sanction and support. In 1900 Texas became the first state to initiate a poisoning program. Other states, including Colorado and Kansas, followed suit. The federal Bureau of Biological Survey [BBS] first

[359] Dennis L. Flath and Tim W. Clark, "Historic Status of Black-footed Ferret Habitat in Montana," *Great Basin Naturalist Memoirs* 8 (1986): 65.

began demonstrating poison control techniques in 1905, but after 1915 became directly involved eradication efforts in partnership with western states. The survey's chie C. Hart Merriam saw in prairie dog eradication a mission for his agency that would provide secure funding. According to one USDA report, in 1920 alone 2.8 million hectares of land in Montana was treated with poisoned bait to kill various species of ground squirrels and prairie dogs. Records from the BBS meanwhile indicate that between 1915 and 1965 a total of 3.4 million hectares (8.4 million acres) of prairie dogs were poisoned in Montana.[360]

In addition to poisoning efforts, prairie dogs declined for a second reason related to the advance of Euro-American settlement; the spread of sylvatic plague. Caused by the same bacteria, *Yersinia pestis*, responsible for the bubonic plague, the disease was introduced into North America in the early twentieth century. It is spread through flea-bites or contact with infected blood or tissue. Because they evolved without exposure to the bacteria, prairie dogs have little or no immunity to sylvatic plague. Mortality rates during outbreaks can top 90%.[361] The combined effects of plague and poison have decimated prairie dog populations across their historic range. By the mid-1980s it is likely that the prairie dog population of eastern Montana had fallen to only 10% of its historic population. While the campaign to exterminate prairie dogs radically reduced their numbers, it did not reduce the overall geographic range of the species. Gone were the

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[360] Craig Knowles, Jonathan Proctor, and Steven Forest, "Black-Tailed Prairie Do Abundance and Distribution in the Great Plains Based on Historic and Contemporary Information," *Great Plains Research: A Journal of Natural and Social Sciences* 12 (Fall 2002) 227-28; Steve C. Forrest and James C. Luchsinger, "Past and Current Chemical Control of Prairie Dogs," in John L. Hoogland, ed., *Conservation of the Black-Tailed Prairie Dog* (Washington DC: Island Press, 2006), 115-28.

[361] "Protecting Black-Footed Ferrets and Prairie Dogs Against Sylvatic Plague," U. S. Geological Survey, Fact Sheet 2008-3087, May 2011.

massive colonies connected through complexes of smaller colonies and in their place were scattered and often isolated populations that have been deemed "relict, insular ecological relationships."[362]

The great casualty of this new regime was the black-footed ferret. As described in chapter 1, black-footed ferrets are an obligate species, dependent upon the prairie dogs for their food and habitat. The destruction of prairie dog colonies eliminated ferret habitat, while the consumption of poisoned prairie dogs killed unknown numbers of ferrets. To make matter worse, black-footed ferrets are also highly susceptible to sylvatic plague. The fractured prairie dog ecosystems that characterized the Great Plains by the mid-twentieth century simply could not sustain viable self-sustaining ferret populations. The link between prairie dog eradication programs and ferret decline was first made in 1958 by biologist Carl Koford.[363] Ferret numbers continued to spiral downward until the animal was believed extinct by the end of the 1970s.

D. THE LITTLE BIGHORN RIVER AND THE DEVELOPMENT OF THE NATIONAL CEMETERY.

The meandering Little Bighorn River played a major role in the course of the battle and remained an important factor in history of the cemetery and monument. The course of the river has continued to evolve since the time of the battle through natural processes of erosion and deposition. At the same time human actions such as channel straightening the alteration of natural stream flows of irrigation have led to changes in the river's course. Most of these human alterations have taken place upstream and downstream of the

[362] Flath and Clark, "Historic Status," 63, 68.
[363] Carl B. Koford, "Prairie Dogs, White Faces and Blue Grama," *Wildlife Monographs* 3 (1958): 1-78.

immediate battlefield area. There is at least one case in which the course of the river within the area of the battlefield was purposefully changed. This occurred in 1923, when a shift in the rivers' current brought the main flow back into an abandoned meander and threatened the line of the Chicago, Burlington, and Quincy railroad (now the Burlington Northern and Santa Fe) at Garryowen. Dr. Charles Kuhlman, a long time student of the battle described the shift in the rivers' current:

> At some time unknown to me the current that once ran southward as far as the mouth of Shoulder Blade Creek, was deflected at the north tip of the high tongue of land between the basin along which I placed the [Reno] skirmish line and the southward course of the stream. After that the current headed straight toward where Garryowen now stands, and as it hit the high bank it turned to the right or northward making a curve. In other words after hitting the bank it dropped into the old or original channel in its course back toward the east . . . It was this change in the direction of the current that made it cut southwestward until it threatened the right of way of the railroad, until the whole loop was eliminated by cutting a channel farther east.[364]

Even three decades after the cut, Kuhlman reported that the shifting river course was still evident in "a broad strip of a swamp weed" which he described as "a very tough plant spreading by rootstalks or Rootsyocks [sic], and flowers in a long stem terminating in a

[364] Charles Kuhlman to Joseph Balmer, 1 March 1954; Kuhlman to Balmer, 27 May 1954, Charles Kuhlman Papers – Collection 81, Box 1, Folder 1-6, Montana Historical Society, Helena.

shape like the sponge-staff of a muzzle loading field piece or canon." It is possible that Kuhlman was here referring to cattails.[365]

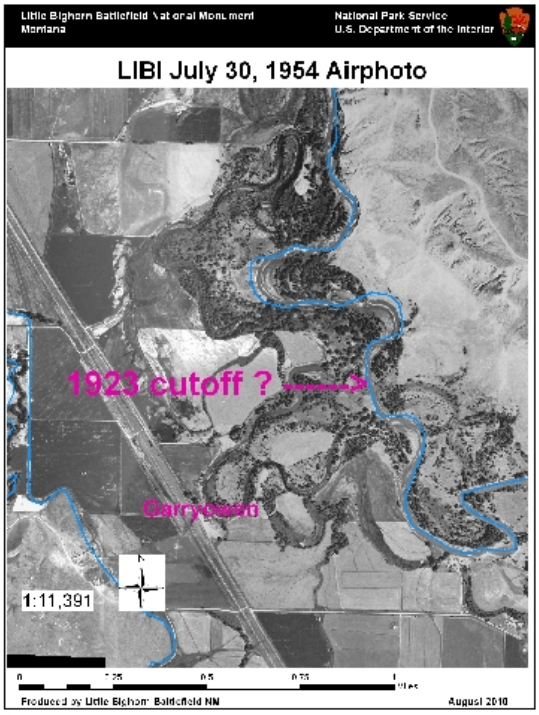

Figure 38. Probable location of 192 cut-off identified o aerial photo. Source: Little Bighorn Battlefield National Monument.

More than any other factor, developing a landscaped National Cemetery demanded that an adequate irrigation system be built. The first real attempt to bring irrigation to the cemetery took place in 1913 when Superintendent Eugene Wessinger installed a gasoline-powered pump at the river. The pump, however, proved incapable of providing adequate water for the envisioned landscaping.[366] Nearly twenty years passed before an adequate system was in place to water the trees shrubs and grass. As early as 1931, Supt. Victor Bolsius oversaw the planting of cottonwoods and ash trees in the cemetery. With the

[365] Kuhlman to Balmer, 1 March 1954, MHS.
[366] Greene, *Stricken Field*, 52.

irrigation system in place the next year more plantings took place. Red cedars and 150 blue spruce were planted in 1933.[367] Still, the irrigation system proved inadequate.

By the late 1930s the first truly effective irrigation system was in place. Water was drawn from the Little Bighorn River by means of an infiltration gallery shallowly buried in the northernmost river oxbow within the cemetery boundaries. One of three pumps contained in a new pumphouse built near the river in 1938 then moved the water uphill to an uncovered 20,000-gallon concrete reservoir located on top of Last Stand Hill just a few yards from the Seventh Cavalry monument. Gravity then fed the irrigation and domestic water systems.[368] Although the new pumps were prone to break down and the entire system could be pushed to its limits at the height of the summer irrigation season, it allowed more landscaping to take place in the cemetery. For example, the same year that the pumphouse was completed a tatarian honeysuckle (*Lonicera tatarica*) hedge was planted along the north and west borders of the cemetery. This ornamental plant soon escaped cultivation and today remains a problem in the monument's riparian bottomlands.

E. THE FINAL YEARS OF THE WAR DEPARTMENT ERA.

During the last decades of War Department Management as growing public interest led to increased interpretative activities on the battlefield, the Reno-Benteen Defense site was incorporated into the cemetery reserve. A small but steady stream of visitors had visited the site in the first half century after the battle, and by the time of the semi-

[367] Greene, *Stricken Field*, 58.
[368] C. R. Bowman, "Report on Inspection of Custer Battlefield National Monument," July 1949, NARA KC Box 167, Fld. 660-033 Sanitation; Fred T. Johnston to Region 2 Director, 4 December 1945; Project Completion Report, Pressure Tank for Domestic Water Supply, 19 July 1947, NARA KC Box 168, Fld. 660-05 Water Supply System.

centennial commemoration in 1926 there was growing sentiment that the site should be more formally memorialized and managed. The raising of the Reno-Benteen Memorial in July of 1929 preceded the actual acquisition of the land from the Crow Tribe by over a year. The amount of land transferred to the War Department amounted to only 160 acres, and the transfer effectively created a second, and much smaller, management "island" located four miles south of the Custer Battlefield portion of the reserve.[369]

The most visible and consequential environmental impact of the Reno-Benteen addition for the larger battlefield area was the construction of a winding two-lane road to connect the two parcels of government owned lands. In the early years a single set of wagon ruts led uphill from the cemetery to Last Stand Hill. By 1915 the primitive road extended south to Calhoun Hill and by 1930 connected the two sites.[370] Construction of graded road was delayed for a decade as right of way issues were worked out. In September 1933, Cemetery Superintendent Victor Bolsius, still unclear on the status of the government's rights of way, requested that the Army seek a definite right of way for the access road connecting the cemetery to the "Custer Battlefield Hiway" [modern I-90/US 87] as well as a right of way to construct a "road from the Busby Road [modern US 212] to the Reno monument, and running through Reno's reservation to the south gate of the Custer battlefield." Apparently Bolsius envisioned a loop road that ran directly to the Reno-Benteen site before turning north and connecting with the Custer battlefield section of the

[369] Green, Stricken Field, 67-68.
[370] Mangum, "Under Siege," 7-8.

reservation.[371] It was not until January of 1938 that the War Department was granted a right of way to build the battlefield road across Crow lands.[372]

The War Department released its specifications for the road at the end of 1938 and construction was completed in 1940. In the estimation of former NPS historian Jerome Greene, "owing to the lack of period sensitivity regarding historic landscapes – [the road] materially affected the original condition of the battlefield and possible altered interpretive conclusions about the site." Grading likely "disturbed and distorted" the landscape on Last Stand Hill and all along the course of the road. The top of Last Stand Hill, for example, was widened even further. The streambed of Medicine Tail Creek was realigned. And most conspicuous of all, a substantial gap was cut directly through Weir Point to make way for the road.[373]

[371] Victor A. Bolsius to Ninth Corps Area Quartermaster, 14 September 1933, NARA Kansas City, RG 79 Region II, Box 167, Folder 630.
[372] Green, Stricken Field, 67-68; Supt. Edward S. Luce to Supt. Yellowstone National Park, 21 September 1949, NARA KC RG 79.
[373] Greene, *Stricken Field*, 69; Mangum, "Under Siege," 8-9.

Figure 39. Weir Point from the South before Road Construction. Moorehouse, 1901. Source: University of Oregon.

The final years of War Department management also saw the only instance of legally permitted grazing within the monument's boundaries. As described earlier, the broken terrain leading down to the river below Last Stand Hill led the army in 1891 to run a straight-line fence that left slightly under 200 acres of the cemetery's riparian bottomlands unenclosed and open to unregulated grazing.[374] By all indications Crow and Euro-American owned stock freely grazed the area for the next four and a half decades. In August of 1936, Vincent Nipper, a white rancher who leased the lands on the west side of the Little Bighorn across from the cemetery approached Supt. Harvey A. Olson with a request to fence off the government lands that had been excluded from the original enclosure. He proposed to run two fence lines from his property across the Little Bighorn River to link up with the

[374] W. H. Owen to Quartermaster General, 3 August 1893, copy in LIBI White Swan Library.

government fence. This action would seal off two of the three oxbow bends in the riparian bottoms that had been unfenced, leaving only the northernmost bend, the site of the cemetery's pump house, unenclosed. He argued that fencing was necessary to prevent stray stock from roaming onto his leased land and that his intention was to save money, as his plan would cut out the need for two full miles of fence, if it were run along the meandering west bank of the Little Bighorn. Of course, it would also effectively create a private pasture for Nipper on cemetery lands without the payment of leasing fees. This fact did not escape the Quartermaster's Office in San Francisco that denied the fencing request. Chief Clerk O. D. Miller pointedly asked if Nipper's real intention was to "secure for his own use the meadows along the river bank for grazing purposes?" If it was, Miller suggested that Nipper should make a formal application, which included "adequate rental," to lease the federal land.[375]

Late in December, Nipper came to the superintendent and verbally requested to lease the unfenced riparian lands, with the exclusion of the pump house area, for $40 per year. Olson supported the request in practical terms. "This seems to be too good an offer for this office to refuse," he wrote, "in as much as this particular tract of land is being pastured every year by range stock and no revinue [sic] is derived." He also noted that since Nipper leased "all of the land on the opposite side of the river" an open bid process was unlikely to result in a better offer.[376] On March 10, 1937, Nipper signed a five-year lease for the lands. The contract required Nipper to build and maintain fencing but prohibited permanent structures as well as timber cutting, mining, and the removal or sand

[375] Olson to Quartermaster, 13 August 1936; O. D. Miller to Olson, 19 August 1936; Olson to Quartermaster, 27 August 1936, NARA College Park.
[376] Harvey A. Olson to Quartermaster, 9th Corps Area, 31 December 1936.

or gravel. It also required the rancher to exercise "due diligence" in protecting the "forests or other property of the United States . . . on the said premises against trespassers, fire, or damage." The rancher would also be responsible for repairing or replacing any government property he or his stock damaged. The lease, however, contained no limitations whatsoever on the number of animals that could be grazed and no provision for their removal in case of overgrazing or range degradation.[377] The military clearly remained focused on protecting government property. Managing an ecosystem or preserving a cultural landscape was simply not a consideration.

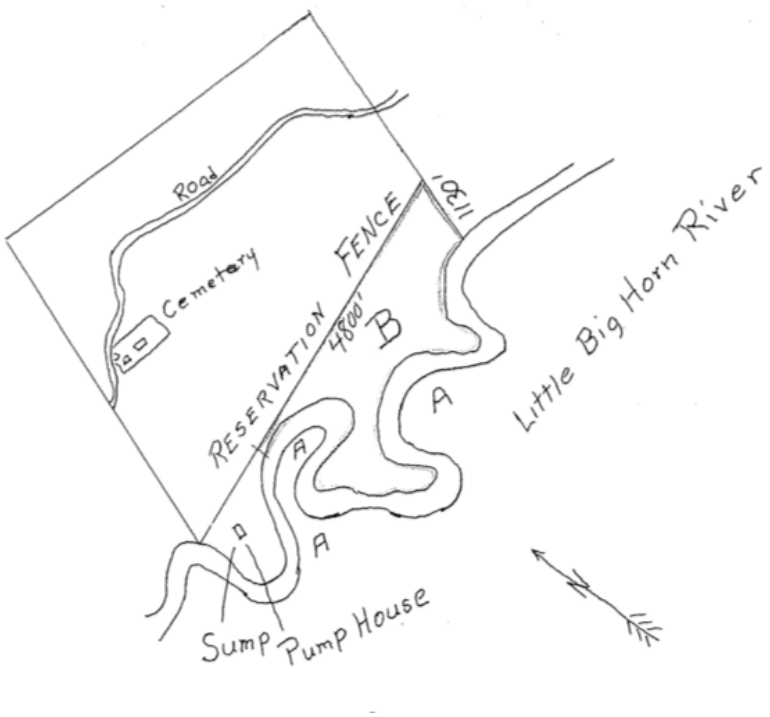

Figure 40. Map from Original Nipper Lease, March 10, 1937. U. S. National Archives. "A" indicates Nipper's leased land on the Crow Reservation, and "B" the land included in the lease. The 1891 War Department fence line is marked "Reservation Fence." One of Nipper's fences is marked "1130'" while the other is the unmarked line just downstream of where the Little Bighorn River comes closest to the 1891 fence li

[377] Lease made between the Secretary of War and Vincent Nipper, 10 March 1937.

The original agreement also included a provision for the lessee to terminate the lease early. For some reason Nipper chose to end the lease on February 10, 1941, shortly after effective NPS administration of the site began.[378] Perhaps he felt the lease was too expensive for the forage it could provide.

Between 1877 and 1940 the War Department managed the area of Little Bighorn Battlefield National Monument, first informally, and then as Custer Battlefield National Cemetery. During this period, management decisions as well as larger environmental changes on surrounding lands shaped the environmental history of the battlefield. War Department management was focused on preserving the monuments placed on the battlefield as well as developing the National Cemetery. Interpreting the battlefield for visitors was a secondary and late developing concern. Managing the natural environment was never a consideration. Still, some army management decisions would later prove critical. Fencing the land and preventing grazing was the single-most influential action taken by the army. The construction of an irrigation system and the initial landscaping of the cemetery, along with the introduction of exotic species would also have lasting impacts. Just as important as these conscious actions, was the range of environmental and agricultural changes taking place around the monument. The destruction of the bison herds and their replacement by range cattle, followed by the advent of irrigated agriculture changed the face of the Little Bighorn valley. Within this sea of change the two small parcels of federally controlled land that made up Custer Battlefield National Cemetery were set upon a separate environmental course.

[378] Luce to Rogers, 2 December 1943,

CHAPTER 4: THE LITTLE BIGHORN BATTLEFIELD UNDER NATIONAL PARK SERVICE MANAGEMENT, 1940-PRESENT.

On July 1, 1940, Custer Battlefield National Cemetery was officially transferred from the administration of the War Department to the Department of the Interior and the National Park Service. The transfer entailed more than a shift in bureaucratic responsibility. Outside of the cemetery proper, War Department management was for the most part passive – for instance, other than fencing the monument no other actions were taken to manage the monument's grasslands. Nor did the army see interpretation of the battle as a central part of its mission at Little Bighorn. The park service, however, brought with it a mandate to both preserve the resource and interpret its meaning for the visiting public. This fundamentally different mission, as well as the regulations and management practices it brought, would have important ramifications for the natural world of the Little Bighorn Battlefield.

The evolution of park service ideas about the management of nature is an important part of the environmental history of all the parks, including Little Bighorn. The tension inherent in the NPS organic act of 1916, which established that the "fundamental purpose" of the parks was to "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in a manner and by such means as will leave them unimpaired for the enjoyment of future generations," meant that the service never focused singularly on preservation.[379] As NPS historian Richard West Sellars

[379] "An Act to Establish a National Park Service," 25 August 1916, 39 Stat. 535. The Park Service's organic act also allowed the secretary of the interior to "sell or dispose of timber"

has detailed, for much of its history the park service privileged the visitor's experience and engaged in "façade management." In short, the service managed scenery rather than resources. And while natural sciences first gained a toehold in park service management in the 1930s, they would not be truly integrated into management decisions for decades.[380]

Using changing park service ideas about the management of nature as an organizational tool, this chapter presents the environmental history of Little Bighorn Battlefield National Monument in two major periods. From 1940 through the era of the Mission 66 initiative the park went through a development period that saw the construction of most of the visitor and administrative infrastructure that exists today. While the visitor experience and interpretation of the battle were paramount, this period also included important decisions and precedents that impacted the natural resources of the park. Beginning in the early 1970s but not being fully realized until the 1980s and 1990s, a second era of natural resource management shaped the landscape of the Little Bighorn battlefield. More intense planning efforts, the application of science in natural resource management, and increasing attempts to integrate cultural and natural resources marked this period.

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when necessary to "control the attacks of insects or diseases or otherwise conserv the scenery or the natural or historic objects," and to "provide in his discretion for the destruction of such animals and of such plant life as may be detrimental to the use of any of said parks." The act also provided for concessions within parks for the "accommodation of visitors" and for grazing leases when "such use is not detrimental to the primary purpose for which such park, monument, or reservation was created."

[380] Richard West Sellars, *Preserving Nature in the National Parks: A History* (New Haven: Yale University Press, 1997); William R. Lowry, "National Parks Policy," in Charles Davis, ed., *Western Public Lands and Environmental Politics* (Boulder, Westview Press, 2001), 169-96.

I. National Park Service Policies and the Environment of the Battlefield in the Development Era – 1940 Through Mission 66.

In June of 1933, Pres. Franklin D. Roosevelt issued Executive Order 6166 that transferred most of the parks, monuments, and historic sites under War Department management to the National Park Service. A subsequent executive order specified the War Department properties that were transferred, including eleven national cemeteries. Custer Battlefield National Cemetery was not transferred at this time, most likely because it was still an active cemetery. The growing visitor interest in the site and desire for greater historical interpretation was manifest in proposed legislation for an historical museum at the battlefield. In the spring of 1939, Secretary of the Interior Harold Ickes wrote, "If the area is preserved as a historic site and a museum is established thereon, such functions should be performed by the National Park Service." Later that year Congress passed legislation to establish a museum. Although construction would be delayed for years, Pres. Roosevelt issued a third executive order, No. 4828, which transferred the cemetery to National Park Service administration effective July 1, 1940.[381]

In January 1941, Edward S. Luce arrived at Custer Battlefield National Cemetery as the first park service superintendent of the site. An enlisted veteran of the Seventh Cavalry in the early twentieth century, he brought with him a passion for the place and its history. Luce remained in charge of the park until his retirement in 1956. Under Luce and his successors, John A. Aubuchon and Thomas A. Garry, the park took on the look that visitors still experience today. While development might characterize this era, important steps

[381] Harold Ickes to Director, Bureau of the Budget, 3 May 1939; Executive Order No. 8428, 3 June 1940, NARA KC, Bx. 166, Fld. 0-00, Laws and Legal Matters; Jerome Greene, *Stricken Field: The Little Bighorn Since 1876* (Norman: University of Oklahoma Press, 2008), 73-75.

were taken to manage the natural environment. Perhaps most importantly, the precedent was set that the park would contain two distinct landscapes, a traditionally landscaped cemetery and battlefield that took on the historic character of the natural landscape of 1876.

A. THE LANDSCAPE DEBATE: A DEVELOPED CEMETERY AND A NATURAL BATTLEFIELD.

From the earliest years of park service administration, questions arose over the expense and appropriateness of maintaining an Eastern style cemetery on the high plains. Creating the look of a traditional military cemetery was important to Supt. Luce. During his first year at the park he pursued a series of actions that reinforced the division between the developed cemetery grounds and the relatively natural battlefield. The most visible and persistent legacy of this divide has been the introduction of exotic species to the monument. In 1941 all of the native sagebrush was removed from the cemetery and replaced with sod. In addition 140 evergreens were planted in the cemetery.[382] In 1944 Supt. Luce described the maintained cemetery; "The cemetery proper is lawn seeded with national cemetery formula and is kept and maintained according to national cemetery regulations. This section has been highly fertilized and has a top soil to a depth of about 18 inches in order to grow grass."[383] Luce's concern for the appearance of the cemetery grounds continued throughout his tenure at the park. In 1952, for instance, he worried about the effect of chlorinated water on the cemetery grass. Frank Mattson, the landscape

[382] Greene, *Stricken Field*, 76

[383] Luce to Supt. YNP, 20 September 1944, NARA KC, Bx. 166, Fld. 601-15, Landscaping. Custer Battlefield was a "coordinated unit" of Yellowstone until 1953 and thus much of the correspondence passed through the larger park's administration.

architect at Yellowstone National Park, assured Luce that chlorine would have no effect on the lawn. He cited a recent article in the journal "Lawn Care," and even went so far as to enter a subscription to the journal for Custer Battlefield.[384]

With World War II raging in Europe and the Pacific, the chief landscape architect of the National Park Service T. C. Vint visited Custer Battlefield National Cemetery. He came away impressed with the quality of the lawn, but sardonically questioned the cost of maintaining grass in such an arid region. He reported that it was one of the "finest lawns in the Western United States." Indeed, he continued, "it is nothing less than an achievement in the lawn making world," and ran "a close second to growing orchids at the south pole." His humorous comments were meant to diffuse the serious question he posed next, was it really necessary to maintain beautiful sod in all national cemeteries, regardless of their natural climate? He carefully suggested that the park service rethink the standard practices of the Army that led to the "conspicuous" shock of bright green atop a dry, sun-soaked Montana hill. Instead, he argued, "a suitable groundcover adapted to an arid climate . . . would be more fitting and require much less maintenance." While Vint hinted at aesthetic motivations (twice referring to the prospective groundcover as more "fitting") he made economics the center of is argument. He noted that pumping water from the Little Bighorn and maintaining the irrigation system constituted a large part of the cemetery's annual expenses. Moreover, he argued that the irrigation system was outdated and that shortly an expensive new system would be necessary. "If cover requiring less care and less water

[384] Frank E. Mattson to Superintendent, CBNM, 20 May 1952, NARA KC, Bx. 166, Fld. 601-15, Landscaping.

could be substituted for the lawn," he wrote, "a simpler water system could be considered."[385]

Vint's suggestions set off a flurry of responses at all levels of the NPS bureaucracy. Uniformly they all defended the maintenance of the bluegrass lawn on both economic and traditional/aesthetic grounds. The first to respond was regional landscape architect Frank Mattson. He pointed out that the six and a half acre cemetery was but a fraction of the monuments land and that the vast majority of the land was "in very much the original ground cover." And while he accepted that keeping grass green under such conditions was difficult he argued that using native vegetation would be no easier:

> Any "pure stand" of ground cover would require, we believe, as much attention as a lawn and any mixed stand would be more difficult. We visualize alpine meadows which would seem to be ideal as a substitute for a grass lawn and which would provide the atmosphere of breathless serenity found among the mountains. At this altitude, however, all of the weeds introduced by intensive cultivation would come into competition and the ground cover could not stand the competition nor the abuse of crowds walking over it.[386]

Mattson also made a direct appeal to tradition. Cemeteries, he argued were so steeped in tradition that they were subject to "unwritten laws of action." The most fundamental of these rules was immaculate maintenance. He concluded, "Would anything but the green grass lawn at Custer be recognized as complying with that tradition?"

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[385] T. C. Vint to NPS Director, 23 August 1944, NARA KC, Box 166, Folder 601-15L.
[386] Frank B. Mattson to Regional Director, 9 September 1944, NARA KC, Bx. 166, Fld. 601-15, Landscaping.

Supt. Luce echoed many of Mattson's points, concluding that the natural landscape was simply not suited for a cemetery. He began with an unflattering portrait of the native ground cover at the monument. When there was sufficient spring rainfall the land was a "dull green" but was a "parched brown" most of the year. The ground cover was dominated by "cheat-grass, prairie wool grass, blue-stem grass, several varieties of cactus, sage brush, and weeds of different sorts." The soil was of a "shale and gumbo variety" and after heavy rains it was impossible to walk over the ground without "accumulating huge bunches of gumbo mud." The soil was also prone to erosion creating practical problems such as maintaining headstone alignment were the sod to be removed. Native grasses would be harder to mow and keep weed free. They would also provide a haven, he contended, for poisonous snakes and thus create a "grave menace" for the visitors and staff. All of these difficulties aside, Luce argued that the "most damaging repercussions" from moving toward natural ground cover would be from the "visiting public, patriotic organizations, and from the relatives of the deceased." Maintaining national cemeteries, Luce wrote, was the "Government's small payment of its debt of gratitude and appreciation to those who have made the Supreme Sacrifice." Ultimately, Luce acknowledged the contrast between the manicured cemetery and the "natural" battlefield but concluded "each is an asset to the other."[387]

Supt. Rogers at Yellowstone supported Luce's arguments. He wrote Regional Director Lawrence Merriam, "Our feeling is that the cemetery and battlefield area being distinctly different in their purposes should not be regarded in the same light from the standpoint of Service objectives and/or landscape treatment. Merriam concurred with the

[387] E. S. Luce to Supt. YNP, 20 September 1944, NARA KC, Bx. 166, Fld. 601-15, Landscaping.

opinions and stated that the factors "dictating" the use of lawn outweighed the arguments for moving toward "native ground cover." He cited the traditional use of grass in cemeteries as well as the "attitude of the public" toward deviating from that tradition. Moreover, Merriam questions the cost saving in installing and maintaining "weedless stands of native grasses or ground cover." In the end he recommended that the grass lawn of the cemetery remain.[388]

Yet while the cemetery would continue to be landscaped in a traditional fashion, it was also clear that for the park service and for Luce in particular the area must be managed primarily as an historic site focused on interpreting the Battle of the Little Bighorn. This goal became clearer in 1944 when the first Master Plan for Custer Battlefield National Cemetery was released. The plan declared that developments would "provide for the minimum considered necessary for proper interpretation, administration, protection and maintenance," and would "place emphasis on the interpretation of Custer's battle with the national cemetery importance subdued." Several "objectionable features" in the current layout of the park were identified and included the aerial power lines coming from Crow Agency along the access road, the prominence of the headquarters development on the skyline as viewed from the highway, and the alignment of the access road which placed emphasis "upon the cemetery rather than the historically important battlefield."[389] These concerns reflect the well-established park service priority of managing landscape for scenic and interpretive purposes rather than for truly environmental concerns. Moreover, many

[388] Edmund B. Rogers to Regional Director, 3 October 1944; Lawrence C. Merriam to NPS Director, 10 October 1944, NARA KC, Bx. 166, Fld. 601-15, Landscaping.
[389] "The Master Plan: Custer Battlefield National Cemetery, Montana," National Park Service, 1944 [hereafter 1944 Master Plan], Denver TIC.

of the future developments anticipated in the plan such as the museum, parking areas, and trails, would be built on untouched and historically important battlefield terrain. Still, the 1944 Master Plan suggested the division of the park into two separate zones demanding very different management practices. In 1946 the park's name was changed to Custer Battlefield National Monument, reflecting the emphasis on interpretation at the site.[390]

Figure 41. Aerial view to southeast showing cemetery and newly constructed visitor center. Ca. 1952. Source: Little Bighorn National Monument. Note the new and more mature plantings of evergreens as well as the tatarian honeysuckle hedge o north and west (bottom and bottom right) sides of the cemetery. The uncovered reservoir, screened by shrubs is visible adjacent to the Seventh Cavalry Memorial at the upper left corner of the photo.

[390] Greene, *Stricken Field*, 78-79.

More than anything else, the decision to maintain an Eastern style military cemetery meant that an irrigation system up to the task had to be maintained at the park. The difficulties of obtaining, treating, and delivering water would become a constant issue. The existing water system had been designed and installed late in the War Department era, with the pumphouse was completed in 1938. In 1949, sanitary engineer C. R. Bowman proved a description of the park's water system. The water was drawn from the Little Bighorn River via an "infiltration gallery made up of 10-inch perforated pipe laid below the stream bed," and first collected a "covered concrete reservoir" on the riverbank. The amount of water held here varied between 20,000 and 40,000 gallons depending on river levels. From the lower reservoir one of three pumps (the smallest pump was used in winter when only drinking water was needed) pushed the water uphill to an uncovered 20,000-gallon concrete reservoir located on Last Stand Hill. Gravity then fed the irrigation and domestic water systems. Most of the water went for irrigation, but the some was diverted to a 3,000-gallon pressure tank buried near the headquarters building. (The original pressure tank was installed in 1915 and by 1945 was so badly rusted that it was replaced in June of 1947.) This water was filtered and chlorinated and then piped to the residences and a drinking fountain.[391]

The potential for flooding as well as the ever-shifting course of the Little Bighorn River complicated the management of the water system. Spring floods and ice jams could threaten the pumphouse. The river's meandering channel was one part of the natural world

[391] C. R. Bowman, "Report on Inspection of Custer Battlefield National Monument," July 1949, NARA KC Box 167, Fld. 660-033 Sanitation; Fred T. Johnston to Region 2 Director, 4 December 1945; Project Completion Report, Pressure Tank for Domestic Water Supply, 19 July 1947, NARA KC Box 168, Fld. 660-05 Water Supply System.

that park service personnel actively attempted to manipulate during this period. In December 1950, Supt. Luce received permission to remove twenty juniper trees located in the cemetery. The trunks were to be cut just below ground level as to not damage the roots of adjoining spruces and the entire tree was then to be used in "river control work."[392] Eight years later during a flurry of activity related to the Mission 66 initiative, more bank stabilization work took place. This effort included the planting of trees along the river and the dumping of 45 cubic yards of rock to form jetties in an attempt to forestall bank erosion.[393]

Wells were not a viable option. The depth of the water table at the cemetery and limited supply posed problems. Another factor that worked against drilling wells for irrigation was the chemical composition of the groundwater. One well was sunk in 1945, but was never used.[394] Oden E. Sheppard of Montana State College advised Luce that using well water for irrigation would be "injurious" because of the "very large percentage of sodium salts in the water, the relatively high amounts of total solids and the fact that there is apparently free sodium carbonate present in the water." Sheppard predicted that the effects of "white alkali" would be apparent by the end of the first irrigating season if groundwater were used for irrigation.[395]

The issue of water rights thus also concerned the park service. None of the military's documents turned over at the time of transfer indicated that a filing had been made on the

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[392] Fred T. Johnson, YNP to Luce, 5 December 1950, NARA KC, Bx. 166, Fld. 601-15, Landscaping.
[393] Greene, *Stricken Field*, 87; Don Rickey Jr., *History of Custer Battlefield* (reprint ed., Fort Collins, CO: Old Army Press, 2005), 104.
[394] Greene, *Stricken Field*, 77.
[395] Oden E. Sheppard to E. S. Luce, 17 January 1946, NARA KC Box 168, Fld. 660-05 Water Supply System; Rickey, *History of Custer Battlefield*, 104.

water drawn from the Little Bighorn since the current system had been put in place in 1932. In a 1942 inquiry the park service's regional director wrote, "since there is considerable irrigation from this stream we believe such a filing should be made." Likewise, the 1944 Master Plan stated, "There are no existing water rights or water claims on the Custer Battlefield National Cemetery." By 1952 no filing had yet been made. Proposals to buy water from the BIA's Willow Creek reservoir seemed the best option.[396]

The water system saw a major expansion in the Mission 66 era. Most notably the above ground reservoir on top of Last Stand Hill was expanded to a capacity of 100,000 gallons. The impetus for a new reservoir was in part due to worries about fire suppression. The old reservoir, built by the army, was uncovered and prone to freezing and provided inadequate water pressure for firefighting. An elevated tank was ruled out because of its visual impact and even a dual system, unfiltered to supply irrigation water and a filtered residential and firefighting system was considered. In addition to the expanded reservoir improvements to the water system in the late 1950s included a new irrigation system for the cemetery as well as a new septic system.[397]

B. ENDING PERMITTED GRAZING IN THE PARK.

Grazing trespass had been a concern at Little Bighorn since the 1880s. Before 1940, the War Department's concerns were not with the ecological or interpretive impact of grazing, but rather with the physical damage that stock might do to the cemetery as well as

[396] Regional Director to Associate Attorney, 30 January 1942; 1944 Master Plan, 6 Assistant Director to Region 2 Director, 14 march 1952, NARA KC Box 168, Fld. 660-05 Water Supply System.
[397] William E. Robertson to NPS Director, 10 July 1951, NARA KC Bx 166, Fld. 600-01 Master Plan; Greene, *Stricken Field*, 86, 93.

the memorials scattered across the battlefield. This was the principal reason for fencing the battlefield in 1891. The advent of NPS administration brought with it new policies intended to preserve both cultural and natural resources, which created new reasons to keep livestock out of the park. Ultimately, park service administrators would cite, both rightly and wrongly, the grazing prohibition as a crucial factor in maintaining the historical character of the landscape in the park.

As described in the previous chapter, legal grazing did occur on a small portion of the monument during the last years of the War Department era on the riparian bottomlands below Last Stand Hill. A white rancher named Vincent Nipper leased the area beginning in August of 1936. He cancelled the lease in February 1941 only one month after Edward Luce had arrived as the first park service superintendent. It is unclear why Nipper cancelled the lease, but at the end of 1943 Nipper once again requested to lease the same ground two major changes affected the decision to permit grazing on battlefield lands. First, the area was now under NPS administration. Unlike the War Department, the park service considered both interpretive and environmental issues including the number and type of animals to be grazed, the carrying capacity of the land in question, and the potential environmental impact of grazing. These concerns generally worked against permitted grazing at Little Bighorn. Second, the onset of World War II created a countervailing justification for opening additional grazing areas on federal lands as a means of increasing the nation's strategic food supply. As part of the food production program, NPS superintendents were asked assess the feasibility of grazing on their individual units. These recommendations were compiled into a list of areas approved for new grazing permits that was approved by both the director of the NPS and the Secretary of the Interior in February

1943. Nipper's request for a new permit in December of that year therefore raised a series of complex questions.[398]

Figure 42. Riparian lands along the Little Bighorn River probably near Medicine Tail Coulee, March 1943, during the era of Nipper's lease. Source: Little Bighorn Battlefield National Monument.

Supt. Luce supported Nipper's request on several grounds. First there was the practical advantage of controlling grazing on that portion of the reserve. The fences Nipper installed in 1937 were apparently still in place. Should the lease be denied and Nipper remove the fence, Luce feared "we would have range stock in the area . . . all the time." Moreover, Luce believed that without the fence he would be legally powerless to prevent grazing trespass. He cited a Montana state law that required landowners to fence property before they could legally exclude free-range stock. He also pointed out that the area in question was actually quite small with about thirty total acres, of which only twenty-three

[398] Lawrence B. Merriam, Region 2 Director to Edmund B. Rogers, YNP, 11 December 1943.

acres was truly usable grazing land, "the remainder is heavy underbrush and timber." Finally, Luce stated that the riparian lands held no interpretive importance for the park. Reflecting a major disjuncture with later park service policy he wrote, "The land has no historical value to the area and is inaccessible to visitors."[399]

Region 2 Director Lawrence Merriam expressed serious administrative, legal, and ecological concerns about the proposed lease. Even with the war emergency, he asserted that here must be compelling reasons for granting the lease beyond Nipper's desire to graze his animals there. There was the practical problem of ending grazing once the war was over. Reflecting on the last war emergency he wrote, "In light of the service's experience in eliminating grazing following World War I, we are hesitant to recommend opening areas to grazing wherein no grazing is now being undertaken unless there is conclusive evidence that there is a definite need for additional grazing land that cannot be readily obtained elsewhere." Citing a recent appeals court decision, Merriam also rejected Supt. Luce's suggestion that Montana's "fence out law" had any force on federal lands. Then there were the ecological considerations. He questioned how so small an area, 30 suitable acres according to Luce's estimate, "can supply sufficient Animal Units of grazing to warrant referring the matter to the Secretary." While acknowledging that the "river land no doubt supports a more luxuriant growth of vegetation" than the upland sections of the cemetery, he estimated that at best the area could "yield no more than five cow years of grazing without causing permanent damage to the area." Still, the director left open the

[399] E. S. Luce to Edmund B. Rogers, 2 December 1943.

possibility of a lease if it was "definitely needed" and with a memorandum "fully justifying the need for opening the Custer Battlefield National Cemetery" to grazing.[400]

Apparently Nipper pressed ahead on the lease issue as in the spring of 1944 Supt. Rogers submitted the sample lease and memo. The request made its way up the administrative ladder. By April it had reached the desk of acting NPS Director Hillory Tolson. He acknowledged that the area was not o the February 1943 list of NPS property approved for grazing, but was swayed by the practical argument that it would provide "better control and less resulting damage to the area can be maintained by granting a permit for grazing to a responsible person."[401]

And so in May 1944, Nepper's grazing lease was renewed at a reduced cost of $25 per year. Several special conditions were attached to the renewal that reflected the expanded concerns of the National Park Service. "This permit is granted during the war emergency and in the interests of the War Food Production Program . . . the permittee fully understands that in no event shall the privilege to graze on the land be extended beyond the duration of the present war emergency and six months thereafter." A maximum of twenty head of cattle would be allowed with an understanding that the herd would remain "mostly around 14." In addition, no sheep would be permitted on the lands and Nipper was prohibited from cutting hay or timber and from removing any sand or gravel. He agreed to maintain the barbed wire fence that stretched across the Little Bighorn and to remove it within thirty days of the lease's expiration.[402] In his year-end report for 1944, Supt. Luce

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[400] Merriam to Rogers, 11 December 1943.
[401] Rogers to Region 2 Director, 23 March 1944; Hillory A. Tolson to Region 2 Director, 12 April 1944.
[402] Grazing Permit I-17p-2134, 1 May 1944 Howard W. Baker, Associate Regional Director,

noted that while Nipper's permit covered the months of May through October, high water on the Little Bighorn prevented cattle from crossing the river until the beginning of July and grazing on cemetery lands only occurred from that point until the end of September.[403]

In 1946, with the war over, the Park Service moved to end grazing at the monument. Nipper, presumably arguing that the "war emergency" somehow continued, put up a fight. Luce reported that the rancher showed up at his office on April 2, 1946 "in a very intoxicated condition and assumed a belligerent attitude," and demanded a permit renewal. Luce told him to submit a request in writing. The next day Nipper's request arrived; "Mr. Luce and I don't get along too good we never will. I want this lease for the duration of the war. From May 1 to October." The superintendent went on the explain that in the past legal grazing presented an advantage over the unrestricted grazing that had taken place on the unfenced riparian lands, but that he believed that within the year he would have "accumulated enough barbed wire to complete the remainder of the necessary fencing." In the meantime he proposed that "in order to prevent any further unpleasant developments," Nipper's lease for one more season with the clear understanding that all grazing on cemetery lands would be terminated as of November 1946. Acting NPS director J. D. Coffman concurred but also stated that it was the park service's desire to "terminate grazing on the area as soon as possible." On June 10, 1946, a one-season renewal was signed. The provisions of the permit were essentially the same except that Nipper was required to remove all of his fencing by the end of November. In the post-Hiroshima age,

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Memorandum for the Director, 24 May 1944, 901-01 Grazing Permits, 1937-1946; Central Classified Files; Records of the National Park Service, Record Group 79; Archives II Reference Section (Civilian), College Park, MD.

[403] "Grazing of Domestic Stock, Report for Calendar Year Ended December 31, 1944."

the permit also contained one other provision; the United States could "enter upon the lands herein described, and mine and remove radio-active mineral substances."[404]

There is no indication that Nipper's lease extended beyond the 1946 season. At that point permitted grazing on the riparian bottoms of the Custer Battlefield section of the monument permanently ended. Still, the fence has never been extended in a manner to completely exclude stock from the bottoms. In 2001, for instance, the fence was moved another 50 feet closer to the river but this still left some acreage along the river accessible to livestock during low water. The Reno-Benteen site remained open to unregulated grazing for the next eight years. The site had been partially fenced in 1947, but it was not until 1954 that the entire area was enclosed and grazing ceased.[405]

[404] Luce to Edmund B. Rogers, 11 April 1946, quoted in Edmund B. Rogers to Regional Director, Region Two, 16 April 1946; J. D. Coffman to Region Two Director, 7 May 1946; Grazing Permit I-43NP-47, 10 June 1946.
[405] Greene, *Stricken Field*, 85; 2007 Resource Management Plan, 23.

Figure 43. Reno-Benteen Defense Site, ca. 1957, Source:Little Bighorn Battlefield National Monument. Note prevalence of big sagebrush.

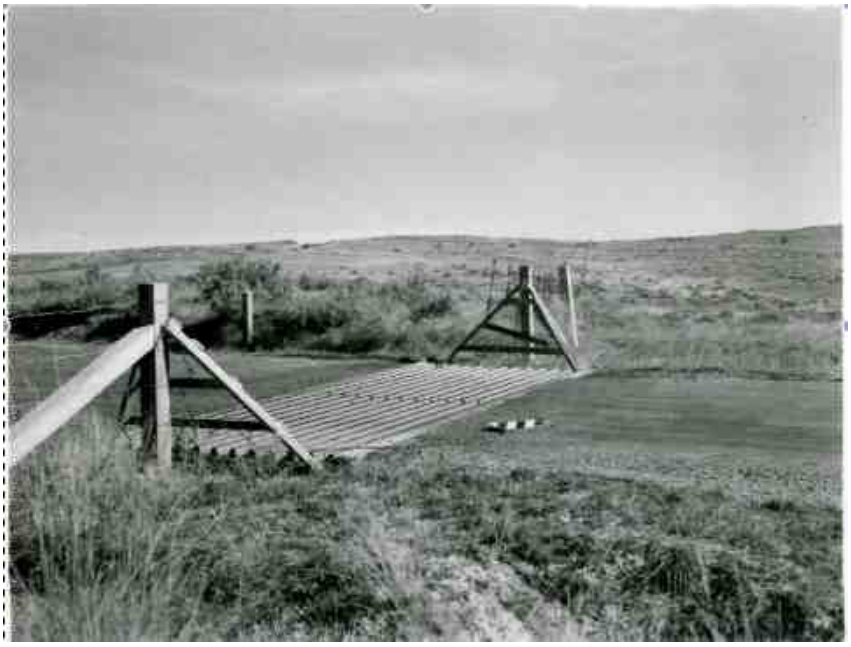

Figure 44. Cattle Guard at south entrance of the Custer battlefield portion of the monument. ca. 1954. Source: Little Bighorn Battlefield National Monument.

In official reports and park planning documents, NPS employees increasingly cited the decision to fence the monument and prohibit grazing as the key factor in maintaining the historic "natural" landscape at the park. A master plan narrative from 1964, for instance, stated: "The battlefield has been fenced since 1891 and never overgrazed; consequently, it is one of the few areas in the region where original grasses remain largely undisturbed." Citing historic accounts, the authors argued "the grasses may have been somewhat higher at the time of the Battle of the Little Bighorn, June 25, 1876, but the general character of the ground cover remains essentially the same."[406] Variations on this language appeared in later planning documents as well as in National Register documentation. Indeed, fencing was the principal management technique employed. The same 1964 master plan reported: "The present program of protecting the area with a boundary fence is effective in the preventing grazing and damage particularly from 4-wheel drive vehicles." The only additional action suggested was the eradication of invasive weeds, particularly Yellow Clover, which lined the park's roadways in summer.[407]

Yet, any completely ungrazed landscape in the Little Bighorn valley was in truth as "unnatural" as one marked by overgrazing. Undoubtedly, the grasslands of the park, and in particular the Custer unit where native grasses dominated the vegetative community, constituted an "area of particular interest to those studying the ecology of natural grasses and other plants." It was equally true, however, that the composition of the park's grasslands was in large part the result of the management decision to exclude grazing and

[406] Master Plan Narrative, Volumes I & III, Custer Battlefield National Monument, Montana, 20 July 1964, Denver TIC, Chapter 1, 8.
[407] Master Plan Narrative, Chapter 3 Management Programs, 28 June 1965, Denver TIC

could never exactly replicate the landscape and plant communities present at the time of the battle. The battlefield landscape of 1876 was the product of grazing by bison and other native species as well as Indian ponies. This grazing was never as intensive and sustained as that associated with commercial stockgrowing, but it did shape the vegetation and landscape. The 1964 master plan briefly acknowledged this fact. "It should be understood, however, that the area was long grazed by buffalo and other ruminants so the present growth of ground cover may be somewhat different from that of 1876."[408] This insight, while not completely lost in future park studies and documents was largely set aside in favor of less critical evaluations that characterized the park's grasslands as "pristine" or "virgin."

C. DEVELOPMENT OF THE VISITOR INFRASTRUCTURE.

Between 1940 and the mid-1960s, the park service developed a visitor infrastructure within the park boundaries while attempting to prevent private developments in close proximity to the park that were deemed inappropriate. The park's small size and the fact that it did not contain most of the historic battlefield drove these concerns. No matter how carefully planned, the park's viewshed and cultural landscape would always be threatened by developments outside of the park boundary. But while the park service worried over the impact of private developments on the park, it pursued a development plan that in many respects included impacts that would have been unthinkable in later decades.

[408] Master Plan Narrative, Ch. 3.

The prospect of development adjacent to the entrance road was a concern for park service administrators. In 1946 one entrepreneur inquired about leasing ground inside the monument for a lodge and museum. His request was denied as park service policy prohibited concessions within parks when such services were readily available nearby, and because any museum would be built and managed by the service itself. While the park service could easily squelch proposed development in the monument, it had no control over the Crow and private lands surrounding it. Supt. Luce dreaded uncontrolled development and wrote, "It will only be a matter of time before undesirable buildings will be built near the entrance . . . in a few years time we will be having hot dog stands, souvenir shops, etc." Luce suggested that the park service lease the lands adjacent to the park as a means of controlling development. The regional director, however, replied that there was no authority to do so and no funds available in any case.[409]

The debate over realigning the park's entrance road illustrated the intersection of aesthetic, interpretive and natural concerns with the complexities of land ownership and Crow sovereignty. Robert Hall, the assistant regional director suggested that realigning the entrance road was desirable but suggested that the best option was the idea of a northeast entrance road. He felt it would better orient visitors and serve to capture tourists travelling to the Black Hills, but he also hoped that, as the majority of the road would be on federal property, it would shield the visitor center and interpretive areas from visible development on Crow lands. During a recent visit he noted several new roads that had been bladed near the current entrance and "detracted materially" from its appearance. Supt. Luce responded

[409] Carl P. Russell to Richard T. Street, 28 August 1946, Edmund Rogers to Regional Director, 20 September 1946, W. E. Robertson to Superintendent YNP, 8 October 1942, NARA KC Box 169, Fld. 900 Public Utility Operations.

that the roads were "only of a temporary nature and were 'bulldozed' to accommodate parking areas for the 75th Anniversary services." Perhaps overstating the ability of nature to reassert itself, he wrote, "These temporary roads are being obliterated by the natural grasses already being grown back on them, and within six month's time they will not be noticeable." In any case, he was powerless to prevent such development because it took place "on private Indian land and the Indians have the right to use their land as they see fit without Government interference. That is Indian policy." Hall wrote in response, "we were all rather disturbed by the appearance of the roadside." He accepted that the Crow people did have the right to do as they pleased with their land, but added, "It is this very point which made us question our ability to control developments along any entrance road passing through Indian lands and prompted our consideration of an alternate route."[410]

The visible development in terms of tourist infrastructure was the long delayed construction of the museum and visitor center. Its construction has raised long-standing interpretive, aesthetic, and environmental concerns. Congress approved the museum in 1939 but with war looming no funding was forthcoming. Finally in 1950 an appropriation allowed plans to move forward. Construction took place between 1950 and 1951, with the museum opening to the public the following year. While undoubtedly an important step in providing interpretation for visitors, the building can also be viewed as an unfortunate intrusion on the battlefield landscape. The placement of the museum and the visitor center "immediately below and west of the Custer monument and adjacent the Last Stand grouping on otherwise pristine battlefield terrain," writes NPS historian Jerome Greene,

[410] Luce to Region 2 Director, 7 August 1951; Hall to Luce, 13 August 1951, NARA KC Bx 166, Fld. 600-01 Master Plan.

"apparently was not a major consideration in its planning beyond the fact that much of the primary interpretive resource would be visible from the observation room." As Greene suggests, the placement of the visitor center in its current location would not likely have occurred in the era after the National Historic Preservation Act of 1966.[411]

Figure 45. View to the west from the Last Stand Group showing proximity of visitor center and cemetery in background. ca. 1960. Source: Little Bighorn Battlefield National Monument. Note substantial growth of big sagebrush.

After his visit in the summer of 1951, landscape architect Robert Hall agreed that landscaping around the museum building should be minimal. Native plants were to come within twelve feet of the building "at which point lawn could be maintained." The few

[411] Greene, *Stricken Field*, 80-82.

plantings that might take place near the building were to consist only of "sage brush and other native materials."[412] In 1952 Luce argued for the dire need for a new approach road that would put the emphasis of visitors on the battlefield and the new museum building rather than the cemetery and administrative buildings. He also noted the problems with unpaved temporary parking lots. In freezing weather or during the dry summer season it was not an issue, but during heavy rains the parking lot became a mud bog.[413]

While Luce generally supported tourist development he always did so within the perceived division between cemetery and battlefield. In 1954 the Seventh U.S. Cavalry Association proposed a large bronze equestrian statue of Custer be placed on the battlefield. Luce was adamantly opposed, partly because he believed the statue would be insulting to Native peoples, but also because it represented another intrusion on the battlefield. He wrote, "It is our interpretive duty to keep this area in the plain, simple manner in which the battlefield was at the time of the battle." Visitors, Luce continued, "wish to visualize the condition of the battlefield without any modernization." He concluded that cemetery and Park Service developments, including the new museum, had already permanently altered the "true picture of the battlefield."[414]

With the exception of the Indian Memorial, which was dedicated in 2003, the last great physical transformation of the battlefield took place with a flurry of construction associated with the Mission 66 initiative. Mission 66 was the brainchild of NPS director Conrad Wirth and at its heart was a concern for the visitor experience. The director's January 1956 presentation to Pres. Dwight Eisenhower and his cabinet reflected the

[412] Hall to Luce, 13 August 1951, NARA KC, Box 166, Fld. 600-01 Master Plan.
[413] Luce to Region 2 Director, 4 May 1952, NARA KC Bx 166, Fld. 601 Land.
[414] Quoted in Greene, *Stricken Field*, 85.

standard tension between preservation and development. Wirth declared that the program was "designed to place the national parks in condition to serve America and Americans, today and in the future." The parks were where "the Nation preserves its irreplaceable treasures in lands, scenery—and its historic sites," but they were also "among the most important vacation lands of the American people," and "contribute substantially to the economic life of the Nation." The central problem, Wirth asserted, was that the "parks are being loved to death. They are neither equipped nor staffed to protect their irreplaceable resources, nor to take care of their increasing millions of visitors." Mission 66, then, would address both needs by expanding visitor services in terms of visitor centers, campgrounds, improved roads, and expanded private concessions, as well as bringing additional resources and staffing to the management of the parks. Ultimately, Wirth's goal was the safely double to capacity of the park system to serve visitors. One portion of Wirth's presentation portended a possible change for Custer Battlefield: "Today some parks are checkerboarded with unsightly private inholdings—land parcels standing in the way of planned development and use. These should be acquired." All of this could be done, Wirth assured, for a ten year investment that would amount to "less than 1/4 the cost of the Grand Coulee Dam."[415]

The Mission 66 prospectus for Custer Battlefield declared that the central purpose of the monument was to help the visitor "understand and appreciate . . . the conflict that took place here and its relation to the expansion of the West and other Indian Wars." In

[415] "Mission 66 Special Presentation to President Eisenhower and the Cabinet by Director Conrad Wirth, January 27, 1956," America's National Park System: The Critical Documents (online book), http://www.cr.nps.gov/history/online_books/anps/anps_4f.htm; National Park Service Archives, Harpers Perry, General Collection Box A8213, Folder entitled, "Cabinet Meeting, Mission 66 Presentation, January 27, 1956."

addition to the interpretive services provided at the visitor center and museum, this meant "the visitor should be able to visit and inspect the battlefield easily by motor and foot trail." Yet access must be tempered by the need to "preserve the evidence in place, [and] protect the area from damage." The core problem facing the park service was the sheer volume of visitors (since 1941 park visitation had nearly doubled from just under 68,000 to 132,556 in 1955) coming to a park where the facilities and infrastructure were simply inadequate and outdated. Much of the proposed plan for Mission 66 at Little Bighorn was focused on providing an enhanced experience for the visitors including an improved battled field road and interpretive trails and signage. Other plans called for improvements to the water system, maintenance facilities and for employee housing. There was also the assumption that the lands lying between the Custer and Reno-Benteen section of the park would come under park service management. The report noted that the many "rut trails" on the lands "to be acquired" were "a primary factor in causing soil erosion." "To preserve native shrubs and grasses, the new area will have to be fenced."[416]

As was the case in many park service units, damage to vegetation was common around heavily used visitor trails. This became a problem at the less monitored Reno-Benteen site. Administrators were concerned with both the trampling of vegetation and potential damage to the historically significant rifle pits and entrenchments in the area. In addition to hard surfacing the trails, the regional director suggested the construction of positive barriers on key sections of the trails in order to keep visitors out of sensitive areas. Once this was achieved, "we believe it will help to plant in an effort to restore native

[416] Mission 66 Prospectus, Custer Battlefield National Monument, 20 April 1956, NARA KC, Box A-31, Fld. A98 Mission 66.

grasses and sagebrush cover."[417] This combination of obliterating the informal trails through restoration and barriers to traffic are standard practices.

Built mostly between 1956 and 1963, Mission 66 developments at Little Bighorn encompassed some $2 million in projects. While many of the developments were not ones that visitors would necessarily notice or directly use, all were aimed at managing the park for an enhanced visitor experience and greater visitor capacity. None of the Mission 66 work was specifically aimed at managing the natural conditions on the battlefield, but many would have environmental implications. The park's long troubled water system was improved with an enlargement of the reservoir atop Last Stand hill. The battlefield road was resurfaced. Employee housing was expanded with three houses and one apartment building. Utility and maintenance facilities were also added. As Jerome Greene has pointed out, this construction represented a further expansion onto "virgin battlefield terrain." Landscaping for the new construction and the cemetery included 100 new trees planted plus 150 shrubs. In some cases these were exotic species while in others more local vegetation was used. For instance, in order to screen the new utility building from visitor view, a row of Rocky Mountain Juniper (*Juniperus scopulorum*) was planted.[418]

[417] George F. Baggley, Regional Director to Superintendent CBNM, 19 December 1960, NARA KC, Box D69, Fld. D30.
[418] Greene, *Stricken Field*, 86-87; "Utility Building," Montana Historic Property Record (Draft by Jim Bertolini, 2012).

Figure 46. View to west from Last Stand group showing Mission 66 era improvements to the visitor center, 1965. Source: Little Bighorn Battlefield National Monument. Compare to Figure above. Note awning added to visitor center, paving of walks and parking area, and additional work in the cemetery.

The Master Plan Narrative accepted in 1964 reflected the Mission 66 era's primary emphasis on the visitor experience, with the preservation of natural and cultural resources an important, if secondary, objective. The plan outlined service wide goals and the corresponding plans at Custer Battlefield National Monument. Not surprisingly the first objective at the national level was to "provide for the highest quality use and enjoyment . . . by the increased millions of visitors in years to come." At Custer battlefield this translated into four objectives. First was to "encourage complete and appropriate use of all of the Monument's resources by park visitors." Secondly the park staff would assist individuals and agencies in doing appropriate research. Allowing the monument's "historical values" guide management and use constituted a third objective. And finally, the park would

"define limits of development, [and] prevent any undue encroachment upon the battlefield." The second stated objective for the park service was to manage and preserve the resources in its charge. Importantly, the staff at Custer Battlefield put the preservation of the "natural" landscape on a par with historical and cultural resources. The plan also established the time of the battle as a management yardstick; "To preserve and protect the battlefield and the vegetative scene as history defines it as of June 25 and 26, 1876, within the limits of practical resource management." The third system-wide objective, the inclusion of additional lands worthy of protection, certainly resonated with the monument staff who made it a park objective "To acquire appropriate lands now separating the two existing battlefield areas, to facilitate protection, management, and interpretation of the complete scene of action." Finally, in line with the service-wide desire for cooperative agreements with other agencies and governments the park would "foster and maintain cooperative activities with local individuals and agencies, particularly the Crow Tribe."[419]

While the park service was in the midst of its building spree, the long expected development of a private concession near the entrance road materialized in July 1960. Robert Delp of Lodge Grass, Montana leased the tract owned by a Crow tribal member and was able to secure a building permit from the BIA superintendent. On July 21st Delp moved a prefabricated structure onto the land and then pursued other developments. The timing was an embarrassment for Supt. Garry as National Park Service Director Wirth was scheduled to visit the monument at the beginning of August. Garry immediately objected to the BIA, the Montana Highway Commission, and the Bighorn County Commission. None were able or willing to order the establishment closed. Powerless to stop the development,

[419] Master Plan Narrative, Ch. 2, 2-3.

Garry alerted his superiors and expressed his concern that other establishments would soon follow. He identified the area of Medicine Tail Coulee as a potential spot for future development.[420] This was also a concern of the private battlefield preservation organization that promoted the acquisition of additional lands for the park. At a 1961 meeting of the Custer Battlefield Historical and Museum Association, "All members again expressed concern over the urgent need to acquire or control the historic lands between the Custer battlefield area and the Reno-Benteen defense site. The threat or possibility of adverse commercial developments was the main reason for the concern."[421]

It is important to note that commercial developments seeking to capitalize on the battle and the park were not the only threats facing Little Bighorn during this era. In 1951, Luce complained that a Bureau of Reclamation surveying crew from the Billings district was damaging the battlefield as well as disrupting the experience of visitors by placing prominent survey stakes on Custer Hill and other obvious locations. At first the crew agreed to use survey points outside the monument, but later approached the superintendent for permission to use necessary points inside the boundary. It was in reaching this new survey point that the crew drove a car "off the roadway in prominent places, thus destroying and despoiling the grass and sage brush and leaving obvious ruts on the battlefield." The damage was bad enough, but Luce also feared that the crew's actions would "act as an invitation for tourists to drive their cars off the road." On August 10th, Luce along with landscape architect Frank Mattson and historical aide Robert M. Utley,

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[420] Thomas Garry to Region 2 Director, 28 July 1960; Garry to Clyde W. Hobbs, Supt. Crow Agency, 27 July 1960, NARA KC Box D69, Fld. D30.
[421] Report of the Executive Secretary for 1961, Custer Battlefield Historical and Museum Association, NARA KC Box A44, Fld. A45.

photographed two members of the surveying crew drive the car a quarter mile off the road "despoiling the battlefield ground and cutting two series of ruts that will take some time to obliterate." When confronted, the two men pleaded ignorance to the fact that their action violated Interior Department regulations.[422]

Perhaps more troubling was the petroleum exploration that began in 1953 and continued into the 1970s. Crews from private companies surveyed and tested on lands surrounding the monument, including those lying between the park's two units and adjacent to the battlefield road. These seismographic tests included the detonation of high explosives and, at times, trespass on park lands. In 1955, for example, trucks from Stanolind Gas and Oil Company tore down fences and crossed part of the Reno-Benteen site leaving behind deep ruts. Three years later the company reached an out of court settlement with the park service for $3,000.[423]

D. WILDLIFE IN THE PARK.

Most wildlife was not integral part of early park service management policies. In the decade before Custer Battlefield became part of the National Park system, some park service personnel such as George M. Wright championed a scientific understanding of wildlife as essential to park management. Still, well in to the 1960s the park service generally treated species in a dichotomous manner, ignoring some while over manipulating others. Birds, small mammals, reptiles, and insects (unless they threatened resources) could be and were usually ignored. Large iconic wildlife – bison, elk, grizzly bear, or wolves

[422] E. S. Luce to Region 2 Director, 10 August 1951, NARA KC, Bx. 166, Fld. 601-15, Landscaping.
[423] Greene, *Stricken Field*, 91.

– became the subject of intense management programs to ensure viewing opportunities for visitors or controlled when deemed a threat.[424]

At a park as small and as culturally and historically focused as Custer Battlefield wildlife management was not an early priority. In 1946, Supt. Luce acknowledged this fact, writing "Although conservation of wildlife is secondary to the battle, birds and small animals continue to increase under the protection afforded them at this area."[425] With a couple of exceptions (the prohibition on hunting and the removal of stray animals, the "protection" offered wildlife at Little Bighorn was essentially passive. Well into the 1970s there were no active efforts to manage habitat with wildlife values in mind.

In his annual reports, Luce stated that due to "careful supervision" wildlife was more common on the battlefield since the transfer to NPS management. He attributed this trend to park service regulations that banned hunting within the cemetery boundaries and the removal of stay dogs and cats. As a result, "Since July 1940 we have noticed a continuous gain in the different species of birds." "Grouse, doves, pheasants, and other domestic game" rebounded with the hunting ban. (Pheasants and partridges were actually introduced game species.) In 1943 Luce reported "grouse, plover, white-crowned sparrows, robins, and meadowlarks." The following year, he reported, that for the first time "Mountain Blue Birds, Baltimore Orioles, wild Yellow Canaries, and Crown Tufted Sparrows," were sighted in the park. Sharp-tailed Grouse made an extensive comeback with their numbers tripling from an estimated 20 to 60 in the first five years of park service management. Another notable return was three mule deer spotted in early June 1945. Luce

[424] Sellars, *Preserving Nature in the National Parks*,
[425] Annual Report of Superintendent, CBNC, 1 July 1946, NARA KC Bx 166, Fld. 207 Reports.

said they were the first he had seen on the battlefield. “We believe they are hiding out among the trees and brush along the river bank.” But as hunting was legal for Crow people on the reservation year round, he supposed they would be killed as soon as they left the area. Luce also noted a decline in “cottontails and jackrabbits” due to an unspecified disease. Later that summer Custer Battlefield staff also noticed two “yellow-haired porcupines,” and that about a dozen coyotes called the park home. Fish populations in the Little Bighorn were reportedly low due to “heavy silt.”[426]

Not all wildlife was welcome. Insects posed the greatest threat to the developed cemetery area. In 1945, for example, an infestation of aphids damaged some of the juniper trees. A “quick application of Black Leaf 40 and pyretheum dust,” however, seemed to solve the problem. The application of such pesticides was noted repeatedly in these early years. Snakes and gophers were also considered pests. In 1952, a decade after he had opposed the use of native grasses in the cemetery on the ground that they would harbor poisonous snakes. Supt. Luce seemingly contradicted himself and reported, “The snakes concentrate on this cemetery area because of the irrigation, which in itself creates an unnatural circumstance.” The lush grass also attracted pocket gophers, which in turn provided a home for the snakes in their burrows as well as a ready food supply. The pocket gopher problem was deemed an infestation by the end of 1951, and steps were undertaken to eliminate the rodents. The following summer, Luce reported that the gopher problem was

[426] Annual Reports of Superintendent, CBNC, 1 October 1942; 22 August 1943; 1 July 1944; 30 June 1945, NARA KC Bx 166, Fld. 207 Reports; Luce to NPS Director, 30 September 1945, NARA KC Bx 168, Fld. 715 Mammals.

under control and that as time permitted, "we are filling and tamping entrances to these gopher holes . . . not only improves the appearance, but discourages snakes."[427]

While 1964 master plan acknowledged the importance of bison in shaping the park's historic landscape, wildlife was clearly a peripheral concern. The document stated that wolves had been extirpated in the area and that coyote "populations [were] kept low i recent years by ranchers protecting their livestock." Wildlife spotted in the park included: "cottontail rabbit, jackrabbit, bobcat, beaver, skunk, porcupine, raccoon, badger, red fox, black tail deer, gopher, ground squirrels, and chipmunks. Birds observed here include the eagle, sage hen, sharp-tailed grouse, kill deer, robin, western kingbird, ring-necked pheasant, magpie, crow, various species of blackbirds, woodpeckers and sparrows, and other birds common to the northern plains." But beyond this list the plan detailed no wildlife management programs then in place and called for no future action.[428]

II. Landscape and Environment at Little Bighorn in the Post-Mission 66 Era.

By the mid 1960's, National Park Service management policies and goals began to shift. The focus on developing visitor infrastructure that characterized the Mission 66 era increasing gave way to policies that privileged environmental concerns and the direct application of science in management decisions. At Little Bighorn these changes led to

[427] Annual Report of Superintendent, CBNC, 30 June 1945, NARA KC Bx 166, Fld. 207 Reports; Luce to Region 2 Director, 24 November 1951; Luce to Region 2 Director, 4 June 1952, NARA KC Bx 168, Fld. 715 Mammals.
[428] Master Plan Narrative, Ch. 1, 9.

proposals to reorient the visitor experience as well as a deeper understanding of the area's ecology. The wildfire that struck the park in 1983 was a crucial factor in changing understandings of both the battle and the place itself. The fire led to not only the well-known archaeological surveys of the battlefield, but to important studies of the area's ecology and wildlife. By the beginning of the twenty-first century he ecological complexity of Little Bighorn Battlefield National Monument became clear.

A. PLANNING AND THE INTEGRATION OF NATURAL AND CULTURAL RESOURCE MANAGEMENT.

One of the results of the growing emphasis on resource management in the parks was an increased focused on planning that integrated the management of both cultural and natural resources. The various management plans developed for the monument from the 1970s to the present reflect these efforts. A second change was the increased importance of science in planning.

The 1972 draft Master Plan radically re-envisioned the park. Driven by valid interpretive concerns yet dependent on the acquisition of new lands the plan was never approved. Still, it cast a long shadow on future planning efforts at Little Bighorn.[429] At the heart of the plan was reorienting the visitor experience by transferring much of the visitor infrastructure away from sensitive battlefield terrain. The existing visitor center and museum (deemed "ugly and too small" as well as "intrusive") would be razed with the facilities moved to Garryowen. A new access route would take visitors first to site of the Valley Fight and Reno's retreat crossing and then to the Reno-Benteen defense site. Visitors

[429] Greene, *Stricken Field*, 148-49.

could then follow the chronology of the battle to the north rather than its reverse, which the existing access road dictated. In the vicinity of Last Stand Hill, the existing road would be moved away from the monument and other sensitive historic resources. As in master plans dating back to 1944, the cemetery was to be secondary to the interpretation of the battle. The plan discounted any possible expansion of the cemetery as a "major intrusion upon the historic scene of the battle." "Important as it may be," the plan author's asserted, "the cemetery must not be allowed to dominate the scene of the battle's climax." To achieve this goal, the existing access road from U. S. Highway 212 would be obliterated. A one way exit road (with inbound access permitted for cemetery services) would intersect the highway at the northeast corner of the existing monument while a two way road from the vicinity of Last Stand hill would dead end at the cemetery. Visitor impact would be further reduced with a shuttle system replacing private automobiles on the battlefield road during the peak summer season. The plan also presaged an important change that did take place, calling for a name change to "Little Bighorn National Monument."[430]

The most radical and controversial aspect of the plan was the proposed acquisition of nearly 12,000 acres of land encompassing nearly all the historic battlefield. The plan's authors observed that because "historic preservation was a relatively incidental pursuit" until the era of park service management, "it is not surprising that its boundaries do not include much of the setting in which the battle took place." The plan included two alternatives that combined the outright purchase of some lands with the acquisition of

[430] "Preliminary Draft, Master Plan, Custer Battlefield National Monument, Montana," 1972, Denver TIC.

restrictive easements over larger areas and a cooperative management agreement with the Crow Nation.[431]

Instead, managing the park to preserve the historic natural landscape was to become a central goal. "Even today the conspicuous unnatural block of dark green trees that stand upon it, in addition to the nearby visitor center, constitute a distraction that only the impact of the story allows one to ignore." It was the integrity of this "pastoral landscape that dominates the Monument and its environs [which] allows the visitor's imagination to slip back in time 100 years with little effort." In addition to the predominate native grasses, "a wide variety of native shrubs and forbs create a subtle visual treat of colors and textures for those who take the time to notice." The plan attributed this "lushness" to the long-standing prohibition on grazing within the monument. Using the prevalence of sagebrush as an indicator of overgrazing, the plan stated that while about 20% of the vegetation outside the fenced area was sage, the plant constituted only about 5% of the vegetation within the park. While acknowledging the impossibility of "maintaining the battlefield exactly as it looked during the fight," the plan asserted that "future management must simply insure that the present basic visual setting is not significantly changed."[432]

In a limited way, the planners accepted that grazing could be part of the monument's management practices. "Although no cattle grazed here 96 years ago," they wrote, "the buffalo did . . . [and] if proper range management practices are followed, the presence of livestock within the expanded monument boundaries will be neither visually nor ecologically intrusive." Livestock would be excluded from areas of "heavy visitor

[431] 1972 Draft Master Plan, 37.
[432] 1972 Draft Master Plan, 41-42.

concentration" as well as from the currently fenced areas of the monument. The reason for the latter was that "Those portions of the monument that are fenced will be of value to scientists and land managers as benchmarks of undisturbed prairie in different stages of succession."[433]

Mining, however, was identified as the land use least consistent with the preservation of the monument's historic landscape. Given the past history of energy exploration on lands surrounding the monument and the regional development of strip mining operations to extract low sulfur coal, these concerns were not unwarranted. It was the potential for the latter that caused the greatest worry. As the Crow Nation retained the subsurface mineral rights to all of the lands outside the monument's boundaries, the planners understood that "the future of the battlefield lies in their hands" and suggested immediate negotiations to "avert potential destruction of the battlefield by mining operations." Recognizing that an outright ban on mineral extraction could jeopardize their plans, the authors conceded that "carefully controlled extraction of petroleum . . . could be pursued with little or no permanent damage to the historic scene." "On the other hand," they concluded, "it is inconceivable that any amount of strip mining could be tolerated within the expanded boundaries."[434]

Proposed landscape management also extended to the riparian areas of the Little Bighorn Valley. The "purity of the Little Bighorn River will be of paramount concern." In this regard the new visitor facilities would "take advantage of the latest most efficient methods of sewage treatment to insure against any amount of pollution." The authors

[433] 1972 Draft Master Plan, 72-73.
[434] 1972 Draft Master Plan, 73-74.

noted that the "diminutive stature" of the grassland vegetation meant that the trees lining the "sinuous course of the Little Bighorn remains the focus of attention from most viewpoints, and serves as a constant point of reference." "The protection of this riparian vegetation," the plan continued, "only a small portion of which occurs within present Monument boundaries, is imperative." Managing valley lands would also enhance the visitor's experience, they argued, by allowing the park service to more fully interpret Native perspectives of the battle. Noting that the "present boundaries of the monument include only the physical viewpoint of the soldiers," the village site would offer a "major fixed point at which the visitor can effectively relate to [the Lakota and Cheyenne] point of view." Nearly all of the riparian areas of the battlefield, of course, were under Crow jurisdiction. While the tribe's Preliminary Reservation Comprehensive Plan, which was under development at the same time, recommended that the flood plains should remain "primarily [in] open-space uses," the park planners worried that the allotted status of the lands and the unclear nature of tribal zoning authority might prevent effective protection of the area. Thus the plan's authors looked to the acquisition of additional lands as a crucial part of the answer while proposing a cooperative management program with the Crow Nation.[435]

[435] 1972 Draft Master Plan, 42-43, 51-52, 56, 73.

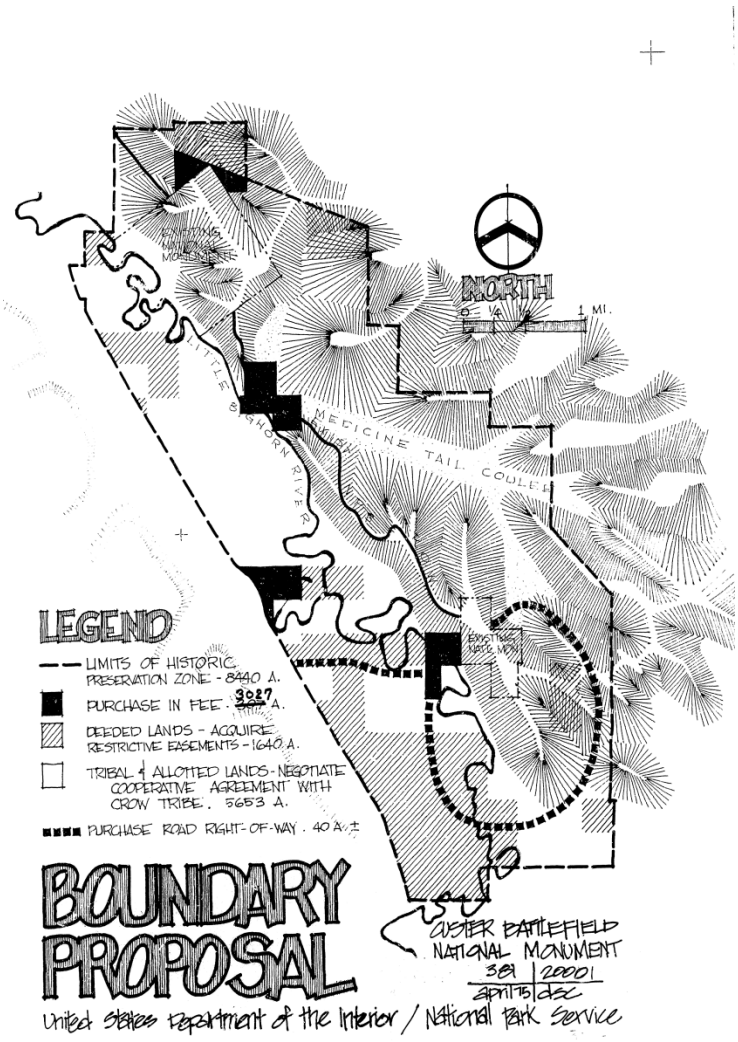

Figure 47. Boundary Proposal and Land Acquisition Plan from 1972 Draft Master Plan. Updated in April 1975. Source: NPS, Denver TIC.

Although the 1972 Draft Master Plan was never approved its guiding premise of managing the battlefield to preserve the historic appearance of the landscape became standard in later planning efforts. For example, the monument's approved 1975 "Statement of Management," spoke directly to managing "natural resources so as to continue to

maintain the general environmental scene as it appeared at the time of the Battle of the Little Bighorn in 1876."[436]

Still, the division between cemetery and battlefield continued to demand dual management policies, and this fact was reflected in the park's resource management plan from the late 1970s. The cemetery landscaping would be maintained to keep the solemn and respectful appearance visitors expected. For the lands outside the cemetery the resource management plan's objective was to "preserve the Historical Integrity of the area by maintaining the grassland in the same condition as it was in 1876." Fencing to prevent grazing, limiting visitor impact to roads and trails, and fire suppression were all identified as essential management actions. The latter was erroneously believed to be essential for preventing "exotic (highbred) grasses which have been used by local ranchers" from colonizing the battlefield. Later studies of effects of fire in the ecosystem suggest that native grasses actually do better than exotics in burned areas.[437] Wildlife was also part of the natural battlefield landscape and the plan declared, "our objective is to continue to provide a habitat for these animals within the carrying capacity of the vegetation." Yet beyond this goal the plan called for no management actions.[438]

By the 1980s the monument had been operating under a master plan dating back to 1959 [1964-65?] and the era of Mission 66 expansion. Between 1982 and 1986 the park service developed a much needed new General Management and Development Concept Plan. One step in the planning process was an environmental assessment [EA] completed in

[436] Quoted in Greene, *Stricken Field*, 150.
[437] Resource Management Plan, 7-8; Bock and Bock, "The Effects of Fire on Virgin Northern Mixed Grassland at Custer Battlefield National Monument," 1987, Section IV, 9-10; Cooper et. al. 2011, 7.
[438] Resource Management Plan, 9-11.

1985. The EA identified land protection as the most pressing issue facing the park. Changing land uses that affected the parks viewshed and the constant threat that "undiscovered artifacts outside the present boundary are subject to unscientific disturbance and removal," were of particular concern. "These lands must be protected from activities that would adversely affect their visual, cultural, and natural resources," the authors wrote. The assessment concluded that "all forms of vegetation manipulation – such as conversion to crop land, overgrazing, chaining, and herbicide spraying – should be prohibited." Likewise, new construction including farm and ranch structures and power lines would be banned in undeveloped areas. Finally, all new park service developments were to be "integrated into the landscape" in order to eliminate or reduce their visual impact. Indeed, controlling environmental manipulation and thus visual impact was an overriding recommendation of the environmental assessment. Using the cemetery as an example (albeit one that could not be changed) of how environmental manipulation impacted the interpretive mission of the park, the report authors argued that summer visitors were first drawn to the "large evergreen trees" and "lush, groomed grass lawn" of the cemetery thinking that it was the site of the "Last Stand" and the resting place for the 7th Cavalry trooper. Only after a confusing visit to the cemetery would they then make their way to the visitor center and museum. To prevent such future occurrences the addition of new lands including the "Indian encampment areas" and "undisturbed upland prairie landscape that appears similar to the setting at the time of the Battle of the Little Bighorn" was critical.[439]

[439] "Environmental Assessment for the General Management Plan and Development Concept Plan for the Custer Battlefield National Monument, Montana," National Park

While the Environmental Assessment identified the cemetery as an example of the type of development to be avoided in the future, it could not escape the dual management policies that the presence of a national cemetery in the midst of a historically "natural" landscape demanded. As had been the case since the War Department era, the essential problem came down to irrigation. By the 1970s the park's water system was capable of delivering enough water to maintain the verdant appearance, yet the question of costs remained. Moreover, the chemical composition of the water posed another problem. High concentrations of iron and manganese in the water stained the white granite tombstones and even eroded their inscriptions. The EA presented two alternatives to the existing spray irrigation system. In one scenario an underground drip system would be installed, eliminating the sprayed mineral deposits and supposedly reducing maintenance costs and water use. The more radical alternative harkened back to Vint's 1943 recommendation and called for "eliminating the irrigation system and maintaining the national cemetery by mowing native grasses for a kept appearance."[440]

The central recommendations of the EA were incorporated into the final 1986 GMP, but in many ways the latter document mirrored the controversial and unapproved 1972 Draft Master Plan. In both cases, the core proposal was the addition of nearly 12,000 acres of land to the park. Land acquisition would occur through a variety of mechanisms such as donations, exchanges for other federal lands, conservation easements, and outright purchase. The current visitor's center along with all "associated walks and parking" was to be "obliterated" and the area restored "as nearly as possible, to blend with the surrounding

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Service, Rocky Mountain Regional Office and Custer Battlefield National Monument, September 1985, Denver TIC, 9, 11.

[440] Environmental Assessment (1985), 12-13, 19, 31.

site conditions." A new visitor center complex would be built on acquired lands near where the current access road leaves U. S. Highway 212 or alternately at Garryowen. Visitors would drive, or ride shuttles during peak months, south to a new access road that would link up with the existing battlefield road at the Reno-Benteen site, allowing visitors to "tour the battlefield in a correct, chronological sequence."[441]

The GMP followed the EA in make landscape preservation its central focus. To achieve this goal all of the lands within the proposed expanded boundaries would be classified within one of four management-zoning areas. The vast majority of new lands and 73% of the total proposed monument acreage would be placed under the "Natural Subzone." This area would "emphasize conservation of natural resources and processes." Existing agricultural activities could continue here, but new farm and ranch developments and plowing previous unbroken prairie would be prohibited. Industrial, commercial, and residential development would also be forbidden. About 20% of the proposed monument's acreage, including nearly all the land within the existing boundaries, would fall within the "Cultural Subzone" to be managed for the preservation of "archaeological sites and values." Here the focus would be on researching and interpreting the battle itself. The "Development Subzone" would encompass approximately 6% of the land devoted to visitor and management needs. Finally, the 1% of the monument encompassed by the national cemetery would be managed as a "Special-Use Subzone." The GMP was approved in August of 1986. It was updated and reprinted in May 1995 and remains in effect for the park.[442]

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[441] "Final General Management and Development Concept Plans," [hereafter 1986 GMP] Custer Battlefield National Monument, August 1986, Denver TIC.
[442] 1986 GMP, 7; Final General Management and Development Concept Plans, Updated May 1995" [hereafter 1995 GMP] Custer Battlefield National Monument, May 1995, Denver TIC.

To date, however, no land transfers have taken place and thus none of the development concept plans have come to fruition. To realize the ambitious plan Congress would have had to authorize both increased spending and the land transfers. In 1987 the Crow Nation issued a Tribal Resolution opposing the addition of land to the park a position it has maintained ever since. The 1995 GMP update noted, "Little Bighorn Battlefield National Monument lies with in the boundaries of the Crow Indian Reservation, there has been and continues to be opposition against expansion of the boundaries. The leaders of the Crow Nation have gone on record expressing their unwillingness to 'give up' any more base land." By 2001, the private Custer Battlefield Preservation Committee has gained control of over 3,200 acres of land in areas deemed critical in the GMP such as the entrance road, Medicine Tail Coulee and the area surrounding the Reno-Benteen defense site. Sen. Ben Nighthorse Campbell introduced a bill that would have expanded the monument's boundaries by allowing the donation of these lands to the federal government. The Crow Nation again opposed the expansion plans and the bill never made it out of committee. The general management principles outlined in the document, however, do remain in effect.[443]

Congress did move in 1991, however, to act on the proposal to change the monument's name. Custer Battlefield National Monument became Little Bighorn Battlefield National Monument. The legislation also included the provision for an Indian Memorial to recognize the centrality of Native peoples to place and to the event. The construction of the memorial would be the only major development to take place on the battlefield after the Mission 66 era.[444]

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[443] 1995 GMP, 7; Greene, Stricken Field, 156, 162-63.
[444] Greene, *Stricken Field*, 158, 164.

Larger park service projects also have had a direct impact on environmental policies and management at LIBI. One of the most important has been the park's participation in the Vital Signs Inventory and Monitoring Program. This system wide initiative emerged from the NPS's 1999 "Natural Resource Challenge." The central goal of the project is to collect baseline scientific data on all park units with significant natural resources and then use that data to better manage natural resources. Over 270 park units organized into 32 networks participate in the program. LIBI is a member of the Rocky Mountain Network that includes parks in Montana and Colorado. In December of 2006 after a three-year planning period the Rocky Mountain Network released its Vital Signs Monitoring Plan. It identifies twelve "vital signs" of park health including vegetation composition, invasive species, groundwater dynamics, and landscape dynamics. The network began monitoring these vital signs in 2008.[445]

At the park level both general statements and specific policies emerged to better manage the historic and natural resources. Citing the 1986 GMP's statement that the monument's "primary purpose" was to "preserve and protect the historic and natural resources pertaining to the Battle of the Little Bighorn," Supt. Darrell Cook issued an environmental management policy in June 2006. The one-page document affirmed the park's commitment to the general principles of preservation and interpretation in making the public "aware of the environmental management system as to its purpose and ultimate benefit."[446]

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[445] 2007 Resource Management Plan, 18-19.
[446] Little Bighorn Battlefield National Monument, Environmental Management Policy, 17 June 2004, LBAF, L-7615 Policy, Procedures, Guidelines.

The Monument's 2007 resource management plan reflected the increased emphasis on research and preservation within the park service. While improving interpretive and management facilities and programs was certainly part of the plan, all of the five stated management objectives spoke in some way to the "battlefield's primary mission of preserving and protecting resources related to the battle." Implicit in the document also was the understanding that natural and cultural resource management must be coordinated for the park to fulfill it primary objective to "Preserve, protect, and manage all prime resources." The Plan detailed the numerous scientific studies carried out in the park, addressed participation in larger NPS initiatives such as the Vital Signs Inventory and Monitoring Program, and described on the ground management programs for vegetation and wildlife.[447]

The plan divided the monument into "natural"/Undeveloped and Developed management zones. The undeveloped zone, encompassing the "natural grass prairie and cultural landscape of the Custer and Reno-Benteen Battlefields," constituted the vast majority of monument lands. The natural lands would be managed to prevent development or alteration and to maintain, insofar as possible, the historical appearance of 1876. The much smaller developed management zone included the area of the cemetery, the visitor center, the monuments on Last Stand hill including the Indian Memorial, as well as the battlefield road. Surrounding the developed lands was a wildfire protection buffer zone. While visitor safety and interpretive programs would shape policy here, other values including wildlife and aesthetics would be considerations. As in all previous planning

[447] Little Bighorn Battlefield National Monument Resources Management Plan, 9 July 2007, LIBI Administrative Files, L 54 – Water Matters.

dating back to the 1940s, the cemetery essentially remained in a category of its own to be managed to ensure "beauty, dignity, and preservation of a reverent atmosphere."[448] The programs detailed in the plan remain the backbone of resource management at the park to the present.

B. DEVELOPMENT CONCERNS.

As suggested by the review of planning documents, controlling development within and surrounding the monument was deemed critical to preserving its "prime resources." With the exception of the Indian Memorial construction the park service moved away from further development within the monument boundaries in the years after the Mission 66 projects. At the same time potential developments on surrounding private and trust lands continued to be the source of concern.

As with the developments near the entrance road in the early 1960s, proposed "encroachments" on the viewshed and cultural landscape of the battlefield often exposed the tension between the park service's desire to protect resources on one hand, and the sovereignty of the Crow Nation and the right of individual Crows to manage their private property on the other. In January of 1995 Crow tribal member Faron Iron began development on his allotment located at the head of Cedar Coulee and adjacent to the battlefield tour road. Iron intended to build a small cabin that would serve as a summer home and gift shop. Ranger and later park chief historian John Doerner reported the development after he noticed well drilling equipment at the site. Although the land was in trust status and the park service had no legal authority over it, access was via the

[448] 2007 Resource Management Plan, 6.

battlefield road. Ranger Michael Stops went to the site and informed the drilling drew that weight limits on the tour road would be strictly enforced. Mr. Iron expressed his willingness to pay any citations. At that point the ranger decided to deny further access via the road as "the citations could not do fair judgment to the deterioration of the tour road." Supt. Gerard Baker and Acting Supt. Cathy Not Afraid subsequently sustained this decision.[449] For his part, Iron was completely cooperative but asserted his right to develop his own private property. He also offered the property for sale to the park service. "I don't want to appear unreasonable," Mr. Iron told the Rocky Mountain News, "I just want them to meet my value." In a letter to Supt. Baker, Iron later named his price at $10,000 per acre plus the cost of construction.[450] The NPS, however, had no legal authority to purchase the land.

The park service sought the assistance of the Bureau of Indian affairs and the Crow tribe in reaching an understanding concerning the development. With the well built and two areas leveled in preparation for a parking lot and the log cabin, the Crow Agency superintendent Kenneth Davis wrote Iron asking him to halt further work until it could be determined if the ground disturbance in any way violated the Archaeological Resources Protection Act of 1979. Iron agreed and by the end of April a "surface cultural inventory and metal detector survey" by BIA archaeologists turned up no resources at the development site. The survey team did find two rock cairns some distance away on Sharpshooter Ridge.[451] The BIA felt increasing pressure to stop the development but had

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[449] Supplemental Case Incident Record, 95003, 13 January 1995, LBAF, L 24 Encroachments, Faron Iron Development.
[450] Rocky Mountain News, 18 January 1995; Faron Iron to Gerard Baker, n.d., LBAF.
[451] Kenneth W. Davis to Faron Iron, 24 March 1995; Davis to Iron, 20 April 1995, LBAF.

no legal authority to do so. In response to an inquiry from Sen. Alan Simpson of Wyoming spurred by a constituent's complaint, BIA Area Director David Pennington wrote: "Although the land modifications may be considered inappropriate by your constituent, the individual is within his rights to use his land to his best advantage." Pennington assured the senator that the BIA would enforce all the provisions of the NHPA and the ARPA, but that the agency also had an obligation to "respect and protect the possessory rights of tribal members."[452]

The Iron allotment was slated to be transferred from trust status to fee simple ownership, which would give Mr. Iron much greater leeway over his property. In order to "mitigate the impacts of issuing a fee patent, the interested parties including Mr. Iron, the park service, BIA, the Montana SHPO, and the Crow Nation worked out a memorandum of agreement in late 1995. The park service was granted permission to conduct an "an intensive metal detector survey" of the property. Any artifacts recovered could be retained and studied for up to six months (a later version extended this period to one year), at which time they would be returned to Iron. In exchange he agreed to consult with the park service to "minimize any visual intrusions," and to not disturb the cairns discovered on Sharpshooter Ridge.[453] Here the issue stalled. Iron did not proceed with work on the site.[454]

Within the park work on roads and trails was intended to mitigate visitor impact and protect the natural and cultural resources. Informal trails that caused erosion were of particular concern. In April 1990, for instance Deep Ravine Trail was closed due to

[452] David W. Pennington to Se. Alan Simpson, 12 April 1995, LBAF. Sen. Phil Graham of Texas received a similar complaint from a constituent.
[453] Draft MOA, 13 December 1995, LBAF. This version of the MOA was signed by all parties except the Crow Tribe. It is unclear if this agreement was ever finalized or went into effect.
[454] Greene, *Stricken Field*, 169.

"overuse, and to give nature a chance to restore the trampled area."[455] It was later reopened but then closed permanently in 1992 due to "damage to vegetation, extreme widening of the pathway, compaction, erosion, threatened archaeological resources, and greater danger of man-caused wildfire." In 1998 the trail was reopened with guided tours and for an environmental assessment of plans to gravel its length to mitigate impact. In 2000, the new gravel trail was reopened to the public.[456]

With the exception of trail work, maintenance programs, and repairs, the only major park service development to take place at LIBI in the post Mission 66 period was the construction of the Indian Memorial on the north side of Last Stand Hill. Four locations were initially considered for the Indian Memorial: the north side of Last Stand Hill, the area just north of the visitor's center, adjacent to the south end of the National Cemetery, and a point on Greasy Grass Ridge. The Environmental Assessment for the project considered the impact of construction and the memorial in terms of cultural, natural, and socioeconomic resources. Surveys indicated there would be no impact on archaeological resources at any of the proposed location and that there would be no "adverse effect on any historic resources." The report authors noted that "Since the fire of 1983, the Custer Battlefield has assumed more of a feeling and appearance of the 1876 period . . . It is not expected that installation of the Indian memorial would change the overall perspective."[457] (5) The study concluded that construction of the memorial any of the possible locations would disturb

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[455] Superintendent's Annual Report, Custer Battlefield National Monument, 1 March 1991, Denver TIC.
[456] Greene, *Stricken Field*, 168-69 (quote at 168); Neil C. Mangum to Mark Baumler, Montana SHPO, 9 June 2000, LBAF, L 6017 National Scenic Trails.
[457] Environmental Assessment for the Construction of the Indian Memorial at Custer Battlefield National Monument [Indian Memorial EA], August 1989, Denver TIC, 5.

about two acres of wildlife habitat and completely destroy the vegetation in the construction area. Erosion would also increase during construction. In order to mitigate construction impact the area affected would be minimized, top soil would be retained and replaced "in order to conserve available organic matter," while the area would be "reseeded with native species to speed the rate of recovery and to minimize the encroachment of invading species." Even with such measures the species composition of the impacted lands would likely be altered for several years. Likewise, resident invertebrates, small mammals, and birds would also be displaced.[458]

Once the memorial was in place, increased visitation would bring other environmental impacts. Soil compaction due to foot traffic could change the moisture available to plants and altering species composition, while increased erosion would lead to "exposure of root systems and the death of more mesic plants." Depending on where the memorial was placed there would be some alteration in species due to visitation. "In shrublands, the amount of grass and the number of low plants between the shrubs would be reduced, and in grasslands, the proportion of annuals and quick-spreading perennials would increase."[459] What the assessment did not anticipate was the accidental introduction of Russian knapweed (*Acroptilon repens*) in a load of fill soil.

Removing the traces of previous developments and restoring a more natural feel to the land also became a goal at LIBI. In 2006, monument staff began a fee demonstration project titled "Restore historic Viewshed for Visitor Enhancement and Photography," aimed at restoring three acres of land at the Quonset hut site near the Little Bighorn River to the

[458] Indian Memorial EA, 6-7.
[459] Indian Memorial EA, 6.

"original historic and natural landscape of 1876." A road loop at the site was obliterated and surplus equipment along with piles of dirt and gravel were removed from two acres of the site. The land was then contoured using historic maps and photographs to provide a baseline. The following year native seed was planted on the site. The original plan called for removal of the Quonset hut. The lack of adequate storage space elsewhere at the park led to a postponement its removal and the restoration of the third acre of the project.[460]

C. FIRE AND RESEARCH.

Perhaps the single most important event to effect to effect the ecology as well as the historical interpretation of the Little Bighorn Battlefield since 1876 took place on August 10, 1983 when a wildfire swept across the Custer battlefield section of the monument. The blaze began when high winds whipped up a smoldering human-caused fire that was believed extinguished. In ninety minutes around 600 acres, or about 90%, of the Custer battlefield burned. Miraculously there was no damage to park facilities or the cemetery. Fire had always been part of the Great Plains ecology but it had been relatively absent from the battlefield since the time of the battle. Under War Department management a fire had burned through the cemetery in 1908. During the Park Service period small fires burned at the Reno-Benteen site in 1947, 1958, and 1968.[461] The 1983 fire was thus likely the largest and most destructive to strike the area since 1876. This seemingly devastating event, however, proved to be a boon for research at the park. In its aftermath archaeological and

[460] 2007 Resource Management Plan, 18.
[461] Greene, *Stricken Field*, 51, 168; Master Plan Narrative (1964), 6.

ecological studies enriched and transformed understandings of the battle and the natural processes at work in the high plains environment.

Figure 48. Small grassfire at Reno-Benteen Defense Site, 1958. Source: Little Bighorn Battlefield National Monument.

Figure 49. Aerial Photograph of the Custer Battlefield section after the fire of August 10, 1983. Source: Little Bighorn Battlefield National Monument. Note the unburned cemetery and visitor center areas.

Figure 50. Aerial view of 198 fire showing unburned section near Calhoun Hill. Source: Little Bighorn Battlefield National Monument.

Undoubtedly the best-known results of the post-fire research were the archaeological surveys that have led to major reassessments of the battle. The fire burned nearly all grasses, forbs and shrubs to the ground, exposing thousands of battle related artifacts that had lain on or near the surface of the battlefield since 1876. Shortly after the fire archaeologist Richard A. Fox conducted a reconnaissance survey of the Custer battlefield that discovered human remains in addition to cartridge cases and other artifacts. In 1984 and 1985 a team from the NPS's Midwest Archaeological Center (MWAC) led by Douglas D. Scott surveyed the entire monument. They collected some 6,000 battle-related artifacts. In the nearly two decades since the fire Fox, Scott, and others have continued their work at the park. These surveys have resulted in numerous publications, including a forthcoming summary of the park's archaeological resources.[462]

Less well know to the public have been natural resource studies that have enriched the understanding of the role of fire on the high plains. Between 1984 and 1986, Jane and Carl Bock of the University of Colorado conducted a study of plants and birds at Little Bighorn Battlefield. The two carried out follow-up studies from 2002 to 2006. In addition to the Bocks, other researchers have looked at the impact of fire on sagebrush grasslands.[463] What these combined studies suggest is that Little Bighorn Battlefield

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[462] Scott, et al., *Archaeological Perspectives on the Battle of the Little Bighorn*; Fox, *Archaeology, History, and Custer's Last Battle*; 2007 Resource Management Plan, 11; Forthcoming Report.

[463] Jane H. Bock and Carl E. Bock, The Effects of Fire on Virgin Northern Mixed Grassland at Custer Battlefield National Monument: Final Report," NPS Contract No. CX-1200-4-A034, May 1987; Jane H. Bock and Carl E. Bock, "A Survey of the Vascular Plants and Birds of Little Bighorn National Battlefield," CESU Task Agreement CA-1200-99-007, July 2006 Steven V. Cooper, Peter Lesica, and Greg M. Kudray, "Post-fire Recovery of Wyoming Big Sagebrush Steppe in Central and Southeast Montana," Natural Resources and Environmental Issues 16 (1): Article 12, January 2011

National Monument is essentially an ecotone, a transition area between two ecosystems. Located at the intersection of the Northern Mixed Grassland and the Sagebrush-Steppe that characterizes much of the intermountain West the landscape at Little Bighorn can shift in relation to historic environmental factors. Fire is perhaps the most important of these factors but grazing, or the lack thereof, is also an important factor.

The most "dramatic" and consequential impact of the 1983 fire was the complete destruction and long-term absence of big sagebrush from the burn area. *Artimisia tridentata* is notoriously vulnerable to fire. The mortality of the shrub at Little Bighorn as a result of the 1983 fire was characteristic of the effect of intense fires on big sagebrush throughout the West. A study conducted by Steven Cooper, Peter Lesica and Greg Kudray on 24 burned sites in southeastern Montana, including LIBI, found that mortality was "virtually complete" in each case. Not only is big sagebrush vulnerable to fire, its recovery period is substantial. William Baker found that full recovery took between 100 and 240 years depending on local conditions. The Cooper study found no measurable recovery on 17 of its 24 sites, including Little Bighorn. The oldest burn Cooper's group examined was 67 years old and showed only an 8% recovery of the sagebrush canopy. At all of their study sites combined, the mean recovery rate was "0.16 percent / year ± 0.45 for the first 70 years." Even in the best case scenario they found a .72 percent a year recovery rate, which meant the pre-burn big sagebrush canopy at this site (not LIBI) would still take 138 years

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http://digitalcommons.usu.ed/nrei/vol16/iss1/12; Steven V. Cooper, Peter Lesica, and Greg M. Kudray, "Post-fire Recovery of Wyoming Big Sagebrush Steppe in Central and Southeast Montana," Report prepared for the Bureau of Land Management, Agreement Number ESA010009 Task Order #29, Montana Natural Heritage Program, 2007; William L. Baker, "Fire Restoration of Sagebrush Ecosystems," *Wildlife Society Bulletin* 34 (2007): 177-85.

to be fully restored. The Bocks follow-up study at Little Bighorn confirmed these trends. A full two decades after the fire, big sagebrush was still non-existent on the twenty plots within the burn area they had originally examined.[464]

The complex interrelationship between fire, grazing regimes, and big sagebrush became a consistent theme in the studies that emerged after the fire. Sustained overgrazing can result in the expansion of sagebrush steppe into grasslands. Drawing a direct correlation between overgrazing and the expansion of big sagebrush in the Little Bighorn valley the Bocks wrote, "the annual presence of horses and perhaps bison as well for decades before the Battle in 1876 may have facilitated the invasion of this Northern Mixed Grass Prairie by big sagebrush." In other words, they surmised that overgrazing might have shaped the historic battlefield. They concluded that the 1983 fire, "offers an opportunity to study patterns o *Artemisia tridentata* invasion in the absence of large domestic or native grazing animals."[465] Fires could keep the spread of sagebrush in check but as the Bocks noted for Little Bighorn, "fire frequency has been episodic in this region historically and pre-historically, related to climatic cycles and probably fuel reductions caused by ungulate grazing. Therefore, ecological opportunities have long existed across the northern Great Plains for plants that are intolerant of fire, as well as for those dependent upon or unaffected by it." At Little Bighorn, however, this general trend had been reversed. Fencing had prevented overgrazing and allowed relatively lush stands of native grasses to survive intermixed with big sagebrush.[466]

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[464] Bocks 1987, ii; Baker 2007, 177; Cooper et.al. 2011, 4-5; Bocks 2006, 23, 26.
[465] Bocks 1987, 12-13.
[466] Bocks 2006, 27.

The prohibition on grazing within the monument may have contributed to the fire's intensity, the mortality of the big sagebrush, and the plant's negligible recovery. The fire burned mostly on park service lands rather than on surrounding ranges. The Bocks suggested that fencing the park off from livestock might have "allowed a heavy grass and litter cover to build up on Custer Battlefield, [and] provided an appropriate heavy fuel load to react with the hot ambient temperature and winds to produce the dramatic fire in 1983." Fires on many sagebrush-grassland habitats were "patchy" due to the lack of a sufficient fuel load, which in turn was related to grazing practices as well as the composition of the grasslands. The Little Bighorn fire, by comparison, was broad and intense likely in part because grazing had been forbidden for decades. There is also the possibility that the "relatively lush" groundcover at Little Bighorn may also have "reduced opportunities for recruitment of big sagebrush seedlings after the fire." Evidence on the effects of post fire grazing, however, is inconclusive. The Cooper study found no significant difference between grazed and ungrazed lands (LIBI was the only ungrazed site in the sample) in regard to big sagebrush's lengthy recovery period.[467]

What was catastrophic for big sagebrush was apparently beneficial for the nearly all the other native flora of the park, especially the grasses. The Bocks post-fire surveys found fewer shrubs on burned plots during all three years of the study (1984-1986), while forbs were more common on the burned plots as compared to unburned control areas. Grasses were also more common on the burns than in the control areas. More importantly, evidence suggests that native grasses benefitted from the fire while the most prevalent

[467] Bocks 1987, 10-11; Cooper et. al. 2011, 1; Bocks 2006, 27; D. D. Austin and P. J. Urness, "Vegetal Changes on a Northern Utah Foothill Range in the Absence of Livestock Grazing between 1948 and 1982," *Great Basin Naturalist* 58 (1998): 188-91.

exotic grass, Japanese or field brome, did better on unburned areas. Bluegrasses of the genus *Poa* showed the most prounced responses to the fire. The introduced Kentucky bluegrass (*Poa pratensis*) diminished while native *Poa juncifolia*, Alkali Bluegrass, was stimulated. (9) Native grasses such as bluebunch wheatgrass, grama grasses, junegrass, needle and thread, alkali bluegrass, and green needlegrass all "showed significant increases during at least one post-fire growing season in comparison with their unburned counterparts." The native threadleaf sedge (*Carex filifolia*) also did better in previously burned plots. These observations led the Bocks to write, "We tentatively conclude that the 1983 Custer fire favored the native grasses over their introduced counterparts."(14) Two decades later the Bocks found some evidence that native grasses and forbs still benefitted from the effects of the 1983 fire, while Japanese brome and other exotics tended to still do better on the unburned plots, although overall, fewer significant differences remained between the burned and unburned plots.[468]

Compared the grasses and forbs, shrubs did not benefit as clearly from the fire although many returned to "pre-burn densities or higher by the second year."[469] In May 2003 the Bocks sampled vegetation on the twenty plots that burned in 1983 as well as five that had not. They found that "Overall shrub canopy and combined shrub/succulent species richness were higher on unburned plots and in swales than on burned uplands." Yet it is important to not the specifics of their findings. Chokecherry and wild rose had recovered well and were especially abundant in the ravines where they found "little or no long-term negative effects of the 1983 fire." While big sagebrush was absent, silver sage was more

[468] Bocks 1987, 9, 14; Bocks 2006, 23, 26.
[469] Bocks 1987, 13.

common in all habitats. The prevalence of silver sage, contributed to the historic character of the battlefield, as it presented the "same general aspect" of its larger relative. "Thanks to the regrowth and spread of *Artemisia cana* [silver sage], the Battlefield must now rather closely resemble how it looked on the 25th of June, 1876, even though *A. tridentata* [big sagebrush] does not dominate the site as it did then."[470]

Evidence drawn from both the Little Bighorn studies and elsewhere, however, complicates the picture of beneficial fire. Fire's impact on field brome, the most common exotic grass at Little Bighorn, is a case in point. The most important effect of the 1983 fire after the destruction of big sagebrush was the elimination of the litter layer on top of the soil. Field brome is dependent upon a healthy litter layer for seed production and seedling survival. Cooper's study found that field brome likely did suffer in the two or so years after a fire due to loss of the litter layer. Yet the Bocks also discovered that over time, field brome accounted for nearly all of the increase in annual grasses in the plots they studied. "We hypothesize that the observed field brome response was due to exploitation of space, water and nutrients following sagebrush mortality," they wrote.[471] The Bocks also attributed the relative failure of field brome in the burned areas to the destruction of the litter layer. These findings point out the folly of the 1970s resource management plan that identified fire as a means of keeping invasive grasses at bay. As Cooper's team concluded, "Burning sagebrush stands infested with field brome may result in long-term increase in this undesirable species."[472]

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[470] Bocks 2006, 23, 26-27, 29.
[471] Bocks 1987, 7,13; Cooper, et. al., 6.
[472] Cooper, et. al. 2011, 7; Bocks 2006, 28; Resource Management Plan, 7-8

While the 1983 fire seemed beneficial for native grasses, its effects were not uniformly advantageous for all life forms. Birds that depended on shrub habitats were adversely affected. In their mid-1980s survey the Bocks compared the burned portions of the battlefield with the surviving sagebrush-grassland habitat at the Reno-Benteen site. They found that no bird species preferred the burned plots in their study. On the other hand, many previously common breeding birds such as lark buntings (*Calamospiza melanocorys*), lark sparrows (*Chondestes grammacus*), and Brewer's sparrows (*Spizella breweri*) "completely avoided the burn." These species preferred the "unburned habitat with higher than average sagebrush canopy."[473] Some species that they expected to find in the area were entirely absent. The attributed the lack of sage sparrows (*Amphispiza belli*) and sage thrashers (*Oreoscoptes montanus*) to the "relatively low density of sage present, even o the unburned area," while "unusually heavy grass cover at both sites certainly could explain the absence of horned larks (*Eremophila alpestris*)." They were unable to explain the absence of vesper sparrows an extremely common breeding bird on similar habitat nearby. "The only bird commonly spotted in the burn area in the years immediately after the fire was the western meadowlark (Sturnella neglecta) which they deemed "perhaps the most adaptable of all North American grassland birds."[474]

The Bocks' follow-up study reinforced the effects of fire on sagebrush dependent birds. Grasshopper sparrows, Brewster's sparrows, and lark sparrows had retuned to the 1983 burn area where they found refuge in the recovered shrub populations of chokecherry (*Prunus virginianus*) and skunkbush (*Rhus trilobata*) found in swales and

[473] Bocks 1987, Part II, 2, 4.
[474] Bocks 1987, Part II, 7-9.

ravines. Meanwhile, an August 1991 fire swept the Reno-Benteen site, killing all of the big sagebrush and making the "shrub dependent bird species were no longer common there." The results of the Bocks' study were "generally consistent with avian responses to fire in sage grasslands elsewhere in North America, and they illustrate the importance of at least some scattered emergent shrub cover to a variety of grassland birds." They concluded: "From an avian perspective, loss of big sage from fires at LIBI has had a negative impact on its biological diversity."[475]

The complex and still developing understanding of fire in areas of intermixed sagebrush and grasslands has led to a reevaluation of the1983 fire. In their 1987 study the Bocks chose to identify the habitat at Little Bighorn as a Northern Mixed Grass Prairie, eschewing earlier characterizations of the place as a transitional zone between true grasslands and sagebrush steppe marked by a Bouteloua-Stipa-Agropyron complex of grasses. In doing so they essentially marked grasslands as the preferred, more "pristine," ecosystem at the park. Indeed, they argued that the fire "converted what *appeared* to be a shrub-steppe ecosystem into a grassland [emphasis mine]." Moreover, in the same report they characterized the expansion of big sagebrush onto the battlefield in the years before and after the battle as an "invasion."[476] This view was consistent with common older understandings of sagebrush as a "pest" that expanded with overgrazing. Still, they recognized the importance of big sagebrush to wildlife, most notably birds. In their follow-up studies, however, the Bocks presented a more nuanced understanding of the impact of fire on the battlefield and the importance of sagebrush to the local ecosystem. This change

[475] Bocks 2006, 13.
[476] Bocks 1987, 11, 12-13.

was largely driven by the obvious impact on avian life they witnessed, but it was also consistent with the work of other scholars, such as Baker, who illustrated the importance of big sagebrush to obligate species and just what its eradication might mean. Therefore, in their second report, the Bocks argued against prescribed burns at Little Bighorn in the immediate future. Prescribed burning, they wrote, "might be indicated if there is some recovery of big sagebrush in areas that could be exempted from fire, and/or if there is a trend toward decreasing relative abundance of native vs. exotic grasses and forbs."[477] In 1983 they wrote, "Taken together, these data further substantiate our hypothesis that fire is a natural and non-destructive feature of the western American grasslands." Two decades later the Bocks still viewed fire as a natural feature an ecosystem where "most native flora" was "at least fire tolerant if not fire dependent" but they also recognized that it was not a simple answer to restore a "pristine" grasslands ecosystem.[478]

The 1983 fire at Little Bighorn should also be understood in light of larger shifts in National Park Service policy concerning fires. In its earliest years the park service adopted a "total-suppression fire policy" modeled on that of the Forest Service and which essentially continued the Army's earlier fire control policy in the parks. The goal of this policy was to insure visitors idealized scenic vistas. During the New Deal and post-World War II years fire policy remained unchanged and suppression got more effective with new methods such as the use of smokejumpers. But as the park service increasingly looked to ecological science as a guide for management policy, more voices questioned the total suppression policy and called for the use of controlled burns. The 1963 Leopold Report

[477] Baker 2007, 177; Bocks 2006, 23.
[478] Bocks 1987, 15; Bocks 2006, 28.

singled out burning as the most "natural" means of managing vegetation in the parks. Still, park service foresters, who shared the training and belief of their colleagues in the USFS resisted change. Up to 1972 total suppression remained official policy. Over the next half-decade controlled burns began as experiments in the parks. It was not until 1978 that the new NPS Management Polices declared that natural fires "must be permitted to continue to influence the ecosystem if truly natural systems are to be perpetuated."[479] Ten years later, however, the conflagrations that engulfed Yellowstone National Park led to a reassessment of the "let it burn" policy in regard to natural fires. The new policy that emerged allowed for natural fires to take their course, but required superintendents to sign documents certifying that the fires were not a threat to life or property. Few superintendents would take such a risk with their park or career. Wyoming senator Malcolm Wallop summed up the effect of the new policy on the use of fire as a management tool: "All the words about natural fire are in there, but the fact is they're now going to have to suppress the fires."[480]

Several wildfires affected portions of the Little Bighorn Battlefield in the years following these policy changes. The entire Reno-Benteen site was burned as well as 125 acres on the north slope of Battle Ridge on August 20, 1991. The fire was part of a much larger blaze that burned some 10,000 acres between U. S. Highway 212 and Reno Creek.[481] On June 28, 1994, 150 acres on Custer Hill burned. The following year later another fire, ignited along Highway 212 swept through parts of the Custer Battlefield section of the

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[479] Sellars, *Preserving Nature in the National Parks*, 25-26, 82-84, 127, 162, 253-58; Leopold, et. al., *Wildlife Management in the National Parks*, 33; National Park Service, *Management Policies*, 1978, Ch. 4, 13.
[480] William R. Lowry, *The Capacity for Wonder: Preserving the National Parks* (Washington, D.C.: The Brookings Institution, 1994), 79-83.
[481] Superintendent's Annual Report, 1991-1992, Little Bighorn Battlefield National Monument, 19 March 1993, Denver TIC.

monument. Although only 42 acres within the park were burned in this instance, it seemed to Supt. Gerard Baker that "Fires are becoming an annual occurrence." "Four Fires in the past five years are cause for concern with the resource protection division," he wrote, "Lack of personnel, training, and funding are critical concerns."[482] Suppression was clearly a central part of the fire policy. A wildland fire management plan was completed in 2005. The plan included both suppression and fuels management.[483]

The scientific studies of the battlefield conducted since the 1983 fire, however, illustrated the importance of fire to the health of the grassland ecosystem. The 2007 Resource Management Plan for Little Bighorn illustrated that park staff had not given up on the potential of fire as one management tool. The plan identified an "alteration of the natural fire regime" as a "threat" to the grassland ecosystem. Citing the "virtual 100% mortality of big sagebrush" the plan stated, "Natural fire is recognized as a prime factor in the evolution and continuation of grassland ecosystems. For the preservation of these natural grasslands and the suppression of invasive weeds, fire, natural or prescribed, can be used as a tool." "The maintenance of the cultural landscapes would involve fire," the plan's authors continued, "since unburned grassland becomes a shrub dominated community over time." In order to utilize prescribed burning, however, a more complete understanding of the "natural fire regime" would be necessary. Moreover, the plan suggested that "ethnographic values" must also be considered; "For example, did the Native Americans burn the area for hunting and warfare purposes."[484] In March of 2012, Supt.

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[482] Superintendent's Annual Report for 1995, Little Bighorn Battlefield National Monument, Denver TIC; Greene, *Stricken Field*, 168.
[483] 2007 Resource Management Plan, 24.
[484] 2007 Resource Management Plan, 17, 24.

Kate Hammond announced the preparation of a new fire management plan and environmental assessment for the monument. The goals of the new plan, she wrote, were to "ensure the health and safety of the public, NPS staff, and firefighters; protect cultural and natural resources; use fire in a manner that maintains a healthy and sustainable ecosystem; and strengthen cooperative fire management partnerships."[485]

D. MANAGING PLANT COMMUNITIES AT LITTLE BIGHORN.

The natural plant communities at Little Bighorn Battlefield National Monument are recognized as an essential part of the park's cultural landscape and historic character. As with all existing National Park Service units, the monument was placed on the National Register of Historic Places with the passage of the National Historic Preservation Act in 1966. In the mid-1980s the park service prepared a detailed historic district nomination for the Custer Battlefield area and the Reno-Benteen site.[486] The nomination authors argued that due to fencing, both tracts had retained more of an historic character than surrounding areas. In reference to the Custer Battlefield section of the park they wrote, "Overgrazing has not been a problem, because the battlefield has been fenced since 1891. Due to this fact, it is one of the few areas within the region that retains its original grasses, with the exception of non-native clover in the summer months." Elsewhere they asserted, "Since the advent of fencing to prevent overgrazing, the ground cover has remained essentially the same as it was on June 25-26, 1876." (Both of these statements are clearly drawn from the language of the 1964 Master Plan Narrative.) The nomination's

[485] H7617 (LIBI), 9 March 2012. http://parkplanning.nps.gov/projectHome.cfm?projectID=40378
[486] CLI, 17.

assessment of the Reno-Benteen site's environmental condition was only slightly less positive. Since the fence went up there to keep stock out in 1954, the "original grasses are relatively undisturbed." More importantly, the nomination directly related the natural condition of the site to its historic character and interpretation: "The ground cover is critical to the interpretation of the battlefield site, because it is believed to have played an important role in the Little Bighorn Battle. According to Sioux and Cheyenne participants, the Indians employed the tall grasses and ravines as cover to advance slowly on the defensive troop positions." In addition to fencing, "Since the fire of 1983, the Custer Battlefield probably has assumed more of a feeling and appearance of the 1876 period." [487] In this context the introduction or invasion of exotic flora was an issue of serious concern for park managers and staff.

Although numerous assessments have concluded that "Overall the Little Bighorn National Monument has an excellent array of relatively intact natural vegetation communities," invasive species pose threats on both the grasslands and riparian areas of the park. As with any location, non-native plants at LIBI are most commonly found along roads, trails, and other disturbed areas where heavy impact is felt. Common non-native plants on the monument's uplands include yellow sweetclover (*Melilotus officinalis*), field bindweed (*Convolvulus arvensis*), fixweed (*Descurainia Sophia*), tumble mustard (*Sisymbrium altissimum*), St. Johnswort (*Hypericum perforatum*), spotted knapweed (*Centaurea biebersteinii*), Dalmatian toadflax (*Linaria dalmatica*), western salsify (*Tragapogon dubius*), curly dock (*Rumex crispus*) and the ubiquitous dandelion (*Taraxicum*

[487] National Register of Historic Places, Inventory-Nomination Form, Custer Battlefield National Monument MRA, May 1, 1987, Denver TIC.

officinale). Visitor use regulations at Little Bighorn, that prohibit visitor foot and vehicle travel away from the roads and trails, has meant "park lands remain relatively weed free."[488]

Even with regulations and programs to control exotics new plants make their way onto the battlefield. Some are introduced intentionally while others are dispersed accidently or through natural processes. The Kentucky bluegrass present on the monument is of course an escapee from the National Cemetery where it is the principal groundcover. It is likely that the non-native crested wheatgrass (*Agropyron cristatum*) was planted around the visitor center after repair and reconstruction work in the mid-1980s. Crested wheatgrass remains established in the area today. An accidental introduction was that of Russian knapweed (*Acroptilon repens*). The species had not been observed at LIBI before 2003 when it probably arrived with loads of soil brought in for the construction of the Indian Memorial.[489]

Three exotic grasses of special note have made their way into the monument: cheatgrass or downy brome (*Bromus tectorum*), Japanese or field brome (*Bromus japonicus* or *B. arvensis*), and bulbous bluegrass (*Poa bulbosa*). Cheatgrass and field brome are both annual grasses native to Eurasia that have posed real problems for range managers across the Western United States. Cheatgrass has spread widely across the Great Basin at the expense of big sagebrush habitat. The presence of cheatgrass radically changes fire regimes, increasing fire intensity and decreasing fire intervals. "Because *Bromus tectorum* thrives in the presence of fire," the Bocks write, "many former sage dominated shrubsteppe

[488] 2007 Resource Management Plan, 20.
[489] Vegetation Mapping Project DRAFT.

ecosystems now exist as near monocultures of this self-perpetuating annual grass." As suggested above, field brome does not benefit as readily from fire, but one study found that it constituted nearly all of the increase in annual grasses found after burning in sagebrush habitat in southeastern Montana. Field brome is viewed as a noxious weed because it "competes with native perennials and has a brief window of grazing availability as it rapidly matures and loses nutrient content, digestibility and palatability." While both of these species have appeared along roadsides in the park, the Bocks conclude that they are "of relatively minor concern because of their inability to spread into the grassland at the expense of native grass species."[490]

In the Bocks' estimation, bulbous bluegrass is a much greater threat at Little Bighorn. The couple did not observe the grass in their mid-1980s fieldwork at the monument nor did they notice it nearby Hardin, Montana. Yet when they returned in 2003 they observed it lining city streets in Hardin and on one isolated plot inside the park. "By May 2006, it lined the entrance road to the Battlefield and was conspicuous long the Battlefield roads themselves," they wrote, "It also had moved out from the roadsides into the grassland itself, although it has not yet established at the Reno-Benteen site in any major way." Bulbous bluegrass is apparently able to effectively colonize areas in existing grasslands where cover is not particularly dense. Importantly they also made a correlation between the post-fire archaeological work done at the park and the spread o *Poa bulbosa.* They had expressed their concerns in 1983 that ground disturbance could leave an opening for invasive species. Even though the disturbed areas were resodded with native grasses, in 2003 the Bocks correlated the sites with bulbous bluegrass, suggesting a "residual

[490] Bocks, 2006, 28-29; Cooper et.al., 2011, 7.

disturbance effect." As a means of control the Bocks recommend hand pulling the grass rather than the use of chemicals that might hurt the "less robust species within the grassland."[491]

The riparian bottomlands are also threatened by the expansion of exotic and invasive species. Two of these are trees that have posed persistent problems in riparian areas all across the American West. The appearance of Russian Olive (Elaeagnus angustifolia) at Little Bighorn Battlefield National Monument likely dates to sometime in the 1940s or 1950s. The tree was first planted as an ornamental species and windbreak in New Mexico in 1903. In many areas of the Rocky Mountain West, including Montana, Russian olive was intentionally planted as a means of erosion control and as part of shelterbelts, especially during the drought years of the Great Depression. The first documented occurrence of the plant escaping cultivation came in Utah in 1924. It rapidly spread to neighboring states, reaching all of the interior western states by the mid 1950s. One 2011 study found 3,000 canopy acres of Russian Olive lining the Yellowstone River and its tributaries in seven Montana counties, including Bighorn.[492] Like Russian olive, various species of genus *Tamarix*, known commonly as salt cedar or tamarisk, were planted for erosion control and shelterbelts throughout much of the west. Tamarisk has infested much of the Colorado River system in the American Southwest. To date in the LIBI bottomlands

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[491] Bocks 2006, 29.

[492] Mark Stannard, Dan Ogle, Larry Holzworth, Joe Scianna, and Emmy Sunleaf, "History, Biology, Ecology, Suppression, and Revegetation of Russian-Olive Sites," USDA, NRCS, Plant Materials Technical Note, No. MT-43 (April 2002); Gabrielle L. Katz and Patrick B. Shafroth, "Biology, Ecology and Management of Elaeagnus Angustifolia L. (Russian Olive) in Western North America," *Wetlands* 23 (December 2003): 763-77; Jeff Combs and Thomas Potter, Russian Olive (Elaeagnus angustifolia L.) Distribution Mapping for the Upper Yellowstone River and Tributaries," USDA, NRCS, Invasive Species Technical Note, No. MT-31 (March 2011).

Tamarix chinensis or *T. ramosissima* has colonized approximately three quarters of an acre total. The presence of Russian olive is even smaller. Still, it is the potential of these two species to completely dominate a riparian ecosystem that causes great concern.

A third exotic species in the riparian areas with the potential to crowd out native plants is Tatarian Honeysuckle (*Lonicera tatarica*). Unlike Russian Olive or Tamarisk, its arrival at the park is easy to date. As one of the last landscaping projects of the War Department, honeysuckle hedges of the shrubs were planted around the north and west borders of the cemetery in 1938. The hedge was possible because the new pumphouse completed that same year could finally supply enough water for the successful irrigation of exotic grasses, shrubs, and trees. A native of Russia and Siberia, tatarian honeysuckle was first bred in the mid-eighteenth century in the Imperial Gardens at St. Petersburg. Within a century it had become a popular ornamental throughout Europe and escaped cultivation in Britain. The same occurred at Little Bighorn, where honeysuckle established itself away from the cemetery in ravines, probably aided by seepage from the cemetery irrigation system and made its way to the bottomlands.[493]

Native cottonwoods and willows are at the greatest risk from the invasion of the three exotics. Cottonwoods have not shown substantial decline but neither have they experienced major regeneration. Native willows (Salix spp.) on the other hand have declined since 1876 due to a variety of causes. In 2006, the Bocks suggested the "judicious"

[493] Rickey, History of Custer Battlefield, 59; Alice M. Coats, *Garden Shrubs and their Histories* (New York: E.P. Dutton & Company, 1964), 204.

reintroduction of peachleaf and sandbar willows due to both their status as native riparian plants and their importance to Native peoples.[494]

Efforts to control exotics at Little Bighorn date back to the earliest years of NPS management. These attempts, however, were irregular and focused along roadways, trails and in the cemetery. The noxious weed control program contained in the 1970s resource management plan applied to both the cemetery and the battlefield, with Canadian Thistle, Goat Weed, and Chick Weed the principal targets on the battlefield. In the cemetery the goal was to "eliminate all weeds." In both areas the herbicide 2-4-D had been in use since 1971, with an estimated 90% success rate in the cemetery and 70% on the battlefield. The plan discounted other means of eradication and called for continued spraying as the best course in preserving the "National Historical scene" and maintaining the "acceptable standard for a National Cemetery (prescribed by Veterans Administration guidelines)." Upkeep of the cemetery demanded the application of even more chemicals. Beginning in 1973 the park service sprayed malathion on the evergreens that bordered the cemetery in an effort to control "pine scale and insects in the cocoon stage." The prospect of simply removing the trees and returning the cemetery grounds to a more natural state was dismissed first because "community objections to such a plan would be great," but also because "these trees separate the National Cemetery from the battlefield grounds, which assists in the interpretation of the Monument."[495]

In the early 1990s the efforts to control invasive/exotic plants moved beyond the roadways and trails and into the grasslands themselves. Crews from the Park Service, the

[494] Bocks 2006, 17.
[495] Custer Battlefield National Monument, Resource Management Plan, n.d. (1970s), Denver TIC, 3-6.

BIA and the Crow Nation cooperated to control weeds such as St. Johnswort (*Hypericum perforatum*), spotted knapweed (*Centaurea biebersteinii*), and Dalmatian toadflax (*Linaria dalmatica*). Field bindweed has also been a problem along the tour road, particularly after it was widened and resurfaced in 2001. Control efforts commonly included the use of chemical herbicides up to the mid-1990s when new federal and state regulations led to a suspension of their use. Between 1999 and 2004, sporadic control efforts occurred. Since 2004, a fee-demonstration project has funded a more regular control program. A NPS Exotic Plant Management Team (EPMT) based at either Glacier or Yellowstone National Park usually visits the monument on an annual basis to monitor weed problems and assist staff in treating infestations. Both mechanical methods – tools and hand puling – as well as chemical herbicides are employed against the weeds. In addition to weed control programs disturbed areas are also reseeded with native species including green needlegrass, bluebunch wheatgrass, blue grama, and sideoats grama.[496]

In addition to the control of invasive plants, maintaining the battlefield tour road is a secondary reason for vegetation management at LIBI. "Vegetation encroachment" on the battlefield tour road "led to a Regular Cyclic Maintenance project to remove to remove vegetation encroachment of the tour road." In 2003, yucca and trees were removed from the roadside and subsequent bi-annual roadside mowing has kept encroachment to a minimum. When funding permitted the mowings have been supplemented with "seasonal chemical control." This roadside maintenance keeps the battlefield road in accordance with the Montana Department of Transportation Maintenance Manual. The goal is to "produce

[496] 2007 Resource Management Plan, 20; Vegetation Mapping Project, DRAFT [CAN I CITE THIS AND HOW?]

and maintain healthy, low-maintenance, self-sustaining roadsides by encouraging beneficial vegetation." The manual also calls for chemical spraying to "control against the spread of noxious weeds, to inhibit the growth of vegetation around structures such as signs and guardrails, improve aesthetics, improve sight distances, reduce fire hazards, reduce snow drifting and to help with drainage problems in areas where mowing is not practical."[497]

In February of 2008, Little Bighorn Battlefield became one of ten smaller parks in the Northern Rockies involved in a joint effort to create an invasive plant management plan. The central goal of the plan would be to "Prevent and reduce damage from invasive plants using environmentally sound, effective management strategies that limit risk to people, park resources and the environment." The emphasis would be on flexibility in order to respond to potential problems as they were identified. The plan was to use of the best "technical and scientific information available" to ensure the safety and success of the program. Transparency in planning and executing invasive plant control was also part of the programs goals, and the plan should also function as a "tool to communicate the importance of invasive plant management."[498]

More recently the staff at Little Bighorn began an initiative to involve visitors in controlling the spread of invasive plants on the monument's upland prairies. The plan included an "Early Detection Rapid Response (EDRR)" strategy aimed at "locating a potential non-native, invasive plant that is just beginning to invade a particular area and

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[497] 2007 Resource Management Plan, 17-18.
[498] Little Bighorn Battlefield National Monument Announcement – Little Bighorn Battlefield National Monument Now Accepting Comments on Invasive Plant Management Plan Development, 6 February 2008, LBAF, L-7617 Statements and Studies.

quickly treating the new infestation." Early identification and treatment of an infestation was more effective and less costly according to the brochure prepared for the program. But to be effective the plan relied on communication between the park, its visitors, and neighbors. Thus the brochure took the form of a "wanted" poster and asked "If you observe a potential invader, please report it to monument staff." The invasive plants profiled in the brochure included black henbane (*Hyoscyamus niger*), Dyer's woad (*Isatis tinctoria*), perennial pepperweed (*Lepidium latifolium*), rush skeletonweed (*Chondrilla juncea*), leafy spurge (*Euphorbia esula*), hawkweeds (*Hieracium spp.*), punctervine or goathead (*Tribulus terrestris*), tall buttercup (*Ranunculus acris*), yellow toadflax (*Linaria vulgaris*), and yellow starthistle (*Centaurea solstitialis*).[499]

E. WILDLIFE.

As described earlier in this chapter, wildlife management at Little Bighorn was essentially a passive endeavor from the 1940 through the 1960s. With the release of the Leopold Report on wildlife management in the parks in 1963 greater attention to the use of biological science in wildlife management began to be seen. Yet the change did not occur overnight. Well into the 1970s the older inattention to wildlife values persisted at many parks, especially the smaller units such as LIBI. The late 1970s resource management plan provides a good example. While the plan stated a commitment to "provide a habitat for these animals within the carrying capacity of the vegetation." Beyond this goal the plan called for no specific management actions. Maintaining the battlefield fence was presumably the most essential and only necessary part of the management effort.

[499] Potential Invasive Plants of the Little Bighorn Prairie, NPS, LIBI, n.d.

Rattlesnakes, of which there was "no shortage" at the monument, were the only species singled out, and only in regard to the danger they posed to visitors. As for other wildlife, the small size of the monument, under 800 total acres, "would seem to have little or no control over a wildlife management program due to outside forces." Thus, the recommended course of action was to "Continue doing nothing."[500]

By the mid 1980s more attention was being paid to wildlife concerns. In part this was due to an increase in baseline data about the species, most of them small and previously ignored in management programs. The 1983 fire was one factor in increasing studies of wildlife in the monument, the Park Service's Natural Resources Challenge was another. The 1987 survey of the monument's bird population has been discussed. Later projects included studies of reptiles and amphibians (2002), fish (2002), small mammals (2003), bats (2006) and a second survey of birds by the Bocks that same year. Most commonly it is small mammals and birds that visitors see. The 2007 resource management plan stated that common mammals in the park included "whitetail deer, cottontail rabbits, porcupines, skunks, coyotes, and foxes."[501]

In 2001 and 2002, funded by the NPS Natural Resources Challenge initiative, a team from the U. S. Geological Survey conducted a survey of reptiles and amphibians at the park. Museum collections and previous studies conducted in Big Horn County suggested that nineteen species of reptiles and amphibians likely were present at the monument. These included eight snake species, two lizards, five kinds of frogs and toads, three turtle species, and the tiger salamander. The goal of the study was to document 90% of the reptile and

[500] Resource Management Plan, 9-11.
[501] 2007 Resource Management Plan, 21.

amphibian species occurring at the park. Field visits in April and June of 2001, however, came at times of limited rainfall. Without standing water the surveys were "limited to visual searches of terrestrial habitats in the riparian are southwest of the visitor center and in uplands elsewhere on the monument" and no reptiles or amphibians were observed on either visit.[502] Later efforts resulted in only a partial list of species. The disappointing results of the survey led to a suggestion in the 2007 resources management plan that park staff should be trained to document amphibians in order to capture data at the opportune time, after a rainy season." In addition, a small mammal survey conducted in 2003 was able to document three additional reptile species at Little Bighorn.[503] The dearth of sighting did not change the fact, according to park staff, that "Rattlesnakes and bull snakes represent 95% of the reptile population; bull snakes alone accounts for about ¾ of all sightings."

During their survey work in the mid-2000s, the Bocks observed sixty bird species in five distinct habitat types at Little Bighorn Battlefield National Monument. The habitat types were "open grasslands, sage grassland, shrubby swales and ravines, river bottomland, and landscaped areas." Their specific findings in regard to the effects of the fire on breeding populations of birds in the grassland and sage grassland portions of the monument have been discussed above. In general they found fire detrimental to avian biological diversity in these areas. At the same time they found the park's riparian areas to be its "richest avian habitat." Here they credited the relative protection from grazing for the "well developed understory, which can benefit a variety of birds dependent on heavy ground cover." Birds in the heavy understory included: veery, gray catbird, brown thrasher,

[502] Reptile and Amphibian Inventory at Grant-Kohrs Ranch National Historic Site and Little Bighorn Battlefield National Monument, Progress Report, October 2001, Denver TIC.
[503] 2007 Resource Management Plan, 21.

spotted towhee, and long sparrow. Outside the park's riparian areas where agriculture takes place they suggested that birds like the ring-neck pheasant, mourning dove, black-billed magpie, and American crow, which did not require such heavy understory, would be more common.

There have also been at least two inquiries into the potential presence of species listed under the Endangered Species Act. In 2004 as part of the proposed rehabilitation of the battlefield tour road possible impacts on endangered species were considered. The study found that only the Bald Eagle and Whooping Crane were known to "occur within or near the study area." In the case of the eagle, the large cottonwoods along the course of the Little Bighorn River offered potential nesting sites although none were discover on monument lands. The same riparian areas offered whooping cranes possible stopover sites during their migration.[504] As part of the 2008 preparation for an invasive plant management program, LIBI Supt. Darrell Cook requested information regarding populations of endangered species that might be found in proximity to several of the parks participating in the project. R. Mark Wilson of the Fish and Wildlife service responded that while gray wolves from the Yellowstone and central Idaho "nonessential experimental populations" might be found near Grant Kohrs Ranch National Historic Site and Big Hole National Battlefield respectively, the FWS did not anticipate the "occurrence of any federally listed threatened, endangered, candidate or proposed species" at Little Bighorn or the other two sites in question.[505]

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[504] Little Bighorn Battlefield National Monument Rehabilitate Route 10 Environmental Assessment, Biological Report, David Evans and Associates, November 2004, 6, 7-9.
[505] Darrell J. Cook to Mark Wilson, 6 February 2008; R. Mark Wilson to Darrell Cook, 20 February 2008, LBAF L-30: Land Use.

One listed species with the potential for reintroduction at or near LIBI is the Black footed ferret. Considered extinct in 1981 when a small population was discovered in northwest Wyoming, all of the known ferret populations today are the result of reintroductions using animals bred in captivity. The decline of the ferrets as well as their potential survival is directly linked to the presence of Black Tailed Prairie dogs. This species itself was in rapid decline but population rebounds led to its removal form the list of candidate species in 2004. At the time of the battle a prairie dog town of indeterminate size was situated just south of the great combined Lakota-Cheyenne village at approximately the spot where Maj. Reno halted his battalion and formed the first skirmish line. Historic accounts do not indicate the presence of prairie dog towns elsewhere on the battlefield. The lack of prairie dogs on the sloping uplands is not surprising as it is consistent with studies that show the rodents prefer ground with less than a 10% grade. It is possible, however, that populations that were not mentioned in the historic record existed elsewhere on the valley floor or on more level terraces. In the 1960s the expansion of prairie dog colonies reportedly was considered a threat to the monuments resources. By the early 2000s a small colony had established itself near the north boundary of the park. This colony, however, covered less than two acres in 2004. Since a colony of between 100 and 150 acres is necessary to support a singe ferret, this population is far too small to warrant the reintroduction of ferrets at this time.[506]

The large species perhaps most responsible for shaping the landscape of the Little Bighorn at the time of the battle are the ones notably absent from the park today. Cyclic

[506] Little Bighorn Battlefield National Monument Rehabilitate Route 10 Environmental Assessment, Biological Report, David Evans and Associates, November 2004, 9-15; 2007 Resource Management Plan, 21-22.

grazing of large herds of bison, as well as antelope, elk, and deer, as well as vast herds of Indian ponies, was an essential factor in determining the composition of the mixed grass prairie and perhaps the advance or retreat of the big sagebrush. Whitetail and mule deer have been reported in the monument from time to time, but the largest and most important grazer, *Bison bison*, has not been present since the late nineteenth century. Agricultural development, fences, and a patchwork of land ownership and jurisdictions pose enormous obstacles for restoring the historic grazing patterns of the large ungulates.

F. THE CHANGING COURSE OF THE LITTLE BIGHORN RIVER.

The Little Bighorn River, as it flows past the monument and constitutes its southwestern border, is a classic sinuous meandering stream. Three large oxbows effectively triple the length of monument's boundary along the river. The creation of new oxbows and the abandonment of old is a natural process in evolution of meandering streams. Yet human actions have the potential to alter this process. Channel straightening, for instance, can increase erosion and stream gradient, perhaps accelerating the cutting of stream banks. The removal of streamside vegetation likewise could create greater instability in stream banks. By the mid 2000s the southernmost of the three meanders within LIBI's boundary was in danger of being cut off and abandoned. Concerns that significant archaeological resources were at risk if the oxbow were to be cut off led to an archaeological survey of the area with metal detectors in July 2010. The potential cut-off also raised the question; did human alterations to the river system impact the natural process?

Douglas Scott, who had overseen much of the archaeological work at the park since the 1983 fire, led the 2010 investigation. The metal detector survey yielded no battle related artifacts in the oxbows. A second part of the project entailed comparing historic maps and aerial photographs to assess historic changes in the river's course. This comparison as well as the obvious meander scars left on the valley floor revealed that the river had indeed shifted course substantially in place since the time of the battle. Scott operated under the assumption that human induced changes were at least in part responsible for changes in the river's course. "Water temperatures and subsequent alterations in stream flow appear to be markedly changing the system by increasing erosion, accelerating the river channel movement," he wrote, "impacting native vegetation species, and accelerating the spread of invasive species."[507]

[507] Douglas D. Scott, "Investigating the Oxbows and Testing Metal Detector Efficiency at Little Bighorn Battlefield National Monument, Montana," Purchase Order R1380109202, September 2010, 2.

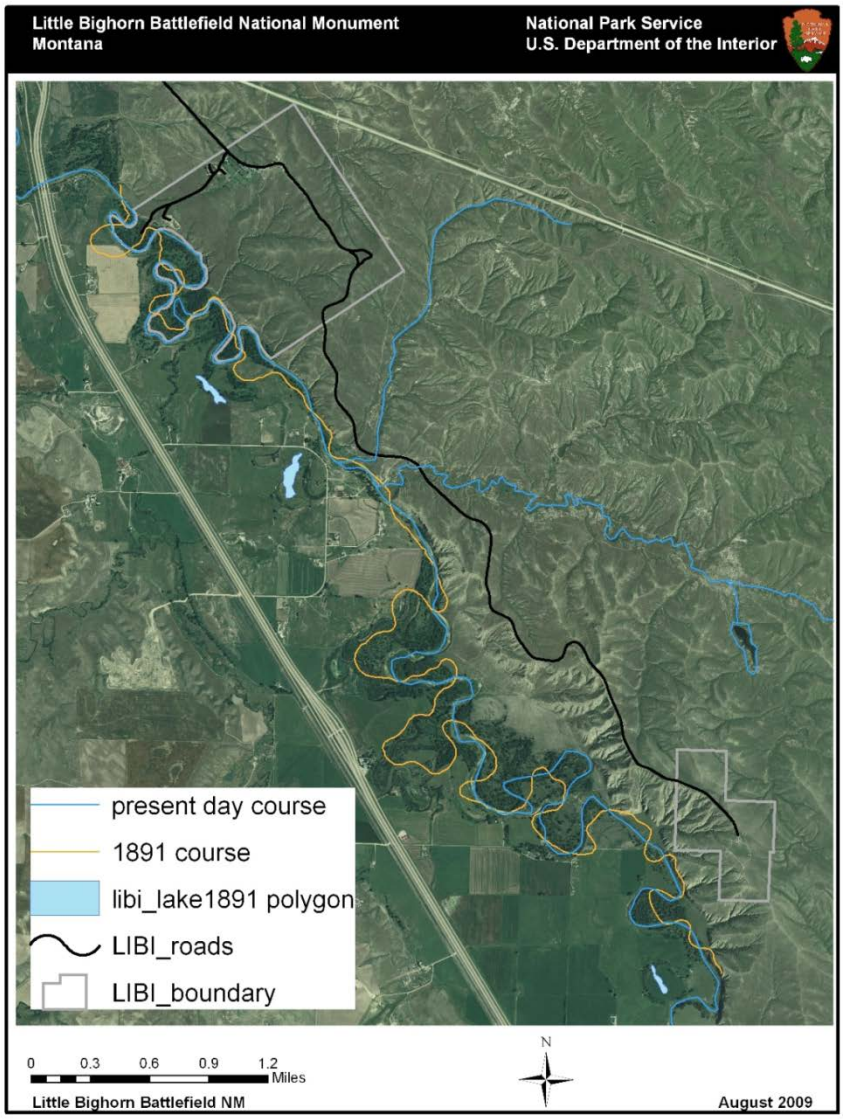

Figure 51. Comparison of channel alignments of Little Bighorn River. Source: Little Bighorn Battlefield National Monument..

Developments in the Little Bighorn Valley have imposed restrictions on the meandering river. During the 1940s and 1950s most sections of the river were modified "via channel relocation, riprap, channel clearing, and diking." These changes impacted over one-half of the main stem's length. The removal of streamside vegetation for agriculture and streamside overgrazing were also primary causes of changes in the river channel. The

construction of the Burlington and Northern Railroad and later Interstate Highway 90 effectively closed off much of the western side of the valley to the fluvial process. All of these forces combined have the potential to increase bank erosion, sediment transport, and channel instability. Straightening of the stream channel increases its power and increases erosion. [508]

While the river above and blow the monument has been subject to substantial human alteration, it appears that the natural fluvial process is still largely in operation at the monument. In 2010 a second team looked at the geomorphology of the stream. Their study concluded that the "erosion and channel migration is predominantly a natural process consistent with meandering river evolution." While the Little Bighorn River is subject to substantial "human alteration" both upstream and downstream of the park, it "displays the elements of a properly functioning stream" as it flows past the monument. The Little Bighorn exhibited "standard point bar – cutbank morphology." While the meanders in the vicinity of the park had shifted considerably, they have maintained "substantial sinuosity." Moreover, the river gradient remained below 1%. Taken together this meant that the "on-going and recent point bar – cutbank formation in the meanders [was] strongly indicative of lateral migration by the channel rather than vertical incision." The report concluded that since no valuable cultural materials had been uncovered on the

[508] Mike Martin to Supt. LIBI, "Geomorphic Evaluation of on-going Channel Migration in a portion of the Little Bighorn River," 26 August 2010; Geologic Resources Inventory Report, Little Bighorn Battlefield National Monument, NPS Geologic Resources Division, June 2011, 5-6.

threatened oxbow that there did not appear to be a "compelling reason to consider an attempt to arrest a natural process."[509]

[509] "Geomorphic Evaluation of on-going Channel Migration."

CONCLUSION AND EXECUTIVE SUMMARY

The environmental history presented in the preceding chapters presents a detailed account of the human and natural forces that shaped the Little Bighorn battlefield before 1876, the ways the landscape appeared and ecological relationships functioned at the time of the battle (including the ways that these factors influenced the course of the battle), and how the landscape and ecology o the area has changed since. This conclusion and summary will revisit the major conclusions of each chapter as well as provide a comparative look at the ecology and landscape of the battlefield in 1876 and today.

I. Executive Summary.

A. THE LITTLE BIGHORN BEFORE 1876.

The events of the geologic and climatologic past seem far removed from the life and death struggle that took place in June 1876, but they, in fact, were the essential forces that created the landscape of the valley. The Cretaceous Era shale and sandstone of the Bearpaw and Judith River formations that forms the bedrock of the Little Bighorn Valley produces highly erodible soils, while periods of uplift created the Rocky Mountains, Missouri Plateau. The result was a landscape characterized by broadly terraced river valleys interspersed with irregularly eroded uplands. The rise of the Rocky Mountains created the basic conditions for high, semiarid grasslands. The climate of the Great Plains saw important shifts over thousands of years, but one overriding factor has been present since the close of the last ice age: a complex drought cycle. Long term and short term drought cycles have forced all life forms to adjust to changing realities on the Plains.

The dominant ecological relationships on the Great Plains before and after the arrival of human populations involve the interactions of grasslands and grazers. The grasslands of the Great Plains are the largest biome on the North American continent. The grassland community at the park has been characterized as "northern mixed grassland." The northern mixed grassland of the Little Bighorn Valley made it an excellent habitat for native ungulate species. The grassland is a combination of "cool season," and "warm season" grasses, meaning their growth cycles, and thus nutritional value for grazers are spread across a substantial part of each year.

The ecology of the Little Bighorn Battlefield, however, is not simply that of grassland, as the monument is situated on the border between the true grasslands and the shrub-steppe ecosystem of the intermountain West. Big sagebrush (*Artemisia tridentata*) is the dominant shrub in the latter ecosystem and at times on the battlefield. Fires, both natural and human caused, are a critical factor in defining the mobile boundary between grassland and shrub-steppe. In general, fires reduce trees and shrubs and encourage the expansion of grasses. This is nowhere more evident than in the case of big sagebrush that suffers 100% mortality during intense fires.

Between the end of the last ice age and their near extinction in the late nineteenth century the bison (*Bison bison*), was the dominant grazing species on the Plains, and for most of that period the single most numerous mammal on the North American continent. Such a prolific large grazer had a profound impact on the ecology of the grasslands. The animals also held inestimable economic, social, cultural, and spiritual importance for Native peoples. The size of bison herds fluctuated according to the season and the nutrition available. Late winter and early spring were the leanest time of the year, as the last year's

growth of grass had lost most of its nutritive value and the growth cycle of cool season grasses had yet to begin. Because the northern mixed prairie contained a higher proportion of cool season grasses and thus provided better forage i late winter and early spring, areas like the Little Bighorn Valley provided excellent bison habitat.

The great bison herds always attracted human hunters. The earliest evidence of human presence on the Plains has been dated to 13,000 BP±. For thousand of years foot-going groups pursed the bison and utilized a wide range of other animal and plant resources. The acquisition of horses from Spanish herds beginning in the late seventeenth century revolutionized the lives of numerous Native peoples, and by the early nineteenth century many groups had adopted equestrian bison hunting to some extent or another. By the early nineteenth century many Native peoples had adopted equestrian bison hunting to some extent or another. The traditionally associated tribes of the Little Bighorn battlefield reflect the diversity of cultures that pursued the bison. The traditionally associated peoples include the Crows, Cheyennes, Arapahos, Lakotas and Dakotas, Assiniboines, and the Three Affiliated Tribes of Mandans, HIdatsas, and Arikaras.

Horses, as a grazing species, allowed human hunters to tap into the great energy reserves of the grasslands in ways that dogs, the only pre-horse domesticated animals on the Plains, never could. Horse could carry larger loads farther and faster, and revolutionized hunting practices as they allowed human hunters to run down bison on horseback. But these advantages came at a price. Horse and bison are commensals, meaning that pony herds posed a direct competition to the bison for forage and water. Keeping horses meant constantly moving during much of the year in search of pasture. The harshness of Plains winters, however, made movement dangerous. Instead, Plains peoples

established more extended camps in riparian areas where forage, water, timber, and sheltered terrain could be found. The same bottomlands coveted by Native peoples were also the refuge of the smaller winter bison herds. Thus, competition for forage between horses and bison continued throughout the winter.

The Native peoples of the Plains did not rely on the bison alone, but rather knew and utilized the full range of resources at their disposal. The review of the Native ethnobotany of the Little Bighorn Valley provided in chapter one illustrates this point. Numerous useful plants grew in the semi-arid uplands and in the riparian bottomlands. Some were valued as food, some as medicine, and others for manufacturing. Some plants had uses in two or even all three of these categories.

The horse-bison ecology and economy that these peoples developed offered great opportunities but also engendered competition and warfare. By the mid-nineteenth century the Lakotas, along with their allies the Cheyennes and Arapahos, had established themselves as a military and economic power on the northern Plains. Their power came largely at the expense of peoples such as the Crows and Arikaras. At the same time the horse-bison economy of Plains Indian peoples was peaking and faced an uncertain future as the herds declined. Some areas of the Plains saw bison numbers fall precipitously. Eastern Montana, including the Little Bighorn Valley, on the other hand saw bison numbers remain more stable well into the century. There were two reasons for this stability. First, the northern mixed grasslands provided ample forage through much of the year to sustain bison numbers. Secondly, intense intertribal conflict made the area a fairly dangerous place where hunters went at considerable risk. Contested hunting grounds had acted de facto

game preserves in other place and the Little Bighorn in the years before 1876 sat squarely in the middle of such a contested ground.

B. THE GREAT SIOUX WAR AND THE BATTLE OF THE LITTLE BIGHORN.

The "Great Sioux War" of 1876-1877 and its most famous event, the Battle of the Little Bighorn, were part of a larger and much longer struggle to control between Native peoples and the United States for control of the Northern Plains. As one of the great refuges for substantial bison herds, the "Powder River country," including the Little Bighorn valley, became a flashpoint for this struggle. Emigrant traffic along the overland trail put pressure on Native resources while the advent of several gold rushes to the Rocky Mountains in the late 1850's and early 1860s focused the conflict on several crucial resource areas. The success of Lakota and Cheyenne warriors during Red Cloud's War of 1866 led to the closure of the Bozeman Trail along with three army forts and was a factor in bringing the Indian Peace Commission to Fort Laramie in 1867 and 1868. The treaty negotiated there with the Lakota bands set aside most of the Powder River Country as an "unceded" hunting ground. This area did not include the Little Bighorn Valley, which was part of the Crow Reservation. The Fort Laramie Treaties did not hold back the relentless expansion of Euro-Americans onto the Plains. Between 1868 and 1876 the United States sought to force Native peoples to stay permanently on their respective reservations. Some Lakota and Cheyenne bands rejected reservation life and sought to continue their traditional lifeways in the unceded country and surrounding areas. The extension of the Northern Pacific Railroad into the Yellowstone Valley sparked conflict in 1873 while the discovery of gold in the Black Hills the following year set off an illegal invasion of the area by white miners and sent many

angry Lakotas and Cheyennes into the camps of the off-reservation bands. With the failure of attempts to gain a cession of the Black Hills, the Grant Administration determined that going to war with the off-reservation bands would create the necessary climate to take the hills. Thus at the end of 1875 all off-reservation Lakotas and Cheyennes were declared hostile and plan set in motion for a three pronged military invasion of the Powder River Country.

The valleys of the Powder, Tongue, Rosebud, and Little Bighorn sheltered substantial bison herds, and it was there that the Army knew it could find the bands declared "hostile" As numerous Native accounts attest the Little Bighorn Valley was a frequent summer hunting ground and generally marked the farthest west villages of Lakotas and Cheyennes would venture. (Smaller war parties would cross the Bighorn River to raid deeper into Crow territory.) In 1876, it was not bison but reports of large herds of pronghorn antelope that took the people into the Little Bighorn Valley.

In environmental terms, Plains Indian villages drew energy directly from the living things around them. Bison and other animals provided meat, manufacturing materials, and hides for the trade, while finding forage for pony herds kept people moving on a daily basis. Large villages of Plains peoples formed regularly during the summer hunts, but the massive size of the combined Lakota – Cheyenne village in 1876 was unheard of. As the army launched preliminary actions against the Indians early in 1876, the village's size ballooned as smaller camps seeking safety in numbers and individuals and families slipping away from the agencies all joined the massive gathering led by Sitting Bull. By the time the village reached the Little Bighorn it sheltered perhaps 8,000 people along with 20,000

horses. A village that size could not stay in any one camp for long, and indeed was by ecological necessity a short-term possibility.

The three Army columns that took to the field in 1876 had a much different ecological relationship to the land. Unlike a Native village that relied on local resources, streams of commodities and energy that flowed from the farms, factories, and cities of an industrial nation sustained the U. S. Army soldier. This support even extended to the army's mounts. Army horses were larger and faster than Native ponies, but could not survive on grass alone. Feed oats had to be transported with the columns. Long supply lines could be ponderous, and often made for slow and frustrating campaigns. But while Indian warriors could win victories, a they di at the Rosebud an Little Bighorn, the army's ability to tap into the resources of the nation allowed it to overwhelm its Native adversaries.

Both Native and army accounts of the Little Bighorn Valley before the battle suggest a landscape rich in wildlife as well as an intact native grassland. During a scouting mission in April of 1876, for example, one army contingent found bison, deer, elk, and antelope in great numbers. The richness of grasslands was also apparent, although the quality of forage improved the farther up the valley one travelled. The Spring and early Summer of 1876 were cold and wet. This weather pattern undoubtedly contributed the lush quality of the grasses. The same weather, however, slowed the advance of the Army columns.

By June of 1876, the combined village of Lakotas and Cheyennes was making its way up Rosebud Creek while the Montana and Dakota columns linked up on the Yellowstone River. Custer's Seventh Cavalry followed the obvious trail of the massive village up the Rosebud valley unaware that Lakota and Cheyenne warriors had repulsed the advance of Gen. George Crook's Wyoming column at the Battle of the Rosebud. Early on June 25th,

1876, fearing that his approach had been discovered, Custer ordered an immediate attack on the village that still lay some fifteen miles distant. By the time the actual attack commenced around 3:00 in the afternoon the temperature had risen to above 90˚.

The topography and ecology of the Little Bighorn Valley and uplands played an important role in the course of the battle. During the opening engagement, Maj. Marcus Reno's attack on the southern end of the village, the Little Bighorn River and its terraced and eroded banks shaped the combat. In particular, ravines just south of the village provided cover for warriors and a means to flank the troops. After the collapse of Reno's initial skirmish line the troops fell back to the heavy timber along the river. There, they found temporary refuge. After they abandoned the timber, however, the troopers found no refuge in the river. Its steep banks and variable depth posed a dangerous obstacle during the retreat. Most made it across the river and dug in on the bluffs above. Many others lay dead in the valley or had been abandoned to hide in the dense vegetation along the river.

Native accounts also confirm that the steeply sloping, open grasslands of the upland reaches of the battlefield also influenced combat. The broken terrain allowed warriors to move close to the soldiers under relative cover, yet the lack of large vegetation made standing to fire a weapon dangerous. Instead, many warriors fired un-aimed arrows in an arc to rain down upon the cavalrymen. When all of the troops under Custer's immediate command were dead, the warriors turned their attention to the survivors of Reno's battalion, now reinforced by Frederick Benteen's men some four miles to the south. The battle now became a siege that stretched through the following day. Grasslands interspersed with Big Sagebrush offered precious little cover for the soldiers who dug in as best they could and used dead horses and mules as breastworks. The scorching heat and

lack of rain made for thirst and desperation. The approach of the Terry-Gibbon column on the 27th lifted the siege, and the great village moved off to the south. The movement was already an environmental necessity as the forage and resources in the area of the battlefield had been exhausted. In the aftermath of the fight the army set about burying the dead and documenting what had happened. These accounts provide another window on the nature of the landscape and ecology of the Little Bighorn Valley and generally confirm earlier assessments.

C. THE WAR DEPARTMENT ERA.

Within a year of the battle, the Army began to informally manage the battlefield as a cemetery, a function that was formalized within a few years. Until the appointment of a cemetery superintendent in 1893, small detachments of soldiers from nearby Fort Custer policed the battlefield and reburied exposed remains. On August 1, 1879, Custer Battlefield National Cemetery was officially established, although the boundaries of the cemetery would not be defined until 1886. Opposition from the Crow Nation and the Bureau of Indian Affairs prevented the withdrawal of all battlefield lands for the cemetery. Instead, one section of land, 640 acres encompassing the Last Stand Hill and Battle Ridge, was withdrawn. In 1930, a second small parcel of 160 acres surrounding the Reno-Benteen defense site was also taken from the Crows. Thus, the Custer Battlefield National Cemetery would consist of two small islands of federal management within the Crow Reservation.

War Department management was focused on the cemetery, not on managing environmental conditions on the larger battlefield. In 1881 the granite obelisk memorializing the dead of the Seventh Cavalry was placed atop Last Stand Hill with the

remains of many of the troopers reinterred in a mass grave beneath. In 1888 active burials began at the cemetery, first with a series of reburials from closed post cemeteries from the across the region and later with new burials. The first reburial took place on Last Stand hill just south of the Seventh Cavalry memorial. In 1890, the iconic white granite markers for the troops who died during the battle were placed across the battlefield. These actions impacted the landscape of the battlefield, most notably on the summit of Last Stand Hill, which was widened and flattened.

Undoubtedly the most consequential management decision made during this period for the area's future environmental history was the fencing of the battlefield in 1891. The army's concern was not with the ecological effects of grazing, but rather with the potential damage loose stock might do to the monuments scattered across the landscape. Still, fencing had important, if unintended, environmental consequences. The fence effectively prevented not just uncontrolled grazing, but all grazing. In 1876, no one controlled grazing in the area. The land was grazed intensively and intermittently as bison herds roamed across the landscape and Native peoples followed along with, oftentimes, large pony herds. Deer, elk, and antelope also freely grazed. Areas could be "overgrazed" in any given year, but as bison and other native ungulates followed the quality of forage it was unlikely they would feed in the exact same spots the following season. So while the fence served to preserve native grasses against invasive species, it also created a somewhat artificial grassland community that did not completely reflect pre-1876 conditions.

War Department management of the site became more regular after the appointment of the first superintendent in 1893. Slowly and steadily the army began to develop the cemetery. The boundaries of the current National Cemetery grounds, covered

just over six acres, were surveyed in 1893 and the superintendent's home was finished the following year. Creating the look of an Eastern cemetery, however, proved elusive. Building an adequate irrigation system proved to be the most persistent problem. Indeed, it was not until the 1930s that an adequate system was in place and substantial landscaping took place. The introduction of exotic species, such as tatarian honeysuckle, is one legacy of the cemetery's development. As more visitors came to the site, the army also moved toward interpreting the site during the latter years of its administration. The addition of the Reno-Benteen site to the cemetery reserve in 1930 and the construction of a graveled tour road connecting the two units of the park were the most important outcomes of the increased emphasis on interpretation.

The War Department's management decisions are only half of the environmental history of the battlefield during this era. The agricultural transformation of the lands surrounding the park was just as important. This process began shortly after the battle. Before the early 1880s, cattle ranching and agriculture had left no mark on the lands south of the Yellowstone River. With the end of the Indian Wars great changes came to these lands. In quick succession the last of the bison herds in the area were exterminated and Euro-American cattle interests flooded the range with hundreds of thousands of head of stock. In 1884, the Crow Agency was moved to the Little Bighorn Valley, bringing permanent settlement to the lands surrounding the battlefield. This was the era of assimilation and the Bureau of Indian Affairs encouraged and pushed the Crows to take up farming and ranching. The first irrigation works in the area began diverting water from the Little Bighorn River. The lands surrounding the cemetery, and including the majority of the historic battlefield were allotted to individual Crow families. Over time a substantial

amount of this allotted land was leased or sold to Euro-Americans for agricultural purposes. A second phase of the agricultural transformation of southeastern Montana began around 1909 with the Homesteading boom. Thousands of Euro-American families flocked to Montana, lured by the prospect of high crop prices and relatively bountiful rains. When the prices dropped and rains failed most abandoned their farms, leaving behind them a transformed landscape.

The agricultural transformation of Montana produced a wide range of long-lasting environmental consequences. The destruction of the bison herds and the rise of the cattle industry reshaped vegetative communities. Many other species experienced a decline in their habitat and some were even pushed toward extinction. The black-tailed prairie dog was targeted for extermination as an agricultural pest. The species survived, but its obligate predator, the black-footed ferret, became extinct in Montana. Farms and ranching also brought new plant species, some purposefully introduced, such as crested wheatgrass, and others that were opportunistic weeds.

D. THE NATIONAL PARK SERVICE ERA.

The transfer of Custer Battlefield National Cemetery to National Park Service administration in 1940, brought with it an expanded mandate to both preserve the park's resources and interpret its meaning for the visiting public. In a broad sense this meant greater attention to both natural and cultural resources as well as a greater attention to planning and the implementation of science in the decision making process. Still, there has always been a tension in park service management policies between preservation and access. For much of its history, the park service privileged the visitor experience rather

than resource preservation. The environmental history of the Little Bighorn battlefield was shaped by, and reflects this larger history of park service management priorities.

The park service era before the late-1960s was marked by a focus on interpreting the battle and providing for the visitor's experience. Consequently most of the visitor infrastructure at the park today dates from the first twenty-five years of NPS management. Some of the development that took place during this era, the 1952 visitor center being the primary example, intruded on the park's primary resource, and would today be deemed inappropriate. The height of the development era came between 1956 and 1966 in conjunction with the service wide Mission 66 initiative. Development, however, was not unrestrained. From the earliest years of park service administration there emerged a division in perception and management practices between the developed National Cemetery and the largely natural battlefield. As a result, the vast majority of visitor and administrative infrastructure of the park has remained confined to the lands around the National Cemetery and the Last Stand Hill/Visitor Center area. The battlefield, on the other hand, was largely left undeveloped and essentially unmanaged.

By the early 1970s the impact of the environmental movement and the growing importance of science in the decision-making process resulted in important shifts in park service management practices. Planning had always taken place but took on added emphasis. The period also saw increasing attempts to integrate the management of natural and cultural resources. This was particularly important at a "cultural" park like Little Bighorn, where the undeveloped battlefield was itself a prime historical/cultural resource. Park service staff also began to rethink past development decision at LIBI. Management plans produced in 1972 and 1986 recognized that most of the historic battlefield lay

outside the park boundaries, and proposed the addition of some 11,000 acres of land to the park as well as the relocation of the visitor infrastructure away from the prime historical resources of the battlefield.

Since the 1980s, understanding the ecology of the park has taken on greater importance at LIBI. A wildfire that swept the Custer battlefield section of the monument in August of 1983 not only led to a number of archaeological surveys of the battlefield, but to a greater understanding of the natural world at the park as well. Studies of the fires effects on plant and bird communities were conducted that provided essential data for park managers. Big sagebrush exhibited the most drastic response to the fire, with virtual 100% mortality in the burned areas. There has been essentially no re-growth of the shrub since the fire. In effect, the fire transformed the monument into a pure grassland and pushed back the shrub-steppe ecosystem which had been asserted itself at least since the time of the battle.

With the greater incorporation of science in decision-making also came more active management programs. In the first decades of park service administration little was done to actively manage the undeveloped battlefield. There was a sense that fencing alone served to preserve the resource in its historic condition. By the 1990s, however, programs began to manage native and invasive plant communities in order to maintain the "historic" character of the landscape and to provide habitat for a range of birds and small wildlife. By the mod-2000's the park also undertook project aimed at restoring parts of the developed sections of the park back to a more natural setting.

II. The Little Bighorn Battlefield Then and Now.

A. TOPOGRAPHY AND LANDFORMS

The most profound changes to the landforms and topography of the battlefield haven taken place in the valley. Many of the changes were the result of human actions. In 1876, the valley floor was a terraced riparian bottom. Substantial belts of cottonwood and willow along with an understory of shrubs marked the course of the river. Away from the river there was a mixture of native grasses, forbs, and sagebrush, along with yucca, and cactus. Beginning within a decade after the battle, valley lands were allotted to Crow families and irrigated agriculture began. Native grasses gave way to hay crops such as bluejoint, timothy, and alfalfa. Into this agricultural landscape came the Burlington-Quincy Railway in 1894. The railroad, and later the highway that is today Interstate 90, pass directly over the site of Maj. Reno's original skirmish line near modern Garryowen, Montana. Not all of the changes in the valley, however, were human caused. The natural process of erosion and deposition that characterizes meandering streams such as the Little Bighorn has continued to reshape the meander belt on the valley floor. According to Walter Camp, this process wiped away the ravine that warriors used to advance on Reno's troops. In 1923, a channel was blasted to prevent one meander from undercutting the railroad right of way. Today, natural channel migration threatens to cut-off one of the park's three oxbow bends.

Changes to the landforms of the upland portions of the battlefield have been less widespread but have had substantial impacts on the historic landscape. These changes have been for the most part related to the development of the cemetery and the visitor infrastructure. Beginning as early as the placement of the Seventh Cavalry memorial in

1881, the top of Last Stand Hill and Battle Ridge was widened and flattened. The army built an open reservoir just east of the monument in the 1930s. The park service replaced this intrusive tank with a larger, underground reservoir as part of Mission 66 improvements, but also chose to bury it just feet from the monument on Last Stand Hill. The construction of the visitor center in such close proximity to Last Stand Hill is perhaps the most obvious example of intrusive development in the park. Since the 1970s, park master plans have made the relocation of the visitor center a priority. The construction of the tour road brought changes to the topography of the historic battlefield along its entire length. Widening, regarding, and placement of culverts took place. The most notable change was the road-cut made through Weir Point.

B. THE LITTLE BIGHORN RIVER.

In 1876, the Little Bighorn River played a central role in the opening engagement of the battle. Both upstream and downstream of the park, the river has been subject to substantial human alteration. The first irrigation canal, the Reno Ditch, was actually built in the midst of the historic battlefield, near Garryowen in 1885. Later, canals were built upstream and downstream of the battlefield. By the 1950's moreover, channel modifications and the clearing of streamside vegetation had impacted over one-half of the main stem's length. Near, the monument, however, the river continues to function largely i natural ways. With the notable exception of the channel cut to save the railroad in 1923 to save the railroad, the river's channel has continued to migrate via natural processes. This has led to alterations in the historic battlefield including the erosion of the ravine

mentioned above and a change in the river's course that has left Reno's original ford high and dry.

C. GRASSLAND AND RIPARIAN VEGETATION.

The grasslands within the monument have remained substantially intact since the time of the battle. The dominant native grasses at the park are bluebunch wheatgrass, thickspike wheatgrass, and alkali bluegrass (*Poa juncifolia*). Bluebunch wheatgrass, alone accounts for over 30% of the total vegetation in the park. Native forbs are also well represented. Invasive species, however, have made their way into the grasslands. Some species, such as crested wheatgrass, are concentrated in a few areas, while others are scattered across the battlefield. Cheatgrass (*Bromus tectorum*), Japanese or field brome (*Bromus japonicus* or *B. arvensis*), and bulbous bluegrass (*Poa bulbosa*) are also invasives of particular note. A variety are also present today and have been the subject of control programs. Some of the most common are yellow sweetclover (*Melilotus officinalis*), field bindweed (*Convolvulus arvensis*), St. Johnswort (*Hypericum perforatum*), Dalmatian toadflax (*Linaria dalmatica*), and dandelion (*Taraxicum officinale*). The prohibition on foot and vehicle travel away from roads and trails has been an important factor in controlling the spread of invasive species.

The most visible change in the upland vegetation since the time of the battle has been the elimination of big sagebrush across much of the historic battlefield. This was a fairly recent development dating to the fire of August 1983 on the Custer Battlefield section of the monument and the fire of August 1991 on the Reno-Benteen unit. The death of the

big sagebrush and the resurgence of native grasses in burn areas have illustrated the importance of fire regimes in shaping the grassland and shrub-steppe ecosystems.

The riparian areas of the park have also seen perhaps greater changes. The large cottonwoods that marked the river's course on the day of the battle are still present, but the native willows that were so important for native lifeways have been greatly reduced. Three introduced species, the Russian olive, tamarisk, and tatarian honeysuckle have been identified as the subjects of control efforts.

D. WILDLIFE.

Historical accounts of the Little Bighorn Valley in 1876 present the picture of a land rich in wildlife. In addition to bison, four other grazing species were present in the Little Bighorn valley in 1876: pronghorn (*Antilocapra Americana*), mule deer (*Odocoileus hemionus*), whitetail deer (*Odocoileus virginianus*), and elk (*Cervus canadensis*). The loss of the large grazing mammals to one extent or another is perhaps the most notable change in the area's wildlife since 1876. Bison were wiped out in eastern Montana by the early 1880s. Elk have been absent from the monument since the late nineteenth century as well. While the other species remain in the vicinity of the park, they are relatively rare visitors within the monument boundaries. Grazing was an essential factor in determining the composition of the mixed grass prairie and perhaps the advance or retreat of the big sagebrush. Agricultural development, fences, and a patchwork of land ownership and jurisdictions pose enormous obstacles for restoring the historic grazing patterns of the large ungulates.

It is likely that the birds, small mammals, and range of small vertebrates and invertebrates that live at the park today were present at the time of the battle.

Unfortunately, historical sources rarely mention of small wildlife. Since the beginning of NPS administration a wide variety of bird species indigenous to the Northern Plains have noted in the park, including eagles, sharp-tailed grouse, kill deer, robins, western kingbirds, magpies, crows, lark buntings, and lark sparrows. In all some sixty bird species were spotted in a 2006 survey. Small mammals include cottontail rabbits, bobcats, beaver, skunks, porcupines, raccoons, badgers, red fox, gophers, ground squirrels, chipmunks, mice, voles, woodrats, and a half-dozen species of bats. Rattlesnakes and bull snakes are very common. A number of other reptile and amphibian species inhabit the uplands and riparian areas.

At the time of the battle at least one prairie dog colony was reported at the site of Reno's initial skirmish line. Today a small colony exists just north of the monument boundary and several others are located within five miles of the park. It seems likely, given the widespread nature of prairie dog colonies the nineteenth century, that a population of black-footed ferrets also lived in relation to the historic prairie dog colony. The ferrets are today one of the most endangered mammals in North America and exist only in areas where captive bred animals have been released among substantial prairie dog populations.

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