

University of Nevada, Reno

Outback Nevada: Public Domain and Environmental Challenge

A Dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy in History

by

Ryan R. Powell

William D. Rowley, Dissertation Advisor

C. Elizabeth Raymond, Co-Chair

December 2017

© by Ryan R. Powell 2017
All Rights Reserved



THE GRADUATE SCHOOL

We recommend that the dissertation
prepared under our supervision by

RYAN R. POWELL

Entitled

Outback Nevada: Public Domain and Environmental Challenge

be accepted in partial fulfillment of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

William D. Rowley, Ph.D., Advisor

C.Elizabeth Raymond, Ph.D. co-chair, Committee Member

Paul Starrs, Ph.D., Committee Member

Sterling Evans, Ph.D., Committee Member

Michael Branch, Ph.D., Graduate School Representative

David W. Zeh, Ph. D., Dean, Graduate School

December, 2017

Abstract

With the arrival of Euro-Americans to Nevada, settlers and travelers experienced struggles and opportunities on marginal lands. These lands did not fit well with Euro-American ideas of progress and resource-use throughout the second part of the nineteenth century. After 1848, many marginal lands became part of America's public domain with little promise for permanent settlements. Because of increased competition on limited rangelands, federal land managers working for the United States Forest Service (USFS) came to Nevada after 1905 and secured the water resources in the highest mountains to promote favorable conditions of water flows for preferred local settlers. These settlers were the cattle ranchers with permanent home ranches that depended on water from the high mountains for summer grazing and haymaking. In the early twentieth century, beginning with the creation of the USFS in 1905 and ending with the Taylor Grazing Act in 1934, federal land managers were critical to maintaining successful settlements on a challenging environment in outback Nevada.

Acknowledgements

I have had the pleasure of working with committee members, C. Elizabeth Raymond, Paul Starrs, Sterling Evans, and Michael Branch. Committee Chair, William D. Rowley, requires an additional acknowledgment for his unwavering support including, but not limited to, criticisms, revisions, and research.

Several archives aided this project with materials and research including the National Archives and Records Administration II (NARA) in College Park, Maryland, the NARA regional branch in San Bernardino, CA, and Special Collections and the University of Nevada, Reno. Connected to this research, a special thanks goes out to Douglas Helms (National Resources and Conservation Service historian) for his assistance when researching at NARA II.

I also take this opportunity to thank my family and colleagues.

Table of Contents

Introduction.....	1
Chapter 1 – Through the Heart of an Outback.....	26
Chapter 2 – A Nevada Anomaly.....	74
Chapter 3 – National Forests and Mountain Grazing, 1897-1925.....	107
Chapter 4 – Nevada National Forests at Close Range.....	157
Chapter 5 – See Nevada First on Roads to a National Monument.....	209
Chapter 6 – Monitoring Mountain Snow.....	254
Summation.....	284
Images.....	293
Bibliography.....	298

List of Images

Image One: Basecamp to Nevada's Outback.....	4
Image Two: Ivar Tidestrom's Use of Merriam's Classification Scheme of Nevada.....	151
Image Three: Ivar Tidestrom's Profile of the 39 th Parallel.....	153
Image Four: National Forest Map of Nevada, 1914.....	293
Image Five: Las Angeles Evening Herald Caricature of Forest Management, 1925.....	295
Image Six: Santa Rose Range Floods at Rebel Creek Ranger Station, 1918.....	296
Image Seven: Santa Rosa Range Quadrat, 1918.....	297
Image Eight: Arthur Sampson's Instructions for Reseeding.....	298

Introduction

In the late 1870s, the naturalist John Muir traveled across Nevada from Lake Tahoe to the Snake Range. Muir followed the 39th parallel from west to east crossing forested mountain chains between the Sierra Nevada and the Nevada-Utah border. He named the central transect “Nevada’s timber belt.” While passing along this irregular belt of timber, Muir described high mountain forests where Euro-American attempts to develop resources produced mining landscapes with barely “ten year old traditions” of boom and bust cycles leaving “dead mining towns” scattered about “like the bones of cattle that have died of thirst.” These failed towns, according to Muir, “do not represent any good accomplishment. They are monuments of fraud and ignorance—sins against science.”¹

The colonizers struggling to remain along the timber belt, Muir stereotypically noted, were a “few plodding Dutchmen” who utilized all the available water for hayfields and stock watering. These Euro-American settlers doggedly placed themselves onto a precarious landscape of limited accessibility and natural resources—as the ruined mining towns testified. While the environment provided the native peoples with a, “pine-nut crop..., perhaps, greater than the entire wheat crop of California,” Muir noted the food source proved of little interest to the new colonizers. According to Muir, nature in Nevada did not serve the wasteful wants of Euro-American settlement.²

Where Muir saw the failure of Euro-American settlers, others found opportunity. Beginning in the 1850s, Euro-Americans settled in Nevada. Mining towns and Mormon

¹ John Muir, *Steep Trails*, edited by William Frederic Bade (Boston and New York: Houghton and Mifflin Company, 1918), 169, 174-75, 203.

² Muir, 157-58.

communities provided initial economic and religious motives to expand settlers throughout portions of Utah Territory and, after 1861, Nevada Territory. Nevada's physical geography, composed of narrow mountain chains and expansive basins in an arid and semi-arid high desert, proved a challenging environment for settlers to impose Euro-American forms of land uses. After 1905, the United States Forest Service established rules and regulations on the mountains where livestock grazing dominated during the summer months. The transition from unregulated resource use of the nineteenth-century open range to the arrival of the Forest Service marked the beginning of a conservation movement in Nevada's mountainous outback. Forest Service personnel worked with local stock operators to order the range use in the high mountains based on limiting stock numbers according to scientific principles for sustainable and efficient-use of forests, forage, and water.

Nevada's Great Basin environment offered marginal lands that challenged Euro-American settlement. Through the second half of the nineteenth century, Euro-Americans largely deplored Nevada's landscape seeing little promise in a cold desert. Travelers perceived a geographic purgatory in an uncertain land between California's Sierra and Utah's Wasatch Mountains with expansive basins along limited and brackish water sources where alkali soils stunted forage growth. Most migrants and settlers, as a necessity, traveled or settled near the basin floors between ranges where water flowing from the mountains made for some opportunity in the high desert. Throughout much of the state, Nevada's north-south trending mountain spines obstructed overland travelers, surveyors, and settlers but an east-to-west route along the Humboldt River north of the timber belt and another to the south where the Virgin River flowed into the Colorado

River were free of mountainous obstructions. Over time, Euro-American settlers sparsely colonized the central portion of Nevada where mountain environments on north-south ranges nurtured a scattering of forests and forage and stored significant reserves of water in the form of snowpack.³

Nevada's marginal lands in a Great Basin between the Eden of California and the land of Zion in Utah has a monotonous appearance for the inexperienced interloper. Late twentieth century naturalist writer Stephen Trimble describes the Great Basin's physical landscape in northern Nevada as a "sagebrush ocean." Trimble points to a turbulent ocean where sagebrush mingles with many species of flora often interrupted across basin floors and alpine peaks.⁴ In 1859, Henry Engelmann suggested that the Great Basin suffered from a "confused hypsometry." According to Engelmann, geologist for Captain James Hervey Simpson's 1859 survey, the region was not a physical basin because it contained "gigantic mountains" at its center. Although hydrologically sound, the description of a place with internal drainage was counterintuitive to the elevated mountains in the Basin's

³ Purgatory, wasteland, desolate, etc. describe the experiences of travelers in the Silver State. Negative experiences—in a land between—set the stage for Nevada as geographic purgatory. This condemnation of the Nevada environment has been a perception difficult to challenge, especially in a state that has been historically more of a thoroughfare than a destination. In other words, a place between. Richard G. Lillard, *Desert Challenge: An Interpretation of Nevada* (New York: Alfred K. Knopf, 1949), 36; Rob Schultheis, *The Hidden West: Journeys in the American Outback* (New York: Random House, 1982), 138; C. Elizabeth Raymond, "When the Desert Won't Bloom: Environmental Limitation in the Great Basin," David M. Wrobel and Michael C. Steiner, editors, *Many Wests: Place, Culture, and Regional Identity* (Lawrence: University Press Kansas, 1997), 75.

⁴ Steven Trimble, *Sagebrush Ocean: A Natural History of the Great Basin*, Tenth Anniversary Edition, (Reno: University of Nevada Press, 1999), 8, 13-16. Trimble focuses his book on a biologically defined Great Basin and the extensive bio-diversity of the high desert. Trimble describes the "void" between the Wasatch and the Sierra where a biologically diverse and misunderstood place remains. If one explored the region they would come to know "a closed inland sea of desert with archipelagoes of mountains in the middle of the ecological mosaic of North America." He divided the Great Basin into four distinct categories: Hydrologic, Physiographic, Historic, and Bio-geographic. Through a historic lens, all three physical definitions are present in this study.

central portion.⁵



Image 1: Storage Tank in Battle Mountain, Nevada. (Photograph by Samantha Szesciorka, 2016)

At the heart of this region of internal drainage is a mountainous shelf in central and eastern Nevada, comprising much of the mountainous Nevada “outback” environment. Contemporary signage in north-central Nevada sometimes identifies the far-flung distances of the state as an “outback.” The *Oxford English Dictionary* notes that the term “outback” is of Australian origin but also transfers to other regions and countries “with an allusion to the Australian interior.”⁶ The outback of Nevada’s mountainous region is part of the Great Basin portions of central and eastern Nevada where the elevated mountain archipelagos and isolated inland playas arc through the timber belt.

⁵ Henry Engelmann, "Report on the Geology of the Country between Fort Leavenworth, Kansas, and the Sierra Nevada, Near Carson Valley," Captain James H. Simpson's, *Report of Explorations Across the Great Basin of the Territory of Utah for a Direct Wagon-Route from Camp Floyd to Genoa, in Carson Valley, in 1859* (Reno: University of Nevada Press, 1983), 301. First published by the Government Printing Office, 1876. Samuel G. Houghton, *A Trace of Desert Waters: The Great Basin Story* (Salt Lake City: Howe Brothers, 1986), 195.

⁶ *Oxford English Dictionary*, prepared by J. A. Simpson and E. S. C. Weiner, 2nd edition, Vol. X (Oxford: Clarendon Press, 1989), p. 1005. The *Oxford English Dictionary* notes that the term outback is of Australian origin but also transfers to other regions and countries, “with allusion to the Australian interior.” The allusion to an outback in Nevada resurfaces through histories and literature in the state. Battle Mountain continues to boast itself as a town along the Humboldt River where the first transcontinental railroad and now I-80 offer a “basecamp to Nevada’s outback.”

This elevated region extends from Nevada's southerly Mount Charleston to the state's northeastern side of the Ruby Mountains along the Utah border and north to the edges of the Snake River drainage.⁷

The Australian historical geographer R. L. Heathcote describes Australia's remote backcountry as a place where, "The grim monotony, the solitude and the insignificance of man in the vast sweep of plains was replaced by an awareness of contrasts, of the power and strength of man 'outback'." Nevada's mountainous cold desert presented similar struggles where settlers faced "the paradoxes of their environment."⁸ According to Richard Lillard in his 1942 classic analysis of Nevada, *Desert Challenge*, the monotonous solitude in the Great Basin's void dislocated Euro-Americans from familiar environments and presented them with challenging basins in a cold desert where opportunity persisted amidst the rugged high mountain terrains.⁹ To describe the high, cold, and arid desert, Euro-Americans used a language fashioned in England and the American East but often failed to articulate the diversity of the mountainous Great Basin desert before them.

The word *basin* confuses the understanding of a place where the center is higher than much of its outer rims. With an elevation of 13,063 feet, the dominant mountain at the center of the Great Basin, Wheeler Peak, rises prominently in eastern Nevada above the basin floors. There are hundreds of prominent mountains in Nevada. Alvin McLane identifies three hundred and fourteen mountain ranges that appear on maps as a "sea gone

⁷ Houghton, *A Trace of Desert Waters*, 183-199.

⁸ R. L. Heathcote, *Back of Bourke: A Study of Land Appraisal and Settlement in Semi-Arid Australia* (Victoria: Melbourne University Press, 1965), 17.

⁹ Richard Lillard, *Desert Challenge: An Interpretation of Nevada* (New York: Alfred K. Knopf, 1942), 13.

mad.”¹⁰ This turbulent topography has a history constructed by imposed forms of Euro-American knowledge, economics, and politics. Over time, settlers colonized the region and integrated the desolate outback hinterland into Euro-American visions for a useful nature.

Between 1848 (Treaty of Guadalupe Hidalgo) and 1934 (Taylor Grazing Act), settlers, surveyors, federal land managers, and scientists imposed Euro-American constructs of knowledge and resource utilization to define these basin and range landscapes. Curiously, water and forests provided the entrée for federal land management into Nevada’s scantily settled high desert region. Between 1905 and 1912, federal land management arrived in Nevada during the Progressive Era as part of a scientific Conservation Movement to curtail unsustainable land, forest, and water use practices of the late nineteenth century.¹¹ Nevada’s high mountain ranges suddenly became national forests where new boundaries circumscribed summer grazing uses. Here was a marginal land that did not fit Euro-American standards of a useful nature. Regardless, forests, water, and meadows were resources of value in the mountains that invited conservation and the Progressive Conservation Movement to Nevada’s outback.

Newly arrived U.S. Forest Service land managers throughout the West had to contend with varied environments, communities, and settlers. Nevada’s environment and its historical uses presented particular problems for the Progressive Conservation Movement agenda as it sought to integrate local economies into sustainable and efficient uses of resources, especially in water and range. The use and management of forest

¹⁰ Alvin McLane, *Silent Cordilleras*, Camp Nevada Monograph No. 4 (Reno: Camp Nevada, 1978), 11.

¹¹ Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Pittsburgh: University of Pittsburgh Press, 1999), 2.

forage for livestock operators throughout the various locales of the West became a major preoccupation of the first land management efforts launched by the U.S. Forest Service. Aspects of this study builds on previous work that describes the Forest Service's program to bring ordered grazing management to the National Forests, notably that of Paul H. Roberts and William D. Rowley.¹² Also, Charles Peterson's *Look to the Mountains* (1975) provides a study of the La Sal National Forest in Utah emphasizing that these federal efforts were not a hegemonic ordering of western public lands. Peterson details the interplay between local conditions and an imposed federal agenda on southeastern Utah's La Sal National Forest. Peterson shows that the ordering of land use by the Forest Service occurred with plasticity and imperfection. The rangers and forest supervisors working on the forest attempted to tailor an appropriate fit for the interests of established populations who over-exploited resources decades prior to the arrival of federal land managers.¹³ This study follows a similar rationale in an effort to illuminate the efforts of forest rangers and supervisors as they negotiated with the local ranching populations in a challenging environment.

The entrance of federal land management in the West was not simply a matter of establishing regulations. Whether or not the prior prevalence of open-range grazing on western lands was a success or failure depends on who answers the question.

¹² Paul H. Roberts, *Hoof Prints on the Forest Ranges: The Early Years of National Forest Range Administration* (San Antonio, Texas: The Naylor Company, 1963), 1-5. Roberts began a conversation about the history of federally managed grazing on western ranges, which brought order and control to western rangelands. William D. Rowley, *U.S. Forest Service Grazing and Rangelands: A History* (College Station: Texas A&M University Press, 1985), 21. Rowley takes up the conversation started by Roberts and develops the themes of management and science on the national forests' western ranges. Also see, Mathew Pearce, *Discontent on the Range: Uncovering the Origins of Public Lands Grazing Politics in the Intermountain West*, Ph.D. Dissertation (Norman: University of Oklahoma, 2014).

¹³ Charles S. Peterson, *Look to the Mountains: Southeastern Utah and the La Sal National Forest* (Provo, Utah: Brigham Young University Press, 1975), 1-2.

Conservationists of the early twentieth century made the case that the use of renewable resources on common public domain lands required rules and regulations to provide the greatest good, for the greatest number, over the longest period. It was a sustainable-use argument typical of the scientific utilitarian Conservation Movement. Later in the twentieth century as the Environmental Movement succeeded the Conservation Movement, many environmentalists concluded that even regulated ranching on public lands continued the “tragedy of the commons” and devastated the ranges calling for the removal, especially cattle, from federally managed lands.¹⁴ Ranchers in turn argued that they were stewards of the land and had the practical experience to maintain their traditional land uses that worked in accord with sound ecological principles. The opposing arguments often pointed to the other’s ignorance of the problem. Perhaps the notion of success or failure concerned with land use is not the right question. Nancy Langston argues in her study of forest management on the Blue Mountains in Oregon, “Across the inland West, the troubled history of land management has its roots not in ignorance but in American visions of the proper relationship to nature.”¹⁵ The foundations for a “proper” relationship with nature, based on settler attempts to colonize the high mountainous cold desert of Nevada, formed during the early twentieth century when unregulated resource-use gave way to a new Conservation Movement. The conservation agenda sought to sculpt nature in the interests of sustainable human uses,

¹⁴ Garrett Hardin, “The Tragedy of the Commons,” *Science*, 392, 3869 (December 1968): 1243-1248; George Wuerthner and Mollie Matteson, *Welfare Ranching: The Subsidized Destruction of the American West* (Chicago: Island Press, 2002); Debra L. Donahue, *The Western Range Revisited: Removing Livestock from Public Lands to Conserve Native Biodiversity* (Norman: University of Oklahoma Press, 1999); Denzel and Nancy Ferguson, *Sacred Cows at the Public Trough* (Bend, Oregon: Maverick Publications, 1983).

¹⁵ Nancy Langston, *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995), 5.

which had to work within political and economic structures far removed from the high—cold and mountainous—desert of northern Nevada.

The Conservation Movement was a response to excessive resource-use and development. Historians of the American West, Gerald Nash among others, argue that settlement in the West developed within a colonial political structure based on the economics of resource extraction. In Nevada’s high desert, external demands brought a diverse network of small settlements designed to exploit natural resources that placed Euro-Americans in precarious and remote locations. Exploitive interests, or investment sources, in San Francisco, New York, and London financed mining settlements that experienced boom and bust cycles, but people who remained on the expansive landscape generally relied on livestock enterprises that in turn depended upon renewable forage resources. Competition for these limited resources in the environment of outback Nevada often brought chaotic and destructive graziers (livestock operators), setting up conditions for the much-vaunted “tragedy of the commons.”¹⁶

¹⁶ Gerald D. Nash, *The American West Transformed: The Impact of the Second World War* (Bloomington: Indiana University Press, 1988), 4-5. Histories of the American West often refer to this colonial condition especially in reference to Bernard de Voto’s, “The West: a Plundered Province” in which de Voto writes that the West was “born of industrialism” which meant a “financial organization” in service of somewhere else that “has not made the West wealthy.” *Harper’s Magazine*, 169 (August 1934): 358. Colonial Nevada is a recurrent theme in the state: past and present. From its inception as a Territory in 1861, many of Nevada’s resources have provided for absent owners of the mining and livestock industries. This colonial structure led to development problems in the state including an insufficient tax base and transient labor. Social progressives articulated these problems during the first two decades of the twentieth century. Romanzo Adams, *Taxation in Nevada: A History* (Carson City: State Printing Office, 1918), 18; Romanzo Adams, “Public Range Lands—A New Policy Needed” *American Journal of Sociology*, 22, 3 (November 1916): 324-351; Anne Martin, “Nevada: Beautiful Desert of Buried Hopes” *The Nation*, 115, 2977 (July 26, 1922): 91. The most recent scholarly textbook treatment of Nevada history asserts that, “a defining characteristic in its history has been colonialism—its dependence on or service to other places.” Michael S. Green, *Nevada: A History of the Silver State* (Reno: University of Nevada Press, 2015), 266; Nathan F. Sayre, *The Politics of Scale: A History of Rangeland Science* (Chicago: University of Chicago Press, 2017), 2-3. Also see Mathew Pearce, *Discontent on the Range*.

At the beginning of the twentieth century, federal land managers of the U.S. Forest Service began the process of demarcating boundaries for land use. The transition from a federal public domain (still available for disposal into private ownership) to federal land management (no longer available for disposal into private ownership) meant restrictions on land use, but promised increased productivity over time. Innovations of resource use included a positivistic approach inherent in the Conservation Movement that assumed humans could improve on nature while productively utilizing natural resources. The control of nature within this Movement emphasized efficient resource-use and an abhorrence of waste counteracted by the application of scientific principles to land management.¹⁷ Between 1897 and 1934, landscapes transformed throughout the West from places of unregulated resource extraction to engineered landscapes designed and managed for sustainable use. Design and management also extended to waterscapes with damming of rivers, production of hydroelectric power, and water diversions for irrigation and stock watering. The control of nature was part of an early twentieth century ethos in which human hubris distinguished the natural world as “other” for the benefit of civilization. The power to manipulate nature promoted the ordering and distribution of resources. Human control of nature, with a heavy dose of optimism, promised higher

¹⁷ The progressive minded middle class ethos was not limited to social improvements as explained thoroughly by Robert Wiebe, it was also an environmental movement based on Jeremy Bentham’s utilitarian concept of sustainable productivity for the greatest number of people. University educated technicians implemented this strategy of efficient management on public lands and reclamation projects during the Progressive Era. Both Wiebe and Hays develop their studies out of the rise of the bureaucratic state and focus their discussion on the national level. Hays, *Conservation and the Gospel of Efficiency*, 4; Robert Wiebe, *The Search for Order, 1877-1920* (New York: Hill and Wang, 1967), 165-66.

outputs and increased efficiency with better socio-economic distributions for all—except perhaps for native peoples.¹⁸

Settler societies in the Great Basin, or invading colonizers, developed as an extension of core economic centers and political ambitions in the West. They also developed in response to local environments. The political historian, Lorenzo Veracini referred to this kind of dual construction (periphery/core) as “settler colonialism.” According to Veracini, “A colony is both a political body that is dominated by an exogenous agency, and an exogenous entity that reproduces itself in a given environment.”¹⁹ In other words, the settler developed an identity both similar and distinct from the state of origin, or core. In a similar way, settlers in the Great Basin reproduced themselves as peripheral agents of dominant political and economic bodies—often assuming a modified identity that prompted oppositional forces to the core centers.

Settlers came to know the land and shape the landscape on which they lived. The New Zealand historian of imperialism and settlement societies James Belich referred to the development of oppositional forces in semi-independent societies as a “settler revolution.” Scholarship on colonialism and settler societies has tended to neglect the

¹⁸ An engineered landscape that came to fruition during the Progressive Era marked a break with the past. Unregulated resource-use no longer proved sustainable. This transformative time reflected a new perception of nature, sometimes referred to as positivism. Scholars have thoroughly described the initial conditions for the new positivistic perception in the American West at the turn to the twentieth century. Notable authors related to the present study include Linda Nash who argues that the sanitizing of nature in California’s Central Valley with flowing waterways and the use of pesticides materialized the idea that humans could control nature for their own benefit. Likewise, in the Great Basin, Nancy Langston, focused on draining swamplands in the Malheur Basin for the creation of croplands and open range grazing. In both studies, the scholars capably argue that nature operates as a part of civilization and efforts to control its direction and purpose brought unintended consequences back to the doorstep of civilization exposing a misplaced human hubris. Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Berkeley: University of California Press, 2006), 12-13; Nancy Langston, *Where Land and Water Meet: A Western Landscape Transformed* (Seattle: University of Washington Press, 2003), 69.

¹⁹ Lorenzo Veracini, *Settler Colonialism: A Theoretical Overview* (Houndmills, Basingstoke, and Hampshire, England: Palgrave Macmillan, 2010), 3.

agency of the settler within national politics and the ubiquitous global economy. According to Belich, settler societies “cloned” the core, but did so through boom and bust cycles that ultimately allowed for the development of stable societies as they reconditioned their economic base.²⁰ Settlers were not simply an extended arm of empire, but part of transforming the old into something new including environments, communities, and individuals. A settler revolution gives credence to authoritative networks dominated by economic and political cores. From another, more localized perspective, a history of settler colonialism delves into the settler experiences as independent agents constructing places outside a hierarchical relationship. Hence, according to Belich and Veracini, “settler revolution” also means a reconstruction of local identities and environments within the dominant institutions connecting hinterland colonizers with distant core economic frameworks.²¹

The Forest Service brought order to the mountains of the Nevada outback. During the early twentieth century, federal management on the mountainous portions of marginal lands in Nevada added an important caveat to settler societies and their desire for economic independence. Federal land managers became partners in sustaining an outback settler society by regulating and distributing scarce resources. In the words of William Cronon’s study of Chicago and the hinterland of the American West: “Frontier and metropolis turn out to be two sides of the same coin.”²² In the case of Nevada, successful

²⁰ James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783-1939* (Oxford: Oxford University Press, 2009), 165-69.

²¹ Belich, 4-7; Veracini, *Settler Colonialism*, 11.

²² William Cronon, *Nature’s Metropolis: Chicago and the Great West* (New York: W. W. Norton & Company, 1991), 51. New western history scholars, such as Cronon, Patricia Limerick, Richard White, and Donald Worster have shed light on the American West as place, thus turning Frederick Jackson Turner on his head. Turner advocated process as part of settlement west where the creation of American individualism and democracy formed in the great experiment into wild nature and frontier. Cronon argues that city and

stock raising operations not only depended on rail transportation to far away metropolitan markets to the West and East, but managers and technicians of the Forest Service who regulated resources in an effort to stabilize settler land-uses on outback Nevada's mountain rangelands.

Settlers became agents where they reproduced their own identities. Veracini's "settler colonialism" downplays the core and its dominant position in the hierarchical relationship with the periphery. Settler colonialism, applied to the Great Basin, describes a settler society both independent and connected to the core metropolises, not only by access to markets but also by the persistent hand of resource management emanating from the core in the form of federal land managers. Most apparent in Veracini's studies on settler colonialism is the importance placed on the balance, a dialectic over time, that transpired between the reproduction of settler and place with regard to exogenous influences both external and *in situ*. In the Great Basin, federal land managers assisted settler autonomy by attempting to stabilize the relationship between renewable resources, their use, and consumption during the height of the Progressive Conservation Movement (1905 thru 1908).

From 1905 to 1909, President Theodore Roosevelt used the power of proclamation to set aside most of Nevada's National Forests. In reality, there were few timber stands of commercial value, but Nevada forests served as important canopies to

country were inextricably linked through market demands thus challenging the idea that the frontier was an isolated experiment into nature (a most problematic term for Cronon). He used Johann Heinrich von Thünen's Isolated State Model to illustrate the connections between city, country, and wilderness. With increasing distance from the core metropolises came decreased cost of the land. The Nevada wilderness during the second half of the nineteenth century was never entirely isolated (whether Indian trade networks, fur trappers, surveyors, or others) and quickly transformed into an outer region of metropole influence where it has remained as a mining and livestock periphery. The Thünen model cited by Cronon in *Nature's Metropolis* is applicable to Nevada with stock interests expanding outwards into marginal lands (outer sphere of influence) where forage offers sustenance over large distances.

conserve snowpack and water supply. For example, the national forest reservations along the 39th parallel included the Toiyabe National Forest and the Nevada National Forest. While John Muir, naturalist and wild lands preservationist referred to these mountainous forests as “Nevada’s timber belt,” other so-called belts of timber included the Humboldt, Charleston and Vegas National Forests in the north and south of Nevada respectively.²³

Some of the most dramatic mountainous features of the Great Basin exist along the transect between Lake Tahoe and the Snake Range near the Utah Border on the 39th parallel in Nevada. Here are a series of mountain chains marked by forests and alpine environments. By some accounts, however, the transect is bare, dry, and empty. Chapter one of this dissertation, “A Mountainous Desert” begins with fur trappers, Mormon expeditions, and surveyors of the Cartographic Division of the U.S. Corps of Engineers. These curious interlopers investigated the mountainous transect through Nevada’s timber belt while most overlanders coursed along low elevation routes in the north and south on their way to California. Nevada’s timber belt was more mountainous with uncertain water sources. Basin crossings most often went along waterways and low elevation passes.

Travelers perceived a foreboding and desolate place. Travel in the basins exposed the sojourner to an expansive high desert of rabbit brush, greasewood, and salt brush casting the entire environment as arid and bare—even the high mountain ranges. The perception is not wrong, but nor is it entirely correct. In some aspects, the Great Basin is an arid and marginal land, but there are many exceptions in hidden mountain environments.²⁴ An effort to uncover the Great Basin’s physical characteristics prompted

²³ Muir, *Steep Trails*, 174

²⁴ James Young, rangeland scientist, quotes Alan Brunner who captures the experience of basin and range perceptions in relation to this study. Brunner explains: “From the top of any of the taller mountain ranges it

surveys and scientific attempts to understand the basin-range structure, isolated opportunities for settlement, and possible road systems able to connect mining and ranching along the central transect to markets and distribution centers.

The first major town came to Nevada's 39th parallel after 1859 at Virginia City known as the Comstock. Chapter two, "A Nevada Anomaly" considers Lake Tahoe's logging and milling as necessary for Nevada's Comstock mines. According to historian Eugene Moehring, the relationship between the Comstock and Lake Tahoe was part of a mid-to-late nineteenth century "complex urban network."²⁵ Industry developed intricate systems of access (transportation) in an effort to exploit natural resources, especially timber. The access routes also made possible an early tourist industry that developed alongside logging and lumbering around the lake. By the turn to the twentieth century, tourism supplanted logging and lumbering as the lake's economic mainstay on the western side of the timber belt. In 1899, President William McKinley proclaimed the Lake Tahoe Forest Reserve in an effort to conserve timber and water resources that contributed to the economic potential of Tahoe as a tourist destination consistent with the notions of an urban elite about a pristine and wild nature.

Beyond Tahoe anomaly, the rest of Nevada's environment posed different challenges. During the first decade of the twentieth century, colonizers along the rest of the 39th parallel in Nevada maintained and proliferated their livestock operations. In these rural and high mountain places of Nevada, a national conservation agenda worked itself out as mining operations formed company towns controlled by remote corporations that

is obvious the Great Basin is all mountains. From the playa in the center of any of the large basins it is obvious the Great Basin is all valleys." James A. Young and Charlie D. Clements, *Cheatgrass: Fire and Forage on the Range* (Reno: University of Nevada Press, 2009), 28.

²⁵ Eugene Moehring, "Comstock Urban Network," *Pacific Historical Review*, 66, 3 (August, 1997): 337.

raised capital on Wall Street.²⁶ As for the settlers on the remote basins of Nevada's outback, livestock operations continued to supply beef to the mines and export products out of the region. Chapters three through six detail the transition from unregulated resource extraction, primarily concerned with mountain summer grazing, to a federally ordered landscape with the implementation of forest use regulations that measured resources and land uses in Nevada's highest mountain ranges. While residents and investors at Lake Tahoe diversified out of an economic dependence on mining and timber toward establishing a tourist industry, the majority of the central transect stabilized its stock raising operations with a new federal land regime that secured the local grazing interests. As a part of stabilizing range livestock operations, the Forest Service imported concepts and methods from scientific studies about rangeland resources designed to sustain mountain rangeland grazing.²⁷

A mark of a settler society's success was its ability to survive and even thrive beyond the initial extractive mining booms. As an example, peripheral regions in the late nineteenth century often turned to agriculture, such as the wheat producing regions outside San Francisco in the United States and Victoria in Australia after their initial mining booms.²⁸ In outback Nevada, the aridity and alkali soils on the basin floors permitted only scattered crop agriculture, most often haymaking, on patented land around

²⁶ New copper mines and smelters attracted workers to settlements in McGill, Ruth, and Ely while the booms of older mining towns of Eureka and Austin struggled to maintain their economic base. Other centers of activity also found resources, especially cord wood from the timber belt and brought to Manhattan, Round Mountain, Tonopah, and Goldfield. Russell R. Elliott, *Nevada's Twentieth-Century Mining Boom: Tonopah, Goldfield, Ely* (Reno: University of Nevada Press, 1966).

²⁷ Rowley, *U.S. Forest Service Grazing and Rangelands*, 96-111.

²⁸ Belich, *Replenishing the Earth*, 317; Rodman W. Paul, "The Wheat Trade between California and the United Kingdom," *Mississippi Valley Historical Review*, 45 (December, 1958): 391-412.

the few water sources with the vast majority of the landscape dominated by open range grazing on the public domain.²⁹

In the second half of the nineteenth century, settlers quickly established home ranches near water sources. Only the home ranch was private property, but extensive use of the public domain ranges was necessary for the ranch to succeed. In addition to the home ranch, settlers with varied interests and backgrounds came to prospect, work in mining camps or for large cattle outfits, and as sheep herders owned by corporations outside the region. The distinction between community, ranch, and range is important to understand these different settlers. While a community could be composed of ranchers, miners, and farmers (and many other economic activities in the service sector), the ranch was often isolated and the range was a large public domain that served as a “gigantic grazing commons.”³⁰

Livestock grazed the range while home ranches or small mining and agricultural communities controlled the more productive water sources. In the Great Basin, the process of transforming the environment occurred when the imperial agents of livestock and invasive plants restructured the American West’s rangelands. The manipulation of flora and the presence of livestock created a new landscape, especially as settler control

²⁹ David Iglar, *Industrial Cowboys: Miller & Lux and the Transformation of the Far West, 1850-1920* (Berkeley: University of California Press, 2005), 7. Similar to William Cronon’s book *Nature’s Metropolis*, Iglar uses the von Thünen model to help explain the expansion of cattle ranching into Oregon’s Malheur segment of the Great Basin high desert, especially after fence-in laws passed in California (1871) to protect wheat fields from open range cattle operations inland from San Francisco. While the Swamp Lands Act assisted the alienation of federal lands in the Malheur Basin of Oregon, no such option existed in much of Nevada. John Sparks, for example, developed a ranching empire in Eastern Nevada by monopolizing the water sources and by extension open range operations during the nineteenth century. James Young, *Cattle in the Cold Desert* (Reno: University of Nevada Press, 2002), 102-104.

³⁰ William D. Rowley, “From Open Range to Closed Range on the Public Lands,” *Land in the American West: Private Claims and the Common Good*, William G. Robbins and James C. Foster, eds. (Seattle: University of Washington Press, 2000), 97.

and development of water sources facilitated the turning out of cattle, horses, and sheep onto an expansive commons.³¹

Ranching occurs on marginal lands and in the American West depends on expansive land bases. Geographer Paul Starrs makes the important observation, “Ranching everywhere depends on ‘marginal’ lands, often lands from which alternative forms of agriculture are barred by aridity, elevation, slope, isolation from markets, or government action that precludes other uses.”³² By 1900, Nevada’s fragile forage resources were an overgrazed commons over-utilized by local home ranches, livestock operators, and absentee owners of stock who typically unleashed vast herds of sheep in the Nevada basins and mountain ranges.³³

Government range regulations brought acceptably cheap range-use permits for ranchers in high mountain meadows guaranteeing leased access for preferred users to forage resources without any necessity to purchase the lands. James Young, a scholar of Great Basin rangeland science, points out that there “was often no legal way to acquire the acres of rangeland necessary to sustain livestock. Even if there had been, the ranch operations probably could not have survived the tax burden that ownership of such lands would have imposed.”³⁴ As federal efforts to alienate the public domain (sell it or give it away) by the late 1870s continued, Euro-American settlers controlled most water sources

³¹ Alfred Crosby, *The Columbian Exchange: Biological and Cultural Consequences of 1492* (Westport, Connecticut: Greenwood Press, 1972), 62-66; *Ecological Imperialism: The Biological Expansion of Europe* (Cambridge: Cambridge University Press, 2004), 153, 162; Tom Griffiths and Libby Robin, eds. *Ecology & Empire: Environmental History of Settler Societies* (Seattle: University of Washington Press, 1997), p. 1. Using Alfred Crosby’s concept of neo-Europes, *Ecology and Empire* reads as an Anglo-world sweep of environmental change as a product of colonialism. In Nevada: George E. Gruell, *Nevada’s Changing Wildlife Habitat: An Ecological History* (Reno: University of Nevada Press, 2012), 77.

³² Paul Starrs, *Let the Cowboy Ride: Cattle Ranching in the American West* (Baltimore: Johns Hopkins University Press, 1998), 11.

³³ Hardin, “The Tragedy of the Commons,” 1243-1248.

³⁴ Young and Sparks, *Cattle in the Cold Desert*, 100

on the habitable valley floors. The ownership of a water source allowed the home ranch to monopolize tens of thousands of acres on the public domain's open range where additional settlement proved problematic.

The paradox of a semi-arid desert with high mountain forage offered opportunity in a challenging environment. Given the difficulty of Euro-American settlement on marginal lands, neither private nor state ownership was preferable to federal management, which came in the form of low use-fees, a system of grazing regulations, and permits to those the Forest Service deemed qualified. Chapter three, "National Forests and Mountain Grazing," considers the creation of a federal management regime as an attempt to develop efficient and sustainable water sources and protect forage for the benefit and continuation of local ranch operations.

The regulation of land and people created both opportunities and problems. James Scott argues in his much-applauded 1997 work *Seeing Like a State* that, "a state's attempt to make a society legible" was a major step toward the imposition of order and governance upon people. The issuance of grazing permits, demarcation of grazing divisions, allotment controls of stock numbers, and the season of graze not only administered and ordered the activities of ranchers, but also quantified and measured their land-use. According to Scott, high modernist state formations tended to distort "local knowledge and know how." Scott sharpens the lines between government bureaucracies and local inhabitants to suggest that the practical application of an idealized system of governance falls short of its original intentions, especially when external forms of order do not integrate with local knowledge. Scott argues that the fundamental problem with settlement related to a misalignment between experience and

bureaucratic management—particularly when the state ordered and quantified local populations and their activities in an effort to make their livelihoods “legible” to the state.³⁵

To secure a successful order of land use, federal management facilitated the needs of ranching operations and scientific investigations provided authority for land management decision-makers. Pivotal to range management decision-making was the question of “allotments” or the numbers grazed under the issuance of grazing permits to individuals. These numbers were achieved by an appeal to scientific study of the range to determine “carrying capacity” as a major work on the history of range science stresses. Nathan Sayre in *The Politics of Scale* (2017) notes the dominance of the concept of “succession” in plant communities in early 20th century range science—a product of the Clementsian school of plant ecology developed by Frederick Clements at the University of Nebraska. The understanding of plant succession and its measurement was essential to determining “carrying capacity.” With the experimentation of the scientific scheme in the Forest Service range management bureaucracy numbers were established, permits issued, and all validated based on a once-flourishing Clementsian range science paradigm. As a result, federal management brought order to the chaotic summer grazing commons in Nevada. Efforts, however, to know the land expressed through a federal management

³⁵ James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 2, 6-7. Scott focuses on how states intervene in society to make that society legible. Scott discusses the tensions between modern state formations and local knowledge. Tensions arise particularly when society is broken into units to be measured and organized: “identified, observed, recorded, counted, aggregated, and monitored” (p. 183).

agenda and scientific knowledge did not always mesh with local experiences or interests as generally noted by Scott and now Sayre in 2017.³⁶

More recently, success of a conservation movement required collaboration. During the first three decades of the twentieth century, Forest Service officers sought to include ranchers in discussions on range regulations. Their success with graziers helped create powerful livestock organizations that in turn exerted influence back upon the Forest Service agenda and even Congress. Greater control for ranchers meant greater security for their land use privileges under the grazing permit system that, by the mid-1920s, came to suggest the possibility of grazing rights in the National Forests.

The early conservation movement in Nevada imposed a federal agenda on the land and people. Chapter four, “Nevada National Forests at Close Range,” details the efforts of the Forest Service to increase mountain forage on Nevada National Forests and to build relationships with local ranching operations. After 1906, the Forest Service in Nevada began implementing a system of range management that favored cattle ranchers who most often owned home ranches adjacent to national forests. During the first three decades of the twentieth century, Forest Service personnel and ranchers under a permit system worked together to manage the most productive outcomes for forage use on the mountain ranges—sometimes uncomfortably. When the Forest Service began to restrict

³⁶ Sayre, *Politics of Scale*, 79-81; Starrs, *Let the Cowboy Ride*, 3-4, 63-67. Starrs emphasizes the problem of land tenure that arose out of the difference between land used and land owned. The use of land suggests that private property is secondary to the western livestock ranching experience. Land used is part of a deep emotional experience for western ranchers that have had to settle with—and settle on—a federally managed landscape. Also, Paul Starrs “Ranching: An Old Way of Life in the New West” in Richard L. Knight, Wendell C. Gilbert, and Ed Marston (eds.) *Ranching West of the 100th Meridian: Culture, Ecology, and Economics* (Washington D. C.: Island Press, 2002), 13-17. Starrs provides insight for how popular ideas about nature and ecology can distort practical land use realities, especially when the fallacious construction of “pristine nature” enters into arguments. Starrs points to Spain as an example of land use in arid and semi-arid regions, not so much as a model of development, but as an example for local land uses that can succeed when, and if, pristine ideas about nature fade from the discussions surrounding land use.

uses of preferred graziers and called upon science to justify decisions that reduced stock numbers and the season of graze, a concerted effort to challenge grazing regulations occurred. By the mid-1920s and after WWI, rancher political power began to challenge the Forest Service's authority. Low cattle prices, increased fees for grazing, and an interest in securing vested rights on the range strained rancher and Forest Service relations.

In 1925 and again in 1931, the Nevada legislature invoked the police powers of the state in an effort to protect open range public domain grazing for established livestock users against itinerant sheep graziers. The state's goals mirrored the Forest Service's efforts to prioritize forage-use by local owners of private property or home ranches. By the time the Taylor Grazing Act (1934) established procedures for imposing grazing regulations on the public domain outside National Forests, Nevada's ranching interests were well poised to exert their power and monopolies over range resources.

In the early twentieth century, few settlers or land managers could have foreseen tourism as part of outback Nevada's land uses. Chapter five, "See Nevada First on Roads to a National Monument," considers the rise of multiple-use of resources on lands preferred as places for grazing privileges. The technological triumph of the automobile in transportation opened the door to diverse users of public lands. In the Snake Range, for example, the most economically viable use translated to grazing during the Conservation Movement, but recreation complicated its primacy, especially after 1922 with the creation of the Lehman Caves National Monument within the Nevada National Forest.

While the Progressive Conservation Movement waned with the onset of World War I, the markets demanded beef and mutton from Nevada ranges. The end of the war

brought a sharp agricultural depression from 1919 to 1921 followed by a not always successful path to recovery in the 1920s as federal land managers tightened allotment controls and increased grazing fees. The Forest Service, now threatened by new land management agencies such as the National Park Service and a state parks movement, expanded management to accommodate tourists. Forest rangers and supervisors not only had to “ride herd on dudes,” but also recruit naturalists and cultural resource experts to explain and interpret the physical environment and cultural histories.³⁷

The stage was set for disagreements between federal land managers and traditional grazing uses in Nevada. The state’s remote outback locales and often-unattractive arid landscapes generally protected rancher interests from the multiple uses of public lands, but an emerging new federal agenda sharpened rancher resistance. Forest supervisors and rangers continued to support rancher interests and uniformly sided with established livestock operators, but the Forest Service mission was too diverse at the national and regional levels. These challenges made for a wedge between a federal agenda and local economic interests.

The primary reason for the advent of national forests in Nevada was water. Forests provided a canopy to conserve snowpack and hence water supply. After 1902, the relationship between forests and irrigation began to unfold. Chapter Six, “Monitoring Mountain Snow,” considers the work of technicians during the first decades of the twentieth century who chartered the crucial relationship between the high mountains and lower elevation communities. The journal *Forestry and Irrigation* prioritized forests as the foundation for land-use due to the importance attributed to mountain water supplies.

³⁷ Arthur H. Carhart, *The National Forests* (New York: Alfred A. Knopf, 1959), 21; James H. Shidler, *Farm Crisis, 1919-1921* (Berkeley: University of California Press, 1957).

Snowpack, a major source of water supply especially into the dry summer season, became a critical factor in this relationship as part of an effort to predict favorable conditions of water flows and provide security for settlers in outback Nevada. Snow surveys did not solve the water problem in the West, but the surveys did build realistic measurements between mountain water supply and irrigation that continues today to illustrate the importance of favorable conditions of water flows in Nevada's Great Basin Outback.

In summation, the initial conditions of federal land management attempted to establish a steady-state of resource-use and protection by understanding water supply and vegetation in high mountain ranges. The rancher, industrialist, recreator, tourist, and environmentalist share a stake in Nevada's public lands. Often, the reconceptualization of Nevada's history of land-uses becomes an idealized construct—dissected from history and reimagined from a present-centered point of view. The historical investigation at hand focuses on the foundation of public lands in Nevada when collaboration between rancher and federal land manager suggested that science and managed lands could bring order to unbridled and unsustainable land uses. Stakeholders in public lands have diversified, but of paramount importance remains the use of resources *in situ*. The foundations for public lands in Nevada suggest that the use of resources will continue to elucidate the visions for a proper relationship with nature as long as the export of water does not jeopardize its marginal environment. In other words, conservation and the Conservation Movement of the early twentieth century structured land uses to secure the settlement of local populations, whether mining, ranching, or to a lesser extent a tourist based economy.

Geographer Nathan Sayre argues that “marginality” unifies rangelands. He not only points to the biophysical characteristics of marginal lands, but also marginal social structures. They are lands on the periphery where government, science, and capital have imposed order on both natural resources and people in an effort to sustain their marginalized usefulness. These vast lands are on the periphery in places where much of “society’s primary attentions are concentrated elsewhere.”³⁸ A history of land use in Nevada’s mountains form the backbone of this study. Many of Nevada’s mountains remain “silent cordilleras.”³⁹ Standardized histories bypass these influential physical structures as they follow historical narratives on the way to somewhere else. What follows is a lesser-known history taking into consideration the struggles of a marginal settler society that remained in Nevada’s outback amidst environmental challenges where water supply and questions surrounding it provided the rationale for the arrival of the Conservation Movement in Nevada’s high mountains via the national forests.

³⁸ Sayre, *The Politics of Scale*, 2-3.

³⁹ McLane, *Silent Cordilleras*, 11.

Chapter One

Through the Heart of an Outback

During the latter half of the nineteenth century, Euro-American colonizers struggled to make sense of the Great Basin's cold desert. They brought preconceived notions for the region that confused their attempts to establish permanent settlements. The confusion began with explorers who declared the West a "Great American Desert" unfit for civilization.¹ When Euro-American settlers came to Nevada, they struggled to establish permanent communities in remote locales with limited resources. Despite confusion and struggle on a marginal land, the mountains of Nevada's Great Basin were part of a hidden West that afforded opportunity.² These mountains lingered on the horizon and along throughways in places where Euro-Americans perceived little more than silhouettes obstructing their passage.

The northern portion of the Great Basin can be a misnomer. While Nevada's portion of the Great Basin is largely a hydrologic basin, it contains approximately one hundred and sixty mountain ranges generally oriented north and south. Between these ranges are at least one hundred and fifty basins. Perhaps the Great Basin's most definitive physical feature is a large endorheic watershed. The region is North America's largest landmass not connected by any surface-water outlet to the ocean. The internal waters

¹ The "Great American Desert" myth was first put forth by Zebulon Pike when he referred to the Great Plains as "sandy deserts" unsuited for civilization—especially on account of no timber. Stephen Long would later echo these sentiments. In 1821 the technology to develop the Plains for Euro-American settlements did not exist. William Goetzmann, *Exploration and Empire: The Explorer and the Scientist in the Winning of the West* (Austin: Texas State Historical Society, 2000), 51, 62.

² Rob Schultheis, *The Hidden West: Journeys into the American Outback* (New York: Random House, 1982), 138. For Schultheis, the Nevada Outback is a perceived "geographic purgatory" that hides abundance and scenic beauty from the average traveler. Richard G. Lillard, *Desert Challenge: An Interpretation of Nevada* (New York: Alfred K. Knopf, 1949), 36, 13. Lillard points out that a purgatory is also opportunity for the rugged individual in search of a desert challenge.

drain to disparate basins rather than to any all-encompassing one. Therefore, it is a basin of internal water flow, structured by mountains, and composed of various environments from desert to alpine without a single dominant watershed. Hydrology sets the boundaries of the Great Basin, but its mountainous topography complicates those parameters. The geology of the Great Basin came into focus along with hydrologic features, not as a basin structure, but as a convex shape where the center is elevated above its surroundings.

The sagebrush country of the Great Basin is a northern portion of the basin and range structure that reaches all the way south to Mexico. For geologists and surveyors, the formation of the basin-range structure became a road map where the effects of geological processes exposed a partial history woven by geomorphological processes into a complicated web of rocks. The Great Basin became part of an early basin and range discourse when scientists sought to carefully untangle the processes that created a system of basins and ranges. The creative nonfiction writer John McPhee remarked, “Basin. Fault. Range. Basin. Fault. Range....The crust of the Great *Basin* has broken into blocks. The blocks are not, except for simplicity’s sake, analogous to dominoes. They are irregular in shape. They more truly suggest stretch marks.”³ Curiously, the stretch marks in northern Nevada’s Great Basin form some of the highest points of elevation in the basin-range structure, both on basin floors and mountain peaks.

On the Overland Route to California, the Great Basin was a formidable distance to cross in late summer on the way to the Sierra Nevada before snowfall blocked passage. Heavy snows could bar passage beginning in the month of October. For emigrants along the California Trail, arrival at Independence Rock in Wyoming by July Fourth suggested

³ John McPhee, *Basin and Range* (New York: Farrar, Strauss, Gerrar, 1981), 44, 50.

a timely schedule to reach the west side of California's Sierra Nevada.⁴ As an obstacle, the Great Basin produced anxiety for travelers who were already frightened by stories of those who, "perished in the snow."⁵ The way forward, became a constant urgency only to be complicated by an uninviting and hostile desert land before achieving the last mountain barrier to California. In 1853, the words of the transcontinental traveler James Cowden echo into the present: "Can't see any use for so much desert country, for certainly it is good for nothing only to hold the rest of creation together."⁶

Yet, along the 39th parallel between Lake Tahoe and today's Great Basin National Park, the mountains of the high desert have forests and perennial streams coursing their way to alluvial fans where they disappear into basin floors. As the water table rises in the spring, the playas saturate to become shallow seas of sterility exposing a hidden source of life for phreatophytes in bucolic beds of alkali-based soils. Travelers that have used the Great Basin to connect one "proper" American environment to another traveled along basin thoroughways covered in greasewood unable to hold down the dust of the alkali flats.

For most Euro-Americans the Great Basin was little more than a region to cross, a wasteland to endure, and remembered as a low point in overland travel. The

⁴ Keith Heyer Meldahl, *Hard Road West: History and Geology along the Gold Rush Trail* (Chicago: University of Chicago Press, 2007), 93.

⁵ James Mason Hutchings, "October 10, 1849," *Seeking the Elephant, 1849: James Mason Hutchings' Journal of His Overland Trek to California, 1848, and Letters from the Mother Lode*, edited by Shirley Sargent (Arthur H. Clark, 1981), 181. Hutchings referred to the Donner Party as those that "perished in the snow."

⁶ C. Elizabeth Raymond, "When the Desert Won't Bloom: Environmental Limitation and the Great Basin," David M. Wrobel and Michael C. Steiner, editors, *Many Wests: Place, Culture, and Regional Identity* (Lawrence: University Press Kansas, 1997), 71. Raymond quotes James Cowden's diary on an overland trip across the country, "Diary kept by James S. Cowden on His Trip 'Overland' from Iowa to California in 1853, with Ox Teams and Wagons" (typescript manuscript, Iowa State Historical Society, Iowa City), 21-22.

environment of the region reflected a land that connected more useful parts of the country to one another.⁷ Euro-American settlement, when it took root after 1860, often prioritized mining and ranching designed to find profit and perhaps a community in a desolate land. Over time, the newcomers developed knowledge about the region, especially Nevada's mountainous structures to better understand how to ranch and mine "so as to stay."

Early maps of the Great Basin depicted a blank space as though nothing was there. For example, P. F. Tardieu's map (1820) of the Territories of Mexico and Louisiana shows little more than grid lines waiting in anticipation to construct new interpretations for a land long inhabited by autochthonous peoples. In 1838, David Burr created a map of the lands now known as the Great Basin and referred to the region as a "Great Sandy Desert." In 1842, the Society for the Diffusion of Useful Knowledge published a map detailing the same unknown area as "Sandy Plains."⁸ In his first exploration into the little known Great Sandy Desert, situated between the Wasatch and Sierra Nevada, John C. Frémont described the basin as a region of internal drainage.⁹ In 1844, he concluded that there was no significant river making its way to the Pacific shores. He put to rest the fabled Rio San Buenaventura, which was an assumed river system coming out of the supposed sandy desert of *terra incognita*. In 1848, Frémont wrote of a "sterile" land with "great exceptions" where the mountain environs "are grassy

⁷ C. Elizabeth Raymond, "Sense of Place in the Great Basin" Wilbur S. Shepperson, editor, *East of Eden West of Zion: Essays on Nevada* (Reno: University of Nevada Press, 1989), 17-29.

⁸ David Burr, *Map of the Western Portion of the United States of North America* (1838); *Society for the Diffusion of Useful Knowledge, Central America II, Including Texas, California, and the Northern States of Mexico* (1842).

⁹ The Great Sandy Desert was a popular description for a blank space representing the Great Basin during the first half of the nineteenth century. John C. Frémont, along with cartographer Charles Preuss began to fill in the gaps of the Great Basin by the 1840s, but the region remained largely unknown until the second half of the nineteenth century.

and wooded showing snow on their summit peaks during the greater part of the year, and affording small streams of water from five to fifty feet wide."¹⁰

The Great Basin, as Frémont named the desert, was one of the last regions surveyed in North America. Consequently, the basin was also a place that allowed mapmakers to posit assumptions based on imagination or second-hand knowledge. The region is composed of a long history where maps have provided a medium for "more and less than actually exists."¹¹ Frémont explained that there was no great river system coming out of the basin and argued, "...where there is so much snow, there must be streams; and where there is no outlet, there must be lakes to hold the accumulated waters, or sands to swallow them up."¹² Frémont's assumptions were partially correct, but the extent of the physical features of the Great Basin remained little known to Euro-Americans until the latter half of the nineteenth century.

Explorers and surveyors used information from indigenous populations when in the field, but the region remained a blank space on maps until the Euro-American mind could express its own structures to represent the landscape. The early creation of maps in the Great Basin offered a certain disconnect with the region. The geographer Simon Ryan argues, "the cartographic practice of representing the unknown as a blank does not imply or innocently reflect gaps in European knowledge but actively erases (and legitimizes the

¹⁰ John C. Frémont, *Narratives of Explorations and Adventure*, edited by Allan Nevins (Literary Licensing, 2013), 514.

¹¹ Richard V. Francaviglia, *Mapping and Imagination in the Great Basin: A Cartographic History* (Reno: University of Nevada Press, 2005), 18. Francaviglia has written several books on how imagination has structured the Great Basin as a place for the Euro-American. In addition to *Mapping and Imagination in the Great Basin*, consider *Believing in Place: The Spiritual Geography of the Great Basin* (2003) and *Go East, Young Man: Imagining the American West as the Orient* (2011); *Mapmakers of the New Zion: A Cartographic History of Mormonism* (2015)

¹² John C. Frémont, "A Report of the Exploring Expedition to Oregon and North California in the Years 1843-44," in *Report of the Exploring Expedition to the Rocky Mountains by John Charles Frémont* (Readex Microprint Corporation, 1966), 276.

erasure of) existing social and geo-cultural formations in preparation for the projection and subsequent emplacement of a new order."¹³ Richard Francaviglia, a historical geographer, echoed Ryan's comments in *Mapping and Imagination in the Great Basin*, as he detailed the imposed assumptions and cultural sensibilities that Euro-Americans placed onto the region using maps as a medium.¹⁴ When mapmakers of the Great Basin began to represent the blanks with certain forms of knowledge, Euro-American interests described a new order based on access, land uses, and boundaries.

Although hydrology first bounded the region together as described by Frémont and termed a "Great Basin," geology provided another, albeit more expansive, definition based on high ranges that exposed an incomplete literature of geologic processes. In both cases, knowing the land erased Native American knowledge and culture so that a new order could prioritize Euro-American ambitions. In this way, Euro-Americans came to settle the land, but in reality, resettled a place that had already been mapped, imagined, and used for thousands of years. Explorers, surveyors, and settlers brought new structures of knowledge and practice that erased the Native American landscape and culture even prior to settlement.¹⁵ Some historians and geographers have argued that the settlement, or resettlement, of remote places such as the Great Basin occurred prior to the physical

¹³ Simon Ryan, "Inscribing the Emptiness: Cartography, Exploration and the Construction of Australia," in *Describing Empire: Post-Colonialism and Textuality*, ed. Chris Tiffin and Alan Lawson (London: Routledge, 1994), 116.

¹⁴ Francaviglia, *Mapping and Imagination in the Great Basin*, 115; J. B. Harley, "Maps Knowledge and Power," *The Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments*, Denis Cosgrove and Stephen Daniels, eds. (Cambridge: Cambridge University Press, 1988), 277-312; J. B. Harley "Maps, Knowledge, and Power," *The New Nature of Maps: Essays in the History of Cartography*, Paul Laxton, ed. (Baltimore: The Johns Hopkins University Press, 2001), 52-55. Harley considers the theoretical perspective of maps using description and analysis to form iconological interpretations to uncover the purpose and meaning behind their construction and intention. Erwin Panofsky provided the foundations for iconological analyses. Erwin Panofsky, *Meaning in the Visual Arts: Papers in and on Art History* (New York: Overlook Press, 1974).

¹⁵ Cole Harris, *The Resettlement of British Columbia: Essays on Colonialism and Geographical Change* (Vancouver: UBC Press, 1997), xii.

presence of Europeans.¹⁶ Soon after the Mexican Cession, Euro-American constructs of knowledge, including hydrology and geology, reconstructed the landscape with great rapidity throughout the latter half of the nineteenth century.

Euro-Americans systematically ignored indigenous, or autochthonous, peoples' historical uses of the land. For Native Americans, mapping with the sand, memory and oral transmissions expressed an intimate experience. Because of the scarcity of resources, Native Americans, particularly Great Basin Paiute, Washoe, and Shoshone depended on land use over expansive and diverse environments. Survival required movement and knowledge about where to go and when to go there. The native peoples maintained their cultures over a substantial region collecting foodstuffs, manipulating the land with fire and seeds, and coordinating rabbit drives, antelope corrals, and big horn deadfalls. To do so, the land was intimately connected to their understanding of place and mapped by experience and oral traditions.¹⁷

Euro-American settlement reconstructed the Great Basin by imposing a network of economic and political frameworks fueled with imperial ambitions. Disparate goals and experiences between Native Americans and Euro-Americans expanded the differences between the two groups of people on the landscape. Native Americans sought to maintain their regional relationship with the land while Euro-Americans resettled the land in an effort to connect resources with other profitable and sustainable endeavors often dependent on economic interests outside the Great Basin region. As a result, Euro-American knowledge was often twice removed from the land, once by map and written

¹⁶ Alfred Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, first published 1986 (New York: Cambridge University Press, 2004), 153-54.

¹⁷ Francaviglia, *Mapping and Imagination in the Great Basin*, 101.

perceptions and again by economic and political interests situated outside the region. Early Euro-American settlers in the Great Basin engaged in the extraction of resources. The fur trade and its explorers came first to the region and they brought their economic and political rationales far removed from the realities of the native populations.

In 1826, Jedediah Strong Smith led an expedition for the St. Louis based Rocky Mountain Fur Company into the Great Basin. He crossed present-day southern Nevada from the Virgin and Colorado Rivers on his way to California where he hoped to find the Rio San Buenaventura (fabled river flowing west from the Rocky Mountains to the California coast). At the mission of San Gabriel in Alta California, Mexican authorities detained Smith for several months for military trespass, but after his release in the spring of 1827, Smith and two other men, Silas Gobel and Robert Evans, entered the Great Basin over Ebbets Pass and dropped into the Walker River drainage near Walker Lake and headed in an easterly direction that brought them roughly along present-day Highway 6 through Nevada. Smith was the first known Euro-American to cross the Great Basin portion of northern Nevada.

Smith trekked through the Northern Great Basin from west to east and he claimed to have “learned enough of the San[d] Plain” in his recent journey “to know that it would be impossible for a party with loaded horses and encumbered with baggage to ever cross....” Of the nine horses in Smith’s party, only two survived to arrive at Bear Lake, Utah. Both men and horses arrived as “mere skeletons.”¹⁸ Smith described a land of sand plains, south of the complex of ranges now known as Toiyabe, Toquima, and Monitor. Before crossing over the Nevada-Utah border, he passed through the Schell Creek Range

¹⁸ Dale L. Morgan, *The Humboldt: High Road of the West*, 24.

probably near Connors Pass and then over Sacramento Pass in the Snake Range. He was the first known Euro-American to travel in what John Muir rather expansively termed, in a collection of essays written in the late 1870s and published posthumously in 1918, “Nevada’s timber belt.”¹⁹ He was too far south of the Humboldt River to lay any claim to its discovery, which can be attributed to Peter Skene Ogden of the Hudson’s Bay Company a year and a half later.²⁰

In 1825-26, Ogden came into the Great Basin as part of a series of Snake River expeditions launched by the Hudson’s Bay Company to trap out the beaver in an arc around the Oregon Country. In addition to supplying his own stores of pelts, he implemented a fur desert policy by the Hudson’s Bay Company, also known as a scorched earth campaign, to trap out the beaver and discourage American trapping enterprises in the Oregon Country including parts of which belonged to Mexico. On his initial expedition into the southern Oregon Country, Ogden may have been the first European descendent to cross into the present-day border of northern Nevada. Later in his 1828-29 expedition, he explored the western edge of the timber belt, just south of Mary’s River (Humboldt River) on the western side of Nevada where the river disappears into the Carson Sink. In eastern Nevada, he explored as far south as the present border of Elko and northern White Pine Counties, which would have brought him along the Ruby Mountains, a range on the northeastern side of Nevada’s timber belt.

¹⁹ John Muir, *Steep Trails*, edited by William Frederic Bade (Boston and New York: Houghton and Mifflin Company, 1918).

²⁰ Dale L. Morgan, *Jedediah Strong Smith and the Opening of the West* (Indianapolis and New York: The Bobbs-Merrill Company, Inc, 1953), 210-211; Gloria Griffin Cline, *Exploring the Great Basin* (Norman: University of Oklahoma Press, 1963).

A few years later, in 1833-34, Joseph Walker led an exploration as part of Captain Benjamin Bonneville's fur trapping expeditions through the Great Basin along Mary's River. Walker identified Mary's River as a possible throughway for wagons and was probably the first explorer to competently refer to the Great Basin as a region of internal drainage.²¹ The routes uncovered for Euro-American throughways by Walker became some of the most significant achievements of Captain Bonneville's rather unsuccessful fur trapping enterprise.²²

In 1841, the California bound Bidwell-Bartleson party were the first overland emigrants to cross the Great Basin.²³ John Bidwell admitted that his party knew little of anything except where they were supposed to end up. As Bidwell later described, "Our ignorance of the route was complete. We knew that California lay west, and that was the extent of our knowledge."²⁴ The approximate Bidwell-Bartleson overland route became the throughway for the California Overland Gold Rush. The route followed the Oregon Trail into southern Idaho to Fort Hall and then struck out southwesterly to find the "Unknown River" later named Humboldt River, along the route identified by Joseph Walker on his return from California in 1835. After 1848 and the Mexican Cession, the discovery of gold by James Marshall at Sutter's Mill brought twenty-five thousand, or

²¹ Scott Stine, *A Way Across the Mountain: Joseph Walker's 1833 Trans-Sierran Passage and the Myth of Yosemite's Discovery* (Norman: University of Oklahoma Press, 2015).

²² Goetzmann, *Exploration and Empire*, 147-159. In addition, Goetzmann reminds the reader that Bernard de Voto claimed Bonneville's fur trapping expedition a subterfuge to gather information on Mexico Territory. He has been seen more as a spy than trapper and evidence for a military reconnaissance in Mexico has, at least, been recognized as a part Bonneville's fur trapping expedition. The Tennessee born explorer and trapper Joseph Walker provided much detail for a wagon route along the Humboldt River, on which scores of overland travelers to California would travel. Walker's explorations are well documented due to the extensive journals kept by Zenas Leonard.

²³ Cline, *Exploring the Great Basin*, 179-185.

²⁴ John Bidwell, "The First Emigrant Train to California," *Century Magazine*, Vol. XLI (Nov., 1890), 3; Cline, *Exploring the Great Basin*, 181.

more, across the California Overland Trail. This route along the Humboldt River, continues to dominate and limit perspectives of the Great Basin.

By the 1830s, most of the rivers in the North American West had been explored by participants in the fur trade. With increased numbers of overland travelers moving west to Oregon Country and Alta-California, Congress began to appropriate funds for surveys to explore transport routes, resources, and locations for military defense posts. The movement of colonizers placed the American government squarely behind expansion along the edges of Mexico's northern territories and into the Oregon Country. Military Officer and explorer, John C. Frémont entered Mexican territory during the transitional years of the early 1840s. Frémont, often lauded as the "Great Pathfinder," was a surveyor in the newly created Topographical Corps retracing the steps of earlier explorers and, most significantly, creating and marking places on maps.

Frémont's map of 1848, compiled from his 1844 and 1845 explorations into the Great Basin, was the first depiction of mountains along eastern Nevada's timber belt. In 1845, Frémont, guided by Joseph Walker and Christopher "Kit" Carson, crossed over the Great Salt Lake region on his way through the Great Basin. Frémont led ten men across the northwest portion of White Pine County on his way to Walker Lake where he rendezvoused with an expedition party he sent down Mary's River (Humboldt River) with Edward M. Kern in charge and Joseph Walker as guide. From a mountain top to the south of Mary's River, Frémont looked north and renamed the small, but significant, waterway after the nineteenth-century German naturalist Alexander von Humboldt. Thereafter, the name Humboldt River slowly replaced Mary's River. Humboldt was a famous gentleman-scientist and naturalist in the early to mid-nineteenth century who

never entered Nevada or the American West, but because of Frémont's admiration his name became affixed to the Nevada landscape.

The transformation from explorer to surveyor could be described as a process from knowing a destination to knowing the route. Frémont created routes by placing topography on maps making his surveys, one might argue, the greatest toponymical explosion to occur in the Great Basin. Perhaps, less a "pathfinder" and more of a path identifier, Frémont along with the cartographer Charles Preuss re-presented the Great Basin as a consumable product for the Euro-American mind. Following Frémont's lead into surveys of the Great Basin, a new era of road building and hopes for a transcontinental railroad began to take shape in the present boundaries of Nevada. Frémont's surveys of the 1840s represented a transitional period in the Great Basin which began to implant and develop Euro-American knowledge onto the landscape. In 1848, Mexico's cession of its northern territories made good American ambitions for territorial expansion that included the Great Basin. As a result, surveyors began to interpret the land for its usefulness and to reimagine America as a "sea to sea empire."²⁵

After the 1848 Treaty of Guadalupe Hidalgo, the War Department expanded its efforts into the Great Basin to establish routes and military outposts, especially for the proposed transcontinental railroad. From 1849 to the early 1860s, the Pacific Railroad Surveys detailed over 400,000 square miles of land for development and scientific purposes in the American West. Competition over a potential route for the railroad was "fervent and bitter." Missouri Senator Thomas Hart Benton quickly maneuvered to maintain Saint Louis as a gateway to the West and sent his son in law, John C. Frémont

²⁵ Tom Chaffin, *Pathfinder: The Course of American Empire* (New York: Hill and Wang, 2002), xxix.

in search of a route along the 38th Parallel. Frémont, already suffering disfavor in the West from a failed rebellion (Bear Flag) and recent acquittal of treason, embarked on a disastrous and impractical route through the Rocky Mountains.²⁶ Other surveys would prove much more favorable.

Railroad surveys “In search of an Iron Trail” proliferated after 1849 throughout the West. As far north as the 49th parallel and to the south along the 32nd parallel, surveyors swept across the West in search of a practical and workable route. Between 1849 and 1867, these surveys, conducted by the Army’s Topographical Engineers, detailed some of the most extensive geographic and scientific knowledge of the West to date. The impetus and funding derived from political debates in Congress over where the Pacific Railroad should be located and whether the North or the South might benefit from the route chosen. In 1853, Congress deferred the final decision for a transcontinental rail line to the Secretary of War, and future president of the Confederacy, Jefferson Davis. Not surprisingly, Davis recommended the southern route as the most feasible, but northern Congressmen rejected his proposal postponing the decision on the route of the Pacific railroad until after the departure of the southern states from Congress. The final decision would not come until 1861.²⁷ In the Far West, the final route went through Nevada along the California Trail and the Humboldt River where the Army conducted the 38th and 40th Parallel Surveys.

On June 22, 1853, Captain John W. Gunnison led the 38th parallel expedition into the Great Basin. Gunnison was familiar with the region around the Great Salt Lake when, in 1849, he served as Lieutenant and second in command for Captain Howard

²⁶ Goetzmann, *Exploration and Empire*, 266-69.

²⁷ Goetzmann, 281-286.

Stansbury's first government surveys of the newly established Mormon settlements. Gunnison's orders from Jefferson Davis directed him to perform a reconnaissance for a railroad of practical grades along the 38th parallel. Disaster struck the survey after descending into the Great Basin along the Sevier River in Utah Territory. His party was attacked by Pahvant Indians killing Captain Gunnison along with seven men in his company.²⁸

Lieutenant Edward Griffin Beckwith, 3rd Artillery, rallied the survivors back to Salt Lake City. While there, Beckwith received orders from the War Department to finish the survey in Captain Gunnison's stead. In 1854, Beckwith's survey confirmed that the most feasible route through Nevada followed the Humboldt River. Beckwith headed north to the 41st parallel, then turned west and connected to the Humboldt River Route, descended toward the Humboldt Sink, but veered west and crossed at mud lake (Black Rock Desert) and followed the Feather River to the Sacramento River.

The following year in 1855, John Reese, O. B. Huntington, and C. A. Huntington guided Lieutenant Colonel Edward J. Steptoe who had orders to investigate Captain Gunnison's death and continue to explore the possibility of a central route through the Basin expedite trans-basin travel. Colonel Steptoe reached the eastern side of the timber belt where a large peak named Biap by the local Indians halted his westerly travel. He named the mountain Jeff Davis Peak (later Wheeler Peak) and determined that a wagon road was feasible, but not a railroad.²⁹ Colonel Steptoe turned north and did little

²⁸ Goetzmann, 278, 287.

²⁹ Darwin Lambert, *Great Basin Drama* (Niwot Colorado: Roberts Rinehart Publishers, 1991), 15-16.

exploration beyond retracing Beckwith's path and spent much of his travels along the Humboldt River route.³⁰

The mountains of Nevada's timber belt along the 39th parallel in the Great Basin were an obstacle to the War Department's railroad surveys. The surveyors reached the western edge of ancient Lake Bonneville and turned north or south to avoid the bulwark of large ranges on the eastern side of present-day Nevada—running north-south between the 38th and 42nd parallels. The only feasible through-route remained the Humboldt River. On the eastern edges of the timber belt, the Deep Creek Range and the Snake Range were both formidable mountain spines at the eastern edge of Ancient Lake Bonneville. Even if the surveyor crossed over the first set of ranges, there would still be the Cherry Creek Range and Ruby Mountains to the north and the Schell Creek, Egan, Wilson Creek, Grant, Quinn Canyon, and White Pine Ranges in the way of a direct path, which created a herringbone of ranges along the 39th Parallel. The eastern side of the timber belt deflected the early railroad surveys, usually to the north where the California Overland Trail coursed along the Humboldt River. Even if the surveyors navigated the eastern side of the timber belt, the central portion, composed of the Diamond, Fish Creek, Monitor, Toiyabe, and Toiyabe ranges, created additional and significant obstacles.

In 1855, a Mormon scout, Howard Egan claimed that he crossed the Great Basin in ten days from Salt Lake City to Sacramento. The trail ran the gamut across basins and ranges with timbered mountains dotted with creeks and springs along much of western Utah Territory. Egan became familiar with the central portion of the Great Basin after 1849 when he drove cattle from the Wasatch to California for the Livingston Kincaid

³⁰ Alvin R. McLane, "Exploration and Early Mapping in Eastern Nevada" *Nevada Historical Quarterly* (19), 286-87.

Company. Egan, a Major in the Nauvoo Legion, traveled through the mountains on the northern edge of the Snake Range in 1855 to search for the fastest route across the central high desert. With three mules to rotate mounts, he succeeded in traversing the Great Basin from Salt Lake City to Sacramento in ten days. To do so, Major Egan averaged approximately seventy miles per twenty-four hour period, rode during the day and night, and rested in brief intervals for sleep and feed.³¹ To go directly, he headed into a mountainous cross-section of the Great Basin. He entered present-day Nevada just north of the Snake Range (Deep Creek Range to Schellbourne Pass and Egan Canyon) and dropped into the route presently along Nevada's Highway 50. The Egan Trail became the approximate transect across the Great Basin for the Pony Express Mail Route (1860-61), the Central Route of the Overland Stage over which Mark Twain traveled to Carson City in 1861, and later the first proposed transcontinental auto-route in 1913, known as the Lincoln Highway.

In 1847, Major Egan came to the Great Salt Lake with Brigham Young. On July 24, Egan arrived at the Great Salt Lake and "rejoiced at having the privilege at beholding this beautiful and extensive valley that may yet become a home of the saints."³² After arrival, Egan commented about the geography: "This valley is bounded by high mountains.... Nature has fortified this place on all sides with only a few narrow passes, which could be made impregnable without much difficulty."³³ The following day, Sunday, July 25, the Elder Heber C. Kimball spoke to the Saints about their mission to settle on the land. Elder Kimball's speech emphasized the goals of Mormon settlement in

³¹ Howard R. Egan, *Pioneering the West, 1846-1878: Major Howard Egan's Diary* (Salt Lake City, Utah: Skelton Publishing Company, 1917), 193-194

³² Egan, 103

³³ Egan, 105

a region where an isolated and marginal nature offered a refuge for the righteous. Elder Kimball spoke of an "edifying nature" that challenged Mormon commitment to succeed on a land of limited resources and warned to not "get giddy and light-minded, as the Nephites did of old, but to strive to work righteousness in the beginning, inasmuch as we have reached 'the promised land' ".³⁴ The Saints confirmed Elder Kimball's vision and succeeded in carving out a place for themselves in the Great Basin. Mormon settlers were the first Euro-Americans, arguably the most successful, to settle on the Great Basin environment.

Mormons established communities based on Elder Kimball's recognition that nature could "edify" their efforts on the western Wasatch Front near the Great Salt Lake and create a matrix of communal endeavors fueled by religious energies. These settlements, based out of Salt Lake City with numerous satellite communities transformed traditional land uses that various Native Americans had forged over thousands of years. The Ute Indians witnessed the transformation of their fishing grounds at Utah Lake as they changed from an intimate connection between belief and experience to one that represented a Mormon holy land in the Great Basin desert. This biblical geographic analogy further fueled the Mormon ideology of a promised land in the Americas.³⁵

Mormon commitment to settle the land pushed the Utes farther from their home regions

³⁴ Egan, 107-108. During the nineteenth century, many Mormons believed that Native Americans were the remnants of biblical peoples who came to Central America, the Nephites and the Lamanites. The Lamanites overwhelmed the Nephites and had forsaken God. He darkened their skin and left them to a life of wandering.

³⁵ Richard Francaviglia, *Mapping and Imagination in the Great Basin*, 151-52; Jared Farmer, *On Zion's Mount: Mormons, Indians, and the American Landscape* (Cambridge: Harvard University Press, 2008), 107-109; Richard Francaviglia, *The Mapmakers of New Zion: A Cartographic History of Mormonism* (Salt Lake City: The University of Utah Press, 2015), 123. Consider the comparison of the Dead Sea and the Sea of Tiberius to the Great Salt Lake and Utah Lake. These lakes provided the Mormons with a biblical comparison represented geographically and culturally confirmed as a New Zion. See Frederick Turner, *Beyond Geography: the Western Spirit Against the Wilderness* (New York: Viking Press, 1980).

and transformed place in such a way that the cultural landscape of Native Americans disintegrated from experience to memory.³⁶

The first permanent Euro-American settlements in the Basin were Mormon satellite towns. They proved remarkably self-sufficient. In 1847, an initial wave of 1,930 Mormons settled on the western flank of the Wasatch front just before the 1848 Treaty of Guadalupe Hidalgo and followed closely by Congress's creation of Utah Territory as part of the Compromise of 1850. By 1855, the Mormon population increased to approximately 36,000. For the most part, these settlements scattered along the Wasatch Front and utilized water from the seasonal snowmelt in the adjacent mountain ranges.

Many of these Mormon settlers were skilled and semi-skilled workers from England. They escaped the doldrums of uncertain employment and established a sense of belonging in a place isolated far from the anomie of urban industrialized England. The historian Dean May examined census records and argued that many Mormons traveled from England to this new promised land and were "twice fired -- in the furnace of overwhelming industrial change and then in the kilns of religious renewal..."³⁷ After settling, Mormons found both isolation from an industrialized world and a place to create their theocratic state. For better or worse, isolation became more of an ideal than a reality.

Congress established the Territory of Utah as part of the Compromise of 1850 and in 1851 President Millard Fillmore appointed Brigham Young as Territorial Governor. This official status gave to Mormons a political power-base after they experienced opposition in New York and Ohio then violent ejection from Missouri and Illinois. After

³⁶ Jared Farmer, *On Zion's Mount*, 104.

³⁷ Dean May, *Three Frontiers: Family, Land, and Society in the American West, 1850-1900* (Cambridge University Press, 1994), 67. May provided a case study of three towns in the American West. He concentrated his studies on Alpine, Utah as an example of Mormon settlement using census records.

successfully settling at the base of the Wasatch, they proposed an extensive state of Deseret to extend from the western slope of the Rocky Mountains, through the Great Basin, and into a corridor to the Pacific Ocean including a mission at San Bernardino in the Southwest. Congress rejected the extensive boundaries of Deseret and confined Utah Territory west of the Rocky Mountains, east of the California state line, and north of Death Valley and the lower Colorado River watershed. As a result, the Territory of Utah (Congress's chosen name) occupied most of what was to be called a "Great Basin Kingdom."³⁸ By 1857, the Church of Latter-day Saints had over 40,000 followers living in the Territory. Mormon dominance briefly prevailed across Utah Territory in 1856 when Genoa in the Carson Valley near Lake Tahoe, "became an officially supported and strategic colony in the Mormon network around the Great Basin."³⁹

In 1856 a brewing dispute between Territorial Governor Brigham Young and the appointed federal judiciary in Utah came to a head over charges that Utah was in reality a theocracy under the thumb of Governor Young. More specifically, federal officials appointed to the Territory complained of mistreatment and polygamy, officially endorsed by the Mormon Church after 1852. Brigham Young and his followers rejected federal interference into the affairs of the Territory. In an attempt to challenge federal authority,

³⁸ Leonard J. Arrington, *Great Basin Kingdom: Economic History of the Latter-Day Saints, 1830-1900*, first published 1958 (Lincoln: University of Nebraska Press, 1966), 35. Arrington argues that while Mormons were proud of their peculiar cultural and religious society in America, their economically driven motives and city planning were very much in-step with American values during the nineteenth century.

³⁹ Arrington, *Great Basin Kingdom*, 86. Genoa was first named Mormon Station and is considered the first permanent settlement in Nevada (1851). Orson Hyde, an apostle of the Church, came to Carson Valley in 1856 to verify that the Saints in Carson Valley had not lost their way. While there he renamed Mormon Station to Genoa because the mountains, particularly Job's Peak, reminded him of his mission to the Italian Alps. He also established the first sawmill in the region at Franktown.

the Territorial Legislature created a probate court and an office of territorial marshal to circumvent federal law enforcement in the Territory.⁴⁰

Under the American territorial system, the President appointed a governor and a three-judge judiciary. Mormons asserted that some of these judicial appointees were not only anti-Mormon but of questionable character even in gentile circles.⁴¹ Mormon Apostle John Taylor complained, “I do not believe in their right constitutionally to appoint our officers. Still they have done it, and we have submitted to it. And they have sent some of the most miserable scoundrels here that ever existed on the earth.”⁴² The Territory of Utah and its Mormon inhabitants were poised for a clash with the central government. President Buchanan took seriously charges from federal officials in Utah that the Territory was a virtual theocracy. After he took office in 1857, President Buchanan received overwhelming support in Congress to correct the affairs of political and social governing including the replacement of Governor Brigham Young who was also President of the Church.

In response, Young made preparations against an invasion from U.S. armed forces and stockpiled supplies located in Cottonwood and Echo Canyons near Salt Lake City. He called for a return of communities along the eastern side of the Sierra Nevada and at San Bernardino to Salt Lake City for the Defense of Zion and prepared for evacuation of the Mormon capital. On the morning of September 1, 1857, Peter Conover, O. B. Huntington, and George Washington Bean set out from Salt Lake City to carry a message

⁴⁰ Clifford L. Stott, *Search for Sanctuary: Brigham Young and the White Mountain Expedition* (Salt Lake City: University of Utah Press, 1984), 20-23

⁴¹ Sally Zanjani, *Devils Will Reign: How Nevada Began* (Reno: University of Nevada Press, 2006), 62; Stott, *Search for Sanctuary*, 22, 127. For example, Judge Drummond infamously would hold court with a prostitute he fancied seated alongside him on the bench.

⁴² Stott, *Search for Sanctuary*, 23

across the undeveloped central transect (Egan's Trail), south of the Humboldt River and through the mountains of the timber belt. They made haste with urgent orders to reach communities on the eastern slope of the Sierra Nevada to abandon their farms and return to Zion.

Unable to find substantial water sources in late summer, Conover and his companions, dehydrated but alive, arrived at the base of the Sierra (Genoa and Franktown) with a message from Brigham Young for the Saints: "rally back to Salt Lake City." Twenty-five days later, "450 faithful Mormons in a long trail of 123 wagons" left on a thirty-seven day journey back to Salt Lake City following the California Trail eastward.⁴³ Their departure left a vacuum eagerly filled by gentiles of Carson Valley and elsewhere. They departed in such a hurry that many Mormons abandoned property or accepted promissory notes that were rarely repaid. Brigham Young's rally-call back to Salt Lake City caused the collapse of Mormon dominance on the far western side of Utah Territory.⁴⁴

Young's call to the Mormon outposts was in response to an event in the spring of 1857 when Secretary of War John B. Floyd sent orders to Fort Leavenworth to create an expeditionary force to bring order to Utah Territory and replace Governor Young. The military force amounted to 2,500 soldiers under the charge of Brigadier General William

⁴³ Zanjani, *Devils Will Reign*, 77-78.

⁴⁴ Zanjani, 58, 61, 65. Sally Zanjani provides an excellent account of early Nevada history on the western side of the state as reflected in her quote of Orson Hyde and the title of her book *Devils Will Reign*. Two years before the Mormons heeded Brigham Young's call back to Salt Lake City, Orson Hyde, one of twelve apostles of the church, arrived on the eastern slope of the Sierra in Carson Valley and reported to Brigham Young: "There are many mormons here, but I fear not saints." He spent the next year securing a Mormon community among a growing number of gentiles. He feared that if the community was not properly secured, then "Devils will reign." In 1856, Hyde departed with his mission complete in the Carson, Eagle, and Washoe Valleys and the Truckee Meadows. Brigham Young's call for a return of the faithful contributed to the collapse of Mormon dominance in Carson Valley.

S. Harney. On June 29, 1857 the Commanding General of the Army explained, “The community and, in part, the civil government of Utah Territory are in a state of substantial rebellion against the laws and authority of the United States.”⁴⁵ General Harney, however, would not lead the expedition into Utah. The Utah Expedition would be put on hold because of turmoil in Kansas over the issue of slavery.

Horace Greeley, editor of the *New York Tribune*, referred to the violent disputes over slavery as “Bleeding Kansas.”⁴⁶ Colonel Albert S. Johnston took the place of General Harney. The latter had been dispatched to Kansas. Compared to “Bleeding Kansas,” Utah seemed of secondary importance until an event in southern Utah on September 11, 1857 marked the eruption of violence in the Territory. Mormons dressed as Indians, and probably in concert with local Paiutes, slaughtered 120 Arkansas pioneers on their way to California at Mountain Meadows in southern Utah. William Dame, under the command of John Lee, was in charge of the troops and gave the order to kill the men, women, and older children. They spared seventeen of the younger children and brought them into the Mormon fold. Brigham Young was increasingly on edge after September 11, especially evidenced by the fact he was aware that Alfred Cumming accompanied Johnston, a non-Mormon designated by President Buchanan to replace the Territorial Governor.

Young’s strategy to defend Zion was to retreat west into the desert. Young referred to this possible retreat into the central mountainous portions of Great Basin as

⁴⁵ *House Executive Document* (No. 2, 35th Congress, 1st session), p. 21. Arrington, *Great Basin Kingdom*, 171.

⁴⁶ Bleeding Kansas can be understood as a general term used to describe the reaction to the 1854 Kansas-Nebraska Act, which established new states as either pro or anti-slavery by popular sovereignty. Kansas became the center of bloody turmoil beginning 1854 where anti-slavery northerners and pro-slavery southerners conflicted over the political and economic future of both state and nation.

the “Sebastopol Plan.” While Salt Lake City might be easy prey for the U.S. Army, unsettled lands to the west in the eastern counties of present-day Nevada offered a defensible refuge with barricading high mountain ranges and perennial water sources. The Sebastopol Plan suggested that Mormons could retreat to isolated portions of the desert where the logistics of supplying a federal army might be the best defense. Young based the Sebastopol Plan on the Russian evacuation of Sevastopol during the Crimean War when a Russian General set fire to the city and retreated inland. In March of 1858, Brigham Young declared that he would “go into the desert and not war with the people [of the United States], but let them destroy themselves.”⁴⁷

In an effort to find sanctuary in the mountains that lay hidden beyond the flats of ancient Lake Bonneville, Young dispatched an expedition into White Mountain Country where, if all else failed, the Latter-day Saints could retreat west, beyond the barren stretches of the Great Salt Desert.⁴⁸ These explorations led to Mormon settlements such as Garrison, Utah along the present border with Nevada in Snake Valley, Panaca to the south in present day Lincoln County, Nevada, and Lund at the northern end of the White River Valley in White Pine County. Young sent two expeditions, one to the southwest from Salt Lake City led by George Washington Bean, and another from the southern settlements of Utah Territory led by William Dame. The historian Clifford Stott refers to the Young’s Sebastopol Plan as a “search for sanctuary.”⁴⁹

⁴⁷ Arrington, *Great Basin Kingdom*, 182-83. Arrington quotes the accounts of Hosea Stout at a “Council of War” in Salt Lake City on March 18, 1858. Also, the Sebastopol Plan referred to the Russian evacuation during the Crimean War.

⁴⁸ Stott, *Search for Sanctuary*, 29, 68.

⁴⁹ Stott, 56-61.

To lead the northern mission, Young chose George Washington Bean, a one-armed Mormon interpreter of Paiute languages, who worked to secure the western lands after the Mexican Cession. He also helped establish the boundaries of Utah Territory. He served as a guide for Lt. Col. Edward Steptoe's 1855 exploration across the Great Basin, which brought Bean to the eastern side of the timber belt. Bean also served as an attachment to Conover's assignment from Governor Young to recall Mormon settlers from the eastern slope of the Sierra. His orders, in 1858, were to search for desert oases as a refuge for the saints. The search for sanctuary, named the White Mountain Expedition, detailed the most extensive information during the 1850s about the remote and little explored ranges on the eastern side of the timber belt.

Colonel William Dame's exploration crossed just south of the present town of Panaca in Lincoln County. While Bean went directly into the eastern side of the timber belt along the 39th parallel, Dame's mission took a different approach. He skirted just below the central portion of Nevada's elevated shelf where a multitude of large springs discharged to form today's Mormon community of Panaca, the railroad community of Caliente, and large springs that rise out of the north end of Paranaghat Valley (Hiko and Alamo). More specifically, Dame traveled along the northern edges of the Colorado watershed and then pushed north into the White River Valley where the present towns of Lund and Preston are located.

Bean and Dame were two of Young's most "trusted frontiersmen" and their expeditions reflected the urgency on the part of Governor Young to, if needed, move the

saints to safety.⁵⁰ Both Bean and Dame embarked on the first attempts to survey for settlements in the interior of the Nevada outback, south of the Humboldt River and north of the Colorado watershed. These Mormon explorations penetrated well into present-day Nevada's White Pine County and the headwaters of the White River (an interior drainage that once flowed from the present towns of Preston and Lund in eastern Nevada into the Colorado River watershed). Perhaps James H. Martineau, cartographer for Dame's southern survey, best summed up the purpose of the expedition into White Mountain Country as a search for some "place of refuge...surrounded by a desert requiring a five day march to cross....Such a desert would be a more formidable barrier than an army of forty thousand men."⁵¹

The efforts of Mormon explorers and surveyors added to knowledge about the eastern side of the timer belt. James Martineau, Bean, and Dame were skilled cartographers, who ordered the Great Basin Kingdom's political boundaries and identified resources and settlements suited to Mormon land uses. Richard Francaviglia argues that Mormon mapmakers, skilled in city plats, had to develop the skills for regional representations so as to reflect their own colonial ambitions. Many Mormon explorers and surveyors developed cartographic techniques while aiding the Army's railroad surveyors of the early 1850s. Mormons, "had to learn the skills of colonial mapmakers who encounter seemingly 'empty' lands and seek to order and control

⁵⁰ Arrington, *Great Basin Kingdom*, 184.

⁵¹ James H. Martineau, "History of the Mission: Exploring the Southwest Deserts of Utah Territory," LDS Archives, entry for May 14, 1858; Richard Francaviglia, *The Mapmakers of New Zion: A Cartographic History of Mormonism* (Salt Lake City: The University of Utah Press, 2015), 131. Richard Francaviglia has recently put together a significant study detailing the contributions of Mormon mapmakers. The recent discovery and publication of Martineau's journals has helped Francaviglia to credit him with significant contributions to mapping the Great Basin. Martineau's work extended into the twentieth century and inspired Francaviglia to declare him a "mapmaker extraordinaire" of his time and place.

them.”⁵² In this way, the White Mountain Expeditions were not only a search for sanctuary, but also part of Brigham Young’s longstanding plans to develop and dominate the Great Basin desert.

In mid-April of 1858, Alfred Cumming, escorted by a large force under the charge of now General Johnston, entered Salt Lake City and immediately calmed the so-called Utah War by negotiating a peaceful settlement that accommodated Mormon interests—particularly economic development tying Utah Territory to markets with transport routes. Young conceded to the presence of the new Territorial Governor Cumming who focused on road building to bring Utah Territory closer to the spheres of American power and influence. Brigham Young remained president of the Church.

Explorers and their efforts to enter the central portion of the Great Basin mainly focused on a way through. As a result, most explorers avoided the mountains that Bean and Dame explored. For the Mormons and their search for sanctuary, higher elevations translated to spring run-off and the possibility for permanent settlements in the interior of the Great Basin. After Bean and Dame explored the eastern portion of present day Nevada, Captain James H. Simpson formally established an official military and transport route across the timber belt transect. Captain Simpson employed Mormon apostate John Reese as a guide. Reese was familiar with the route. He was one of the first settlers at Mormon Station, present day Genoa, and guide for Colonel Steptoe.⁵³

In 1828, James Simpson entered the U. S. Military Academy at the age of fifteen. He fought in the Seminole War in the late 1830s and afterward transferred to the U.S.

⁵² Francaviglia, *The Mapmakers of New Zion*, 84.

⁵³ McLane, “Exploration and Early Mapping in Eastern Nevada,” 287.

Army's Topographical Engineers in 1838.⁵⁴ In the 1830s, the U.S. Army became the builders of western roads. The historian of western expansion, W. Turrentine Jackson remarked that despite western individualism, "the Westerner always sought the aid of the federal government in solving his transportation problem."⁵⁵ This was not a one-way street. As communities developed, the Army established new routes, defense posts, and supply stations for additional surveys. This relationship between settler and federal road builder helped to develop the West. Isolated locales, especially the more remote and marginal became dependent on the routes identified by the Army Corp of Topographical Engineers. In Nevada, this was especially true for the remote mining communities in the outback of the state.

Initial appropriations to develop a federal road system in the United States began in 1802 with the creation of the Corp of Engineers. In 1830, the War Department created the Corps of Topographical Engineers in an effort to "take charge of civil works, including harbor and river improvements together with road construction." By 1837 and the appointment of Joel R. Poinsett as Secretary of War, a federal road building program with the Topographical Engineers in charge was firmly established.⁵⁶ Simpson spent the next two decades working for the Topographical Engineers. In 1849, he began working for the southwestern expeditions of Captain Randolph Barnes Marcy, which Colonel Abert, head of the Topographical Engineers, organized in response to a congressional directive for a 32nd parallel survey. Simpson determined that the route was "superior" and

⁵⁴ Stephen D. Zink, "Forward to the Reprint Edition," *James H. Simpson: Report of Explorations Across the Great Basin* (Reno: University of Nevada Press, 1983), 6a.

⁵⁵ W. Turrentine Jackson, *Wagon Roads West: A Study of Federal Road Surveys and Construction in the Trans-Mississippi West, 1846-1869* (Berkeley: University of California Press, 1952), 1.

⁵⁶ Jackson, 2.

“practical” for a railroad.⁵⁷ The route proved more a political problem than a topographical one when northern politicians and lobbyists argued for a more northern route.

By the summer of 1859, Simpson, who had been attached to the expeditionary force in Utah, received orders to embark on a reconnaissance survey from Camp Floyd, Utah to Genoa, Nevada. He traveled along a transect just north of the 39th parallel that followed much of the Egan Trail. The Simpson route, through the heart of Nevada’s outback timber belt, became not only a major transport line in Nevada for mining and ranching communities, but also part of the Pony Express mail route in 1860-61. After establishing the official route, he concurred with Steptoe’s initial assessment that it was suitable as a wagon road, but not a railroad. With the establishment of this road, new spaces opened to Euro-American settlement including miners returning into Nevada from California, an eastward moving California ranch frontier, and Mormon expansion into the irrigable basins watered by mountain snows in the timber belt of the central portion of Nevada’s outback.

After 1860, the Simpson route connected the various mining ventures from the Comstock to Osceola in the Snake Range. It became a main artery along Nevada’s central transect by the time Congress created Nevada Territory in 1861 at the outset of the Civil War. In 1862, the mining town of Austin became a hub of resource extraction in central Nevada Territory. After Austin, prospectors fanned out eastward to Eureka and Pioche (1864), Hamilton (1865), Newark (1866), Ely also known as Mineral City (1867), Ward, and Osceola (1872) prompting Congress to move the eastern boundary of Nevada

⁵⁷ Goetzmann, *Exploration and Empire*, 272.

Territory farther eastward prior to 1864 at the expense of Utah Territory. When President Lincoln proclaimed the state of Nevada on October 31, 1864, in accordance with Congress's instructions Nevada could look forward to continued expansion of its boundaries.

In 1862, Congress expanded Nevada to include the western flank of the Egan Range where George Washington Bean and William Dame surveyed for a possible Mormon sanctuary less than a decade before (Preston). In 1866, after Nevada statehood (1864), the state boundaries again expanded farther east to include the Snake Range at the borders of ancient Lake Bonneville and the far eastern side of the timber belt in Snake Valley at the present day Nevada-Utah border. In 1867, the state boundaries expanded again to the south to include a significant portion of the Colorado River watershed and the Mojave Desert that had been part of the Mormon Dixie lands (where Mormons grew cotton and other crops in southern Utah and Northern Arizona Territories). After 1867, the political boundaries became the approximate borders of present-day Nevada, which included the entire portion of the Nevada timber belt.

Elevating the Great Basin

The effort to better know the land and what it had to offer brought surveyors and scientists into the basin who worked to create a landscape legible to Euro-American constructs of knowledge. From his 1859 survey of the central Great Basin in northern Nevada, Captain Simpson concluded that Frémont was correct about the internal drainage of the basin, but under-estimated the extensive structures of the mountains. According to Simpson, the basin was "not destitute of mountains. The fact, on the contrary, is that it is

probably the most mountainous region, considering its extent, within the limits of our country."⁵⁸

The mining geologist Henry Engelmann, attached to the Simpson Survey, suggested that Frémont's Great Basin gave a "...wrong impression of its hypsometrical condition." In other words, much of the region is elevated and not a basin at all, but a mountainous region with a complex of high desert basins interrupted by "gigantic mountain ranges at its center" running north and south.⁵⁹ In 1886, *The Report of the Director of the United States Geological Survey* included a section on the geological structures of the Southwest by Clarence Dutton. An acclaimed geologist by the 1880s, Dutton described the basin and range mountainous structures as "a great belt of cordilleras coming up through Mexico and crossing into the United States territory" composed of "abrupt ranges or ridges, looking upon the map as an army of caterpillars crawling northward."⁶⁰

The contiguous geologic structure described as "caterpillars crawling northward" extends much farther south than the hydrologic Great Basin of northern Nevada—all the way into present-day Mexico. The Great Basin is also basin and range country containing more than 400 mountain ranges. During the nineteenth century, geologists contemplated the geologic history of the region as an isolated structure that produced a varied array of phenomena associated with orogenic (mountain building) processes. These mountain

⁵⁸ John H. Simpson, *The Shortest Route to California* (1869), 35.

⁵⁹ Henry Engelmann, "Report on the Geology of the Country between Fort Leavenworth, Kansas, and the Sierra Nevada, Near Carson Valley," Captain James H. Simpson's, *Report of Explorations Across the Great Basin of the Territory of Utah for a Direct Wagon-Route from Camp Floyd to Genoa, in Carson Valley, in 1859* (Reno: University of Nevada Press, 1983), 301. First published by the Government Printing Office, 1876.

⁶⁰ Clarence Dutton, "Mount Taylor and the Zuni Plateau," 116.

structures shared similar traits, both in time and place, but there was no overarching theory to bring the geologic region together—only the misleading idea of a basin that, in fact, drained internally into higher basins and taller mountains prominently standing equal to or above the boundaries of the supposed bowl. Geologists of the era referred to the region as a basin-range structure.

By the time Euro-American surveyors examined the central Great Basin, Charles Lyell's use of Uniformitarianism was an entrenched method for understanding the history of rock formations on the earth. Sir Charles Lyell (1797-1875) was a gentleman-scientist from England in the early to mid-nineteenth century. Following in the footsteps of James Hutton and William Smith, he contributed to a method of understanding geologic structures that opened the door to the concept of deep time. He, along with his colleagues, avoided the all-encompassing eighteenth century theories of catastrophism, neptunism, and plutonism, which explained geologic structures as catastrophic events, aqueous precipitates, or volcanic actions respectively.⁶¹ Lyell used all these processes, albeit in slow motion, by extending time to provide perspective for change on the earth's surface over the course of hundreds of thousands of years.⁶²

⁶¹ A. Hallam, *Great Geological Controversies*, 2nd ed. (Oxford: Oxford University Press, 1989), 1-2.

⁶² Martin J. S. Rudwick, *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists* (Chicago: University of Chicago Press, 1985), 17-18. Rudwick provides a historical account of not only methods and theories of geology, but interconnects the disciplines of history and geology as two forms of investigations into a past where only artifacts, or fragments, remain that have allowed both present-centered histories and non-speculative narratives to come to fruition. In other words, Rudwick uses the Devonian controversy to illustrate that the chronological layers of evidence, whether in archives or stratified layers of rock, create complicated and uncertain evidence that tend to distort the past and ultimately offer causation as a way to legitimate unfounded connections. Rudwick argued that gentleman scientists in the early nineteenth century unraveled these potential spurious correlations between cause and effect in the stratigraphically layered earth. Though Charles Lyell often fell into unfounded theoretical speculation, according to Rudwick, he also provided a measure for gentlemen scientists to challenge the distance between speculation and proof.

The use of an extended time reference, which was a break from geological accounts supported by a biblically based time frame, enabled early nineteenth century natural historians to bypass causal debates associated with grand theories of the earth and concentrate on present processes that tended toward uniform changes of uplift, deformation, and erosion over millennia.⁶³ Lyell famously commented, "The present is the key to the past," which was an extension of James Hutton's suggestion that, "[It] is the little causes, long continued, which are considered as bringing about the greatest changes of the earth."⁶⁴ Published between 1830 and 1833, Lyell's three volumes, titled *Principles of Geology*, popularized an influential method for investigating geomorphological processes and consequently geological history and biological evolution throughout the nineteenth and early twentieth centuries.

For example, Charles Darwin carefully studied the first volume of *Principles* on his voyage aboard the *Beagle*, which helped guide his perspective for change over time.⁶⁵ Darwin used nature as a platform for the mechanisms of selection and variation as causal agents of change in species with an acute eye for how a long timeframe may play a role in life's "entangled bank."⁶⁶ Geology lacked a guiding mechanism, or theoretical

⁶³ Stephen Jay Gould, *Time's Arrow Time's Cycle: Myth and Metaphor in the Discovery of Geologic Time* (Cambridge: Harvard University Press, 1987), 5-6. Gould uses Hutton and Lyell to break down biblical time by focusing on observation before speculation and the use of empirical evaluation of process over theoretical causation. As Gould broke down these dichotomies that stemmed from Aristotle and Plato; Bacon and Descartes, he commented that, "they are simplifying models for organizing thought, not ways of the world." (9). Too often, the history of geology is taught as "textbook cardboard" in a whiggish mode in an effort to show that observation overcame superstition. The context of the time was never so simple and the brief discussion on the history of geology in this dissertation does not wish to fall into such simplistic speculation either, although a change of investigating the earth was clearly underway.

⁶⁴ James Hutton, *Theory of the Earth: with Proofs and Illustrations*, Vol. 2 (1795), 205.

⁶⁵ Janet Browne, *Charles Darwin: Voyaging* (Princeton, New Jersey: Princeton University Press, 1995), 186-190.

⁶⁶ Joel B. Hagen, *An Entangled Bank: The Origins of Ecosystem Ecology* (New Brunswick: Rutgers University Press, 1992). Hagen's book provides an account of how Darwin's idea of an entangled bank provided the roots to twentieth century ecology.

framework for change, but Lyell and other gentlemen of science (natural historians and natural philosophers) offered a methodological approach to explain process as a slow uniform transformation of the land. At the heart of Lyell's method was an empirical approach to studying the Earth; one that the new professional geologists hoped would never fall into the depths of speculation. An extended time frame provided a new and powerful operative for change without a causal, or definitive, theory of the earth.

During the nineteenth century, the art of studying rocks and their history transformed from a gentleman's activity to a professional discipline. The science of geology, as a specialized discipline, arose out of scientific societies, universities, and the state's agenda to maximize resource development. In the western United States, settlement and science converged on the land at a time when industry propelled economic opportunity as part of discovery. Geologists served two fronts as they explored the Great Basin. On one front, they served the interests of empire and western expansion. On the other front, they served the interests of disciplinary knowledge concerned with the formation of the earth over time. Their two interests were not necessarily exclusive, but often served one another for the purposes of colonial and imperial endeavors.

In 1866, Clarence King convinced the War Department to consider his lead on a project brought to his attention while working on the California Geological Surveys under Josiah D. Whitney. King wanted to lead the fortieth parallel survey to assess the resources along the unfinished route of the first transcontinental railroad. King received commission for the survey from the Secretary of War, Edwin M. Stanton. General Andrew A. Humphreys oversaw the project and allowed King much leeway concerning the logistics and direction of the survey. King hired only civilian scientists, including

three geologists: James D. Hague, Arnold Hague, and Samuel F. Emmons; one botanist, William W. Bailey (later replaced by Soreno Watson after Bailey suffered health problems); four topographers, James Gardner, Henry Custer, F. A. Clark, and W. E. Wilson; one ornithologist, Robert Ridgeway; and photographer, Timothy O' Sullivan. A group of teamsters and camp personnel supported the efforts of the survey team along with Sergeant Edward Schwartz of the 8th Cavalry as escorts.

King's survey was an army-sponsored expedition concerned with settlement and resources.⁶⁷ In the preface to the *Atlas*, King admitted that his survey was a reconnaissance mission as opposed to a technical geodetic survey.⁶⁸ A reconnaissance was consistent with War Department surveys, but King's selection of personnel suggested an emphasis placed on science. He used the opportunity to delve into a scientific discourse while contributing to the priorities of the Army along the parallel. As one author argued, King was a Humboltean. That is to say, he prioritized experience in nature where knowledge of numerous phenomena, well documented, can create an epiphany for the whole: unity in diversity.⁶⁹

King's government sponsored survey enjoyed the freedom to include personnel outside of the military. Although his geological maps stand out as a valued economic product of his survey, he also sharpened the discourse concerned with the formation of basin and range geology. The King survey of the Great Basin marked a transition in

⁶⁷ William H. Geotzmann, *Exploration and Empire*, 430-435

⁶⁸ Clarence King, "United States Geological Exploration of the 40th parallel" (Vol. 1, 1878), 735.

⁶⁹ Aaron Sachs, *The Humboldt Current: Nineteenth Century Exploration and the Roots of American Environmentalism* (NY: Penguin Books, 2006), 18, 25, 346. Sachs takes William Goetzmann's arguments in *Exploration and Empire* to suggest that nineteenth century surveyors were not only in the service of American empire building, but also interested in a unifying scientific endeavor to uncover the diverse interconnections of nature—similar to Alexander von Humboldt's deep interests in a unifying knowledge for diverse experiences.

western exploration that went so far as to consider the grand designs of nature that had been circumvented by the quest for more specialized forms of knowledge. King was an astute geologist and observer who recognized the value of nature's laboratory in scientific investigations and carefully integrated specialization into grand designs.⁷⁰ In this way, surveyor-scientists grappled with the realization that the American West provided information of nature's grand design and at the same time provided a laboratory for new specialized disciplines.

In the Great Basin, King's geological work, along with the Hague brothers and Emmons, identified a historical plateau that underwent monoclinical activity and then further expressed synclinal and anticlinal action. This is to say, King understood that faulting and folding created the "basin-ranges" at various intervals. He commented, "The result of this complicated interlacing system of dislocation is that all the ranges of the Great Basin are broken into irregular blocks, sections of which have sunk many thousands of feet below the level of the adjoining members."⁷¹ He suggested that the region was once a contiguous block, similar to the Colorado Plateau, but one that went through processes of deformation. He posited that the basin-range structure once took shape by compression to create a high plateau and furthered its deformed character by faults struck on either east or west trending forces. In other words, the plateau broke apart. King's assessment, according to the 19th century geologist Grove Karl Gilbert,

⁷⁰ Sachs, 238-239

⁷¹ Clarence King, "United States Geological Exploration of the 40th parallel," 735.

influenced the discussion of basin-range structure for the next half-century, especially with regard to dating its mountainous formations from Paleozoic and Mesozoic origins.⁷²

Grove Karl Gilbert was a lasting figure in the Great Basin geological discourse long after his death in 1918. Gilbert served as geologist for the surveys west of the one hundredth meridian in the Great Basin during the early 1870s under the charge of George Montague Wheeler. He later departed the Wheeler surveys to assist John Wesley Powell in his studies of the arid regions in the American Southwest. The Wheeler Surveys were probably the most ambitious of government explorations to organize the lands west of the one hundredth meridian into ninety-four geodetic quadrants. Wheeler, as with King, received support from the War Department. Unlike King, Wheeler was a West Point graduate (King graduated from Yale) steeped in the efforts of military support for western settlement. In 1869, his first survey began at Halleck, Nevada. His team was primarily composed of Army Corps of Engineers personnel. The Army Corps had long set the standard for survey teams, especially during the 1850s railroad surveys.

After the 1848 Treaty of Guadalupe Hidalgo and prior to the Civil War, the Army Corps of Engineers staffed the exploration teams who gathered information on the physical geography to be compiled by the Chief of Engineers. Post-Civil War expansion west brought a new era of surveys focused less on military needs and demands. For example, the King survey and Wheeler's first survey can be distinguished by the fact that King had no army personnel, except escorts. Wheeler used enlisted men, except teamsters and camp personnel, similar to the antebellum surveys. After 1869, Wheeler included additional civilian scientists and a reporter named Frederick W. Loring in an attempt to

⁷² Grove Karl Gilbert, "Studies in Basin-Range Structure" (Washington: Government Printing Office, 1928). In addition, Gilbert credits King with coining "Basin-Range Structure."

bring attention to the efforts made by the Army Corps to settle the West and make known opportunities for settlement and resource extraction, especially mining. By incorporating civilian scientists into army surveys, the Army recognized the broader goals of its work and weakened its future leadership in the survey enterprise.⁷³ Wheeler reflects this transition at a time when scientific knowledge became as important, if not more than, the military goals of pacifying the West and protecting it for settlement. The new scientific surveys sought to establish how resources could be ordered for sustained settlement.

Lieutenant Wheeler was one of the last great Army surveyors of the late nineteenth century. In his first survey into Nevada's Great Basin (1869), Wheeler quickly traveled south from the transcontinental railroad along the eastern border of Nevada and into the White Pine Mining District (established 1865). King already surveyed much of the land surrounding the rail line through Fort Halleck and Wheeler sought to assess the potential mining districts and settlements south of the railroad in the outback of eastern Nevada. On June 7, 1869, Assistant Adjutant General John P. Sherburne detailed the goals of the survey. The parameters included a "reconnaissance," if practical, to extend as far south to "the head of navigation on the Colorado River, with a view of opening a road thereto from the White Pine or Grant [mining] District." In addition, the survey team would produce "a military map of the country, and for the selection of the site or sites for such military post or posts to cover the mining country south and east of White Pine from hostile Indians, as may be required."⁷⁴

⁷³ William Goetzmann, *Exploration and Empire*, 467.

⁷⁴ John C. Sherburne, "Special Orders 94: Headquarters Department of California," in *Preliminary Report on a Reconnaissance through Southern and Southeastern Nevada, Made in 1869*, by George Montague Wheeler (Washington: Government Printing Office, 1875), 7.

As with most military surveys, the roads, posts, and assessment of potential “hostiles” remained paramount, but Wheeler also considered the importance of the physical geography of the country for settlement, especially “its resources in wood, water, agriculture or mineral productions.”⁷⁵ On July 13, Wheeler set out from Halleck, Nevada on his first expedition into Nevada’s high desert. His survey team consisted of 36 persons, 8 wagons, 48 mules, and 31 horses. Wheeler concentrated his main route south through Steptoe, Cave, Meadow, and Paranaghat Valleys. In the north (Steptoe and Cave Valleys), the team surveyed the surrounding countryside, including west into the White Pine Range and east into the Snake Range both on the eastern side of Nevada’s timber belt.

The mining town of Hamilton in the White Pine Range was one of promise in 1868. Western historian, W. Turrentine Jackson in his 1963 book *Treasure Hill* argued that the White Pine Mining District portrayed a dismal picture of the waste and futility common in mining towns that underwent boom and bust cycles of the nineteenth and early twentieth centuries. For example, the mines in the White Pine Mining District started to boom in 1867 and peaked in 1868-69. In the spring of 1868, after the snows retreated and routes opened, a train of twenty-seven wagons arrived with supplies from Salt Lake City initiating a constant arrival of wagon trains, pack trains, and stages into Hamilton where the, “thoroughfares were soon lined with pack mules, so crowded that it required ‘generalship of vaqueros to segregate them on main street.’”⁷⁶ Investors from San Francisco, New York, and especially London speculated on another Comstock Lode

⁷⁵ Sherburne, 7.

⁷⁶ W. Turrentine Jackson, *Treasure Hill: Portrait of a Silver Mining Camp* (Tucson: The University of Arizona Press, 1963), 47; *The Inland Empire*, April 22, 1869.

propelling the town of Hamilton to ten thousand residents and the entire population of the mining district to 30,000 people—all within a year and a half. Supply routes ran in all directions to Reno, Salt Lake City, Halleck (and later Elko), and Pioche. The *Overland Monthly* reported in March of 1869 that the roads to Hamilton suffered from: “Long lines of mules and oxen, drawing heavy wagons, laden with supplies of every kind—mill machinery, whiskey, provisions, whiskey, hardware, whiskey, mule feed, and whiskey again.”⁷⁷

Wheeler’s survey arrived in the latter part of 1869 to find a bleak future for the mining district where no fissure veins could be identified to sustain the excitement less than a year before. Wheeler commented:

The excitement of the fall of 1868 and succeeding winter was so much greater than the size and richness of the place demanded, that the consequent reaction had caused great distress among the working classes, and the streets of Hamilton were thronged with hardy miners and rough mountain men, without anything to do and without money.⁷⁸

Hamilton did not endure, but its brief success illustrated that the central and eastern portions of Nevada’s outback could be accessed and settled with the proper amount of outside capital investment. Indeed, other towns along the timber belt continued to thrive after their initial booms in the 1860s, including Austin (1862), Eureka (1864), and Pioche (1863). Along with the short-lived Pony express trail (1860-61), the mining towns through the central transect of Nevada’s timber belt became a part of a well-worn

⁷⁷ Russell R. Elliott, “The Early History of White Pine County, Nevada, 1865-1887,” *The Pacific Northwest Quarterly*, 30, 2 (April, 1939): 153-154. Albert S. Evans, “Up in the Po-go-nip,” *Overland Monthly* (San Francisco, March, 1869), II, 273.

⁷⁸ George Montague Wheeler, *Preliminary Report on a Reconnaissance through Southern and Southeastern Nevada, Made in 1869* (Washington Printing Office, 1875), 8.

throughway suitable to wagon travel that had been originally proposed by Lieutenant Colonel Steptoe in 1855 and surveyed by Captain Simpson.

Wheeler continued his reconnaissance through the eastern side of White Pine and Lincoln Counties in eastern Nevada. He recognized that some major veins of valuable ore might still be discovered and determined that much of the region promised the potential for further settlement to support mining communities based upon assessments of ore in the mountains and water to sustain communities from groundwater, especially artesian springs.

Wheeler's work in the far eastern border of Nevada, included a survey of the Snake Range. The main camps for the survey remained in Cave Valley to support a small group that departed for the Snake Range, the easternmost range of the timber belt. Of particular interest, for Wheeler, was a lake suspected to be in Utah Territory named Preuss Lake by Frémont after his diligent, yet troubled, Prussian cartographer Charles Preuss. For Wheeler, the lake proved disappointing, but he did ascend Jeff Davis Peak (named by Colonel Steptoe in 1855), highest point in the vicinity. The party determined a height above 13,000 feet and, according to Wheeler, the Nevada state mineralogist, Professor A. F. White, recommended that the mountain be officially renamed Wheeler Peak.⁷⁹ Maps soon showed the new name and today the mountain remains one of the Great Basin National Park's most spectacular physical features.

Between 1869 and 1872, Wheeler made three trips into the eastern portion of the Great Basin. In 1871, he embarked on his second survey of the region to survey west of the Nevada-Utah border turning to the southwest into Death Valley. In an effort to make

⁷⁹ Wheeler, 62.

the War Department survey more acceptable to Congress and additional appropriations, he employed civilian scientists, a journalist (Loring), a photographer (O'Sullivan), and geologist Grove Karl Gilbert who had been working for the Ohio State Geological Survey.

As noted earlier, Gilbert, not an enlisted man, became one of the preeminent American geologists of the late nineteenth and early twentieth centuries. After Wheeler, Gilbert worked for John Wesley Powell. He joined the United States Geological Survey in 1879, first as Director of the Great Basin Division then the Appalachia Division. In 1889, he became Chief Geologist for the United State Geological Survey. As part of Wheeler's surveys, Gilbert identified four primary features concerned with basin and range geology. First, he pointed out that the ranges were not formed at the same time, but had similar characteristics expressed over a large area, which ran parallel, recurred in moderate dimensions, and at regular intervals. Second, the ridges of the ranges were not the product of erosion, but of uplift. Third, the prevalence of faulted monoclinals indicated that the ranges were products, at least in part, of vertical action and not horizontal. For his fourth and final characteristic, Gilbert reiterated the first three findings and turned to the fact that the points of action that created the basin-range structure were hidden from empirical evaluation. He stated:

We may say, without fairly entering the field of speculation, that the forces which have been concerned in the upheaval of the Basin Ranges have been uniform in kind over large areas; that whatever may have been their ultimate sources and directions, they have manifested themselves at the surface as simple agents of uplift, acting in vertical or nearly vertical planes: and that their loci are below the immediate surface of the earth's crust.⁸⁰

⁸⁰ Grove Karl Gilbert, "Report on the Geology of portions of Nevada, Utah, California, and Arizona, examined in the Years 1871 and 1872" *United States Geographical and Geological Surveys West of the 100th Meridian*. Annual Report vol. 3, 1875, 41.

Gilbert's attempts to explain the processes that created the mountains in the Great Basin avoided speculation and he stated with satisfaction that the ultimate forces remain unknown and hidden below the surface of the earth's crust. He later recalled, in 1877, that John Wesley Powell agreed with this general assessment of basin-range structure. He also credited King for founding the discourse and with publishing the monoclinical faulting trend in 1870.⁸¹

By 1880, according to Gilbert, three points could simplify the discourse: one, the basin range structure was a product of faulting that exposed earlier folds; two, the faults were subject to erosion on one side and exhibited dramatic relief on the opposite point of action; three, basin fill covered much of the points of contact that created the basin-range structure. In other words, the evidence for processes that created the basin-range structure remained far under the basin floors. Clarence Dutton, a master of geological metaphors and analogies expressed the structure of the region as "corrugated by folding."

Dutton focused on the Utah Plateau Province while working under John Wesley Powell. His famous statement that the basin-ranges appeared as "caterpillars rushing northward from Mexico" has long been misquoted, but the metaphor has remained consistent with his original vision in 1885. Gilbert attributed to Dutton, "The idea that the Great Basin district, corrugated by folding at the end of the Jurassic period, had been reduced by erosion to a condition of low relief aids the conception that the mountains of to-day were created by later and disruptive deformation." He added that it was "Dutton's addition, although King had paved the way for it by pointing out that the district had

⁸¹ Grove Karl Gilbert, "Studies in Basin-Range Structure" (Washington: Government Printing Office, 1928) professional paper 153, 2.

furnished a great body of sediment to Cretaceous seas farther east.”⁸² Put simply, the geologists of the nineteenth century argued that a cross section of basin and range geology resembled a corrugated box where a high plateau broke apart to create large mountains, subject to uplift, and consequently eroded to create a basin fill between the valleys, hence basins. To bring the analogy a step further, the mountains could be likened to an older somewhat dilapidated cardboard box where the air pockets deflated and filled with detritus and water.

In addition to the processes that created the mountains in the Great Basin, King, Gilbert, and Dutton recognized evidence of two large lakes that formed in recent geologic history: Lake Bonneville on the eastern side of the Great Basin and Lake Lahontan on the western side. It was the work of Israel C. Russell who brought the history of the two lakes into focus as actors in this geologic drama.

In 1878, Russell joined the Wheeler Surveys of western Utah as an assistant to J.J. Stevenson, at which time he became more familiar with the geologic work of Grove Karl Gilbert. Gilbert named Lake Bonneville in 1875 after Benjamin Louis Eulalie de Bonneville, an explorer, fur trapper, and army officer in the American West. Clarence King named Lake Lahontan after Baron de LaHontan (1666-1716), the French explorer of Canada and upper Mississippi Valley and author of a popular catalogue of his adventures. Russell’s knowledge of geology was first structured by Gilbert and later came to fruition when he surveyed northwestern Nevada and eastern California between the years of 1881-1884 under the direction of Clarence King and John Wesley Powell, who were the first and second Directors of the United States Geological Survey

⁸² Grove Karl Gilbert, “Report on the Geology of portions of Nevada, Utah, California, and Arizona, examined in the Years 1871 and 1872,” 41.

(established in 1879). Throughout the 1880s, Russell enjoyed friendly conversation and instruction from Gilbert at weekly lunches known as the “Great Basin Mess.” In these brown bag lunches numerous geologists, part of a clique associated with Director Powell, focused their research on the Great Basin and other places where geologic processes informed their discussions. The discussions were semi-official meetings that offered camaraderie and intellectual stimulation.⁸³

Between 1881 and 1884, Russell examined the ancient lakebeds of Lahontan and Mono. He carefully mapped their ancient shores and turned his attention to the remains of glacial features left over from the last ice age. Adding to the work of Clarence King and G. K. Gilbert, Russell published extensively on the Great Basin.⁸⁴ Russell’s publications in 1885 and 1890, with the USGS, unraveled “the complicated pattern of changing ice age landscapes in the region.”⁸⁵ Gilbert and Russell are now credited with placing the geologic effects of the Great Basin in the Quaternary Period. In the process, they set the scientific foundations for understanding the most recent geologic period in the Great Basin. The Quaternary Period is made up of the Pleistocene Epoch (2 million years ago to 10,000 years ago) and the Holocene Epoch (post-glacial, 10,000 years ago to present). The only glacier in Nevada left from the pre-Holocene Epoch is on the eastern side of Wheeler Peak in the southern Snake Range on the far eastern edge of Nevada’s timber belt.

⁸³ Stephen J. Pyne, *Grove Karl Gilbert: A Great Engine of Research* (Austin: University of Texas Press, 1990), 162-63.

⁸⁴ James A. Young, “Israel Cook Russell in the Great Basin,” *Nevada Historical Society Quarterly*, XXIV, 2 (Summer 1981): 160-162.

⁸⁵ Frank L DeCourten, *The Broken Land: Adventures in Great Basin Geology* (Salt Lake City: The University of Utah Press, 2003), 196. In addition, the ancient Lake that remains today as Mono Lake was once named Russell Lake.

The geologic development of the basin-range structure remains a disputed issue among scientists. Geologic history is an imprecise story based on precise evidence. To assist geologists, the modern theory of plate tectonics, developed during the 1960s and 1970s, provided a wealth of information for how the basin-range structure formed. Most mountains in the geologic past have formed by compression of the earth's plates. This process is how the initial Great Basin plateau formed when the Farallon Plate slammed into the North American Plate that eventually subducted, or swallowed, the Farallon Plate over the course of millions of years. Over the last several hundreds of millions of years the plateau has been stretched, or pulled apart, which is a less common orogenic process among the mountain structures of today.

Plate tectonics, the grand mechanism behind geologic change, did not become an accepted theory until the 1970s. Alfred Wegener first proposed the idea of continental drift in 1912 with questionable evidence. He argued that continents drifted on the crust due to the earth's rotation. In his 1915 publication, *The Origin of Continents and Oceans*, he argued that a super continent, Pangaea, first formed in the Antarctic and due to centrifugal forces, continental landmasses moved about as evidenced by fossil records and the continental puzzle patterns remaining across the face of the globe.⁸⁶ Wegener's approach to investigating his hypothesis of continental drift used millions of years as a way to deliver his ideas, but still could not prove an acceptable theory concerned with the actual mechanisms that shaped the land formations on the earth. Another fifty years passed until plate tectonics developed as a reasonable theory for how the earth's land

⁸⁶ Alfred Wegener, *The Origin of Continents and Oceans*, (New York: Dover Publications, 1966), first published, 1915.

formations came into existence.⁸⁷ Numerous studies unfolded during the 1960s, including but not limited to, sea floor spreading, paleomagnetism, and earthquake data, to provide a viable theory for continental drift, mountain building, earthquakes, and volcanoes.⁸⁸ In appropriate geologic methodology, plate tectonics provided a patiently awaited mechanism for Charles Lyell's empirical approach to studying the formations on the earth.

In 1981, John McPhee's literary skills described a basin and range structure focused on Dutton's army of caterpillars. In consultation with geologists, McPhee popularized tectonic processes and brought focus to the Great Basin region, a place situated at the northern half of basin and range geology. "Basin. Fault. Range. Basin, Fault, Range," McPhee exclaimed lyrically that the Great Basin region could be likened to "stretch marks" on the land where two of the earth's plates have collided and pulled away from one another, but they resist and snap back together. Most of the earth's mountain building processes are the result of compression. Conversely, "The crust--in this region between the Rockies and the Sierra--is spreading out, being stretched, being thinned, being literally pulled to pieces."⁸⁹ The crustal plates pull apart and snap back together to create mountains through a process of block faulting and have eroded their flanks to create basins, as opposed to valleys, in between the mountain ranges.

Few places on earth could be said to have stretched as far as the basin-range structure. As geologist Keith Heyer Meldahl explained, if one were to add up all the

⁸⁷ Naomi Oreskes, *The Rejection of Continental Drift: Theory and Method in American Earth Sciences* (New York: Oxford University Press, 1999), 5-6.

⁸⁸ Naomi Oreskes (ed), *Plate Tectonics: An Insider's History of the Modern Theory of the Earth* (Cambridge: Westview Press, 2003), 3-27.

⁸⁹ John McPhee, *Basin and Range* (New York: Farrar, Strauss, Gerrar, 1981), 49

displacements and faults between Reno and Salt Lake City, “you come up with 250 miles of east-west extension.” Given that the present distance is more than 450 miles, the east-west stretching has more than doubled in distance since the basin and range orogenies (20 mya) began to pull apart a high plateau that had formed before and during the Sevier orogeny (100 mya).⁹⁰ It is difficult to conceive of basin and range geology, but it is a physical landmass that has held the state of California to the rest of the contiguous lower forty-eight states—a charge that early travelers placed on the region without knowing that their commentary of a land holding one part of creation to another was at least partly true.

Geology is often a precise science. Conversely, geologic history is similar to human history. The artifacts remain scattered about and the remnants await interpreters to form a collage. Nineteenth century geologists were bricoleurs. They used a variety of seemingly disconnected evidence to construct knowledge based on observation and description. King, Gilbert, Dutton, and Russell recognized the importance of high mountain formations, or perhaps artifacts of rock, in the Great Basin as remnants of a time long past. In turn, they identified and ordered the geology of the region both in time and place. Surveyors and geologists recognized the Great Basin’s basin-range structure as a curious place where obtaining knowledge took patience as would settlement on marginal lands.

Throughout its history, the Great Basin presented an obstacle to overland passage. Access through and around its mountainous structure began along the routes that held one useful American environment to another. Although Mormons, ranchers, and miners came

⁹⁰ Keith Heyer Meldahl, *Hard Road West: History and Geology along the Gold Rush Trail* (Chicago: University of Chicago Press, 2007), 123, 195-97. Meldahl makes note that plate movement was critical to understanding the creation of the mountains by volcanic action and subduction from the Farallon Plate that triggered the Nevadan, Sevier, and Laramie Orogenies off the west coast of North America, 199.

to the region and various entrepreneurs and travelers took advantage of increased access routes, especially after the construction of the transcontinental railroad (1869), the timber belt remained sparsely settled and the attractions of its high alpine environments eluded interest. As with most histories, exceptions to the rule are prevalent in the Great Basin. Settlers, prospectors, and surveyors continued to explore and settle along the timber belt and often reconditioned their perspectives of the environment for sustainable land use possibilities. First came Mormons in search of sanctuary, and afterward, miners from California prospected for a new El Dorado where some settlers found permanence with stock grazing along river bottoms and in the high mountain meadows.

The first major settlement around rich precious ores in the Great Basin occurred on Mount Davidson in 1859 on the western anchor of the 39th parallel where Nevada's timber belt extends into the Sierra's Lake Tahoe. Through the second half of the nineteenth century, the western anchor of the timber belt proved essential for successful underground mining enterprises in Nevada's rich Comstock Lode. After 1860, prospectors and a ranch frontier quickly moved east into the Great Basin's mountainous transect.

Chapter Two

A Nevada Anomaly, 1859-1905

On July 18, 1861, Samuel Clemens and his brother Orion departed St. Louis, Missouri on the Overland Stage. Orion's appointment as Secretary of the new Nevada Territory brought the brothers to Carson City via the Central Route through Nevada. James Hervey Simpson surveyed this approximate route in 1859, which transected central Nevada and the timber belt. Upon arriving in Nevada's timber belt Samuel recalled in *Roughing It* (1872), under his pen name Mark Twain: "We passed the highest mountain peaks we had yet seen." The following day, the coach crossed the Reese River Valley where the brothers, "encountered the eastward-bound telegraph-constructors at Reese River station." In their excitement, they paused their journey to send a message to Nevada Territorial Governor James Nye of their expeditious arrival to Carson City. On the twentieth day after leaving Missouri, the brothers arrived at their destination in Carson City, located between the Comstock and Lake Tahoe.¹

The 1858-59 discovery of the Comstock with its rich silver and gold ore in far western Utah Territory in the Virginia Range led to the development of an urban complex built on deep shaft underground industrialized mining. The 1859-60 "Rush to Washoe" brought scores of wealth seekers and settlers to the region. By 1861 rapid development of the Comstock created instant towns and provided the political momentum to persuade

¹ Mark Twain, *Roughing It* (Harford, Connecticut: American Publishing Company, 1872), 151. The Pony Express lasted only a short time between the spring of 1860 and November of 1861. The express mail route created an infrastructure with resupply stations every ten to twenty miles and opened the door to travel along the Timber Belt. The Overland Stage referred to it as the Central Route. The completion of the Pacific Telegraph in 1861 made overland Pony Express route across the timber belt obsolete.

Congress to carve Nevada Territory out of Utah's western counties.² Transportation routes integrated the central complex of Comstock mining towns consisting of Virginia City, Gold Hill, and Silver City into a network designed for exporting ore and importing resources and supplies.

The Lake Tahoe Basin in the Sierra, only sixteen miles from Virginia City, had an abundance of forests. Mature stands of timber brought the axe to in a place where the principal feature was scenic mountain lake. Beginning in the mid-1860s, Lake Tahoe became a favorite summer destination making for an early tourist industry as a by-product of logging and lumbering residents on the Comstock used the resource-transportation infrastructure to escape the hustle and bustle of their increasingly industrialized lives.³

In the 1860s and 1870s, the clear cutting of the forests at Lake Tahoe for the bracing of Comstock mines transformed an environment that would have otherwise

² J. Rosse Browne, *A Peep at Washoe and Washoe Revisited* (Balboa Island, California: Paisano Press, 1959), 64-65; Gunther Barth, *Instant Cities: Urbanization and the Rise of San Francisco and Denver* (New York: Oxford University Press, 1975), 140. According to Barth, distinguishing characteristics of instant cities such as San Francisco were that they developed rapidly and in a constant state of flux. Virginia City, operated as a hinterland metropole and helped San Francisco to develop rapidly due to the wealth delivered to California from the Comstock. Gray Brechin, *Imperial San Francisco: Urban Power, Earthly Ruin* (Berkeley: University of California Press, 2006), 41.

³ The southern end of Lake Tahoe is on the 39th parallel at the point where the California-Nevada state line diverges off the 120th meridian and orients in a southeasterly direction toward the Colorado River. The eastern side of the lake lies within the state of Nevada. This resource rich part of Nevada provided lumber for the Comstock, Carson City, Reno, and the surrounding region. Opportunities proliferated from a combination of resource dependent communities at the lake, including but not limited to, mining, logging, fishing, and ranching. Between 1860 and 1890, mining was the dominant economic engine for the region and centered at Virginia City on the Comstock. The eastern shores of Lake Tahoe are entirely in Nevada's portion of the Carson Range of the Sierra. The lake's outlet flows into the Truckee River, north through California for approximately thirteen miles, then turns east into Nevada where it terminates at Pyramid Lake. As a result, all of Lake Tahoe is part of the hydrologic Great Basin and its resources have had a significant role in the development of western Nevada. The Nevada-California border is one of the most surveyed boundaries in the United States. The official boundary was not settled until 1980 when the Supreme Court ruled in favor of the Alexis von Schmidt survey (1873) from Oregon to North Lake Tahoe and the United States Coast & Geodetic Survey line (1899) from the South Lake Tahoe to the Colorado River. John P. Wilusz, "The Colorful History of the California/Nevada State Boundary," *Professional Surveyor* (January, 2002).

remained inaccessible for years and probably decades. “Landscapes of work” and “landscapes of leisure” developed in tandem at the lake where the timber industry cut the forests but also opened a place of scenic attractions and recreational opportunities.⁴ Between 1860 and 1900, the extraction of Comstock ores, the spoliation of Tahoe forests, and the presence of a scenic alpine lake combined to found the beginnings of a tourist destination at the lake.

The Lake Tahoe landscape can be divided into three visions for America’s wild and scenic places in the West: a useful nature, a scenic nature, and a conserved nature. The first American vision suggested that nature was useful as a resource for economic progress. Barons of industry put to work throngs of men and women who exploited natural resources and built a transport infrastructure across the continent. Land was an abundant commodity in America and the use of its resources simply reflected the beginning of settlement and order. During the mid-to-late nineteenth century, industries plundered the American environment. The American environmental historian, Arthur Ekrich comments: “Seemingly, most Americans were unworried by the conflict going on between civilization and Nature.”⁵

The destruction of nature and the spoliation of the scenic American wilderness was part of progress that combined westward expansion and technology. During the nineteenth century, stories of iconic heroes saturated the American public’s imagination as they consumed the re-presentations of explorers such as Daniel Boone, Davy Crockett, Kit Carson, John C. Frémont, and William F. Cody—especially George Armstrong

⁴ Peter Coates, *Nature: Western Attitudes since Ancient Times* (Berkeley: University of California Press, 2005), 120-21. According to Peter Coates the symbiosis between landscapes of leisure and landscapes of work often operated in tandem to create Euro-American places during the nineteenth century.

⁵ Arthur A. Ekirch, *Man and Nature in America* (Lincoln: University of Nebraska Press, 1973), 23.

Custer. Newspapers and dime novels were popular mediums that circulated the exploits of western exploration, military expansion, and settlement. These popularized leaders of westward expansion became icons in the service of American expansion and conquest of the wilderness. According to historian Perry Miller, the conquest of wilderness produced an ambivalent national anxiety about the contradictions in the American identity as it witnessed empire building and the destruction of wild and scenic places.⁶

A second American vision, a scenic nature, had been shaped from the beginning of the nineteenth century as a romantic view. Transcendentalists Ralph Waldo Emerson and Henry David Thoreau emphasized the permanency of nature, and in Thoreau's case a deep suspicion of technological progress. Especially prominent in their writings was the permanence of nature's order that served as a "law and a guide." Ekrich argues that the guiding laws of nature transcended transient human institutions whereas, "nature provided something permanent to cling to."⁷

Paintings of the nineteenth century often reflected the permanence of nature and the insignificance of humans. Beginning in the 1820s, artists of the Hudson River School, such as Thomas Cole and Frederick Church introduced Americans to a canvas dominated by nature where humans settled discretely into the grandeur of nature. After the 1850s, a second generation of landscape painters including Albert Bierstadt and Thomas Moran depicted the magnificence of nature across the Mississippi, the Rocky Mountains, and

⁶ Arthur A. Ekirch, *Man and Nature in America* (Lincoln: University of Nebraska Press, 1973), 23; Perry Miller "The Romantic Dilemma in American Nationalism and the Concept of Nature," *Harvard Theological Review*, XLVIII (October, 1955): 247; Henry Nash Smith, *Virgin Land: The American West as Symbol and Myth*, twentieth printing (Cambridge: Harvard University Press, 2007), 103; Richard Slotkin, *The Fatal Environment: The Myth of the Frontier in the Age of Industrialization, 1800-1890* (Norman: University of Oklahoma Press, 1994), 117. In addition, James Fennimore Cooper's character Leatherstocking symbolizes a character caught between the progress of American civilization and the technological destruction of civilization.

⁷ Ekrich, *Man and Nature in America*, 59.

into the Far West. Not only did these paintings inspire popular acclaim for an American nature, but so too did the photography of William H. Jackson who helped to popularize Yellowstone and other soon-to-be iconic nature places. The historian of wilderness, Roderick Fraser Nash points to these artistic mediums, landscape painting and especially photography, “as a potent new force in directing American attention to wilderness as a source of nationalism.”⁸

The landscape historian, Anne Hyde brings this second vision to focus during the latter half of the nineteenth century. She argues that Americans cultivated a national identity as a response to, and ultimately rejection of, European traditions and material cultures. Identity centered on an American vision set in the nation’s wild and scenic places. Yosemite and Yellowstone were places where humans could conveniently visit and enjoy nature—an American equivalent to the European Cathedral. In these nature-places, according to Hyde, Americans severed their European ties and came to discover a national identity of their own.⁹

A third and synthesizing American vision, a conserved nature, developed after 1864 with George Perkins Marsh’s publication of *Man and Nature*. According to Marsh, when civilizations devastate nature those same civilizations fail.¹⁰ Ekrich suggests that Marsh’s *Man and Nature* was both a warning and an opportunity. For example, to varying degrees, “man disrupts the fundamental harmony or balance of nature....,” which “is both good and bad.” Humans could continue to exploit nature and improve it—for

⁸ Roderick Fraser Nash, *Wilderness and the American Mind* (New Haven: Yale University Press, 2001), 83.

⁹ Anne Farrar Hyde, *An American Vision: Far Western Landscape and National Culture, 1820-1920* (New York: New York University Press, 1990), 243.

¹⁰ George Perkins Marsh, *Man and Nature: or, Physical Geography as Modified by Human Action* (New York: Scribner, 1864).

their own ends—if conservation played a mediating role. Marsh served as minister (1861-1882) to Turkey and then Italy where he found examples of past civilizations and their destructive use of the environment. His studies noted how civilizations caused environmental collapse and ultimately their own demise. In the United States, Marsh who was from a prominent family in Vermont, became particularly concerned with the unsustainable use of American forests.¹¹

Marsh is remembered as a conservationist. The landscape geographer David Lowenthal and biographer of George Perkins Marsh argues, “Every society’s way of treating its landed legacy is spun in a web of custom; tradition resists changes that new circumstances ceaselessly mandate.”¹² The interface between tradition and change came to Lake Tahoe after 1860 where a useful nature served both economic and scenic purposes. Between 1860 and 1900, few places presented the varied visions about the proper human relationship with nature as did Tahoe: “The Lake of the Sky.”¹³ Lowenthal asserts that Americans during the latter half of the nineteenth century “schooled in a rhetoric of wilderness conquest found it hard to recognize the ill-effects of that conquest.” George Perkins Marsh, he continued, “sought to open Americans’ eyes to their own impact on the fabric of nature.”¹⁴ By the 1880s, Lake Tahoe’s scenic and physical assets were in jeopardy and steps were taken to save the lake from the destructive lumber industry. Lake Tahoe was an anomaly along Nevada’s timber belt where all three American visions created a landscape that represented the diversity of western settlement.

¹¹ Ekirch, *Man and Nature in America*, 75-77.

¹² David Lowenthal, *George Perkins Marsh: Prophet of Conservation* (Seattle: University of Washington Press, 2000), 405.

¹³ George Wharton James, *The Lake of the Sky: Lake Tahoe in the High Sierras of California and Nevada* (New York: Baker and Taylor, 1915).

¹⁴ David Lowenthal, *George Perkins Marsh: Prophet of Conservation*, 405.

Western places in the United States became accessible by the latter half of the nineteenth century when commerce brought industry into the wilderness, or as one literary scholar termed it: “the machine in the garden.”¹⁵ At Lake Tahoe, industry facilitated the opening of a wilderness garden to tourism although be it a damaged garden. The Tahoe Basin had immense timber stands in a dramatic mountain setting in addition to the beauty of a clear alpine lake. The lure of immediate profits pushed loggers and lumbermen to build transportation into this place that in turn provided access for tourists eager to enjoy in a place where Mark Twain remembered a man who “went to there to die. But he made a failure of it.” According to Twain, Lake Tahoe high in the mountains, had air “the same the angels breathe.”¹⁶

Comstock

Between 1859 and 1864, the remote Comstock urban network grew exponentially. In 1860 after the initial Rush to Washoe, there were approximately 2,200 residents in the Comstock’s Virginia City, 600 in Silver City, and another 600 in Gold Hill.¹⁷ J. Ross Browne found the conditions of Virginia City deplorable in 1860 as he entered the town and commented: “Frame shanties, pitched together as if by accident; tent or canvas, or blankets, of brush, of potato-sacks and old shirts with empty whiskey barrels for chimneys....” By 1863, the number of people grew to perhaps 20,000 inhabitants and the foundations for an industrial city emerged in an unlikely place. Mark Twain commented

¹⁵ Leo Marx, *The Machine in the Garden: Technology and the Pastoral Ideal in America* (Oxford: Oxford University Press, 2000). Marx brings an eye to the relationship between nature and industry using literature as a medium for how humans idealized pastoral America in an industrial and technological age (late eighteenth and nineteenth centuries).

¹⁶ Twain, *Roughing it*, 170-172.

¹⁷ Eugene Moehring, “Comstock Urban Network,” *Pacific Historical Review*, 66, 3 (August, 1997): 337.

on the economic potential of the Comstock: “During the great flush year of 1863, Nevada produced \$25,000,000 in bullion—almost, if not quite, a round million to each thousand inhabitants.”¹⁸

J. Rosse Browne returned in 1863 to find, “The business part of the town has been built up with astonishing rapidity. In the spring of 1860 there was nothing of it save a few frame shanties.... It now presents some of the distinguishing features of a metropolitan city.”¹⁹ In the early 1860s, Virginia City was still in its infancy, but grew rapidly.

Argonaut Alfred Doten, the future editor of the *Gold Hill News*, arrived to Virginia City and struggled to describe the Comstock as it was, “all in process of creation.”²⁰

After 1864, the year of Nevada statehood, outside investment brought in monies to drive shafts and mining levels to unprecedented depths—some to 3,000 feet. The Nevada Constitution guaranteed protection of foreign investment properties and confined taxation to mining revenues to avoid taxing mining claims as real estate. A Nevada constitutional scholar writes, “In short, Nevadans had come to believe, accurately, that the day of the solitary miner was over and that mining could survive only with the infusion of capital from other places and ‘corporatization’ of what had previously been an individual labor.”²¹ The dependency on outside money resulted in the “domination of ‘fortified’ monopolies, such as the Bank of California and later the Bonanza firm.” By 1870, Virginia City had grown into a small metropolis with the most advanced

¹⁸ Mark Twain, *Roughing It*. (Washington D.C.: American Publishing Company, 1872), 382.

¹⁹ J. Rosse Browne, *A Peep at Washoe and Washoe Revisited* (Balboa Island, California: Paisano Press, 1959), 64-65. Also, see Russell Elliot’s *History of Nevada* (Lincoln: University of Nebraska Press, 1973), 44-46.

²⁰ Alfred Doten, *The Journals of Alfred Doten*, July, 1st, 1863, edited by Walter Van Tilburg Clark (Reno: University of Nevada Press, 1973), 716.

²¹ Michael W. Bowers, *The Sagebrush State: Nevada’s History, Government, and Politics*. (Reno: University of Nevada Press, 1996), 23.

infrastructure including lighted streets, water, gas, sewer, opera houses, first-class restaurants, and other pleasantries of civilization that drew heavily upon investment from San Francisco.²²

The curious combination of industrial city and frontier town developed into what Eugene Moehring called “The Comstock Urban Network.”²³ Investment from San Francisco, especially William Ralston’s Bank of California represented by his agent in Nevada, William Sharon, developed the Comstock as a central node of resource extraction. This hinterland metropolis became an appendage of San Francisco investors who financed technology and labor to follow the rich stubborn veins of ore deep into the earth.

Investment capital for the development of the Comstock placed demands on the resources of the Sierra in terms of timber, water, and even ice for cooling rooms at great depths in the mines. The square-set bracing system for the mines alone consumed tremendous amounts of timber resources in addition to the cord wood needed for steam engines to pump water from the mines, lift and lower cages, and operate ore processors with the technology of the Washoe Pan process. The infusion of capital from San Francisco and New York brought an array of technological innovations able to remove profitable ore from thousands of feet below the surface of the earth with deep-shaft mining. From these operations an extensive network of transport reached westward into the Sierra for the commodities to build and fuel the mining industry on the Comstock.

Square-set bracing for the Comstock mine’s soft clay came from the innovative mind of German mining engineer Philip Deidesheimer. This bracing system, constructed

²² Elliott, *History of Nevada*, 146.

²³ Moehring, “Comstock Urban Network,” 337.

of post and beams fashioned into modular cubes, facilitated mining deep into the earth where ore could be removed to form stopes and cathedral caverns. Cathedral caverns were rich deposits of ore that when mined, using square sets, formed into a large pocket of interlocked bracing. The cathedral required support and square sets for structural integrity of extensive tunnels and large caverns that created an underground city and a honeycomb of rooms. Mark Twain wrote:

Virginia was a busy city of streets and houses above ground. Under it was another busy city, down in the bowels of the earth, where a great population of men thronged in and out among an intricate maze of tunnels and drifts, flitting hither and thither under a winking sparkle of lights, and over their heads towered a vast web of interlocking timbers that held the walls of the gutted Comstock apart.²⁴

Sierra Nevada forests around Lake Tahoe and in the Truckee River drainage basin to the north supplied the mines and towns of the trans-Sierra urban network. Dan De Quille, fellow journalist of Mark Twain, observed that logging, “stripped the mountains of the forests of which they are now clothed.... The Comstock Lode may truthfully be said to be the tomb of the Sierra.”²⁵ The *Weekly Nevada State Journal* in 1876 reported that the Pacific Wood, Lumber, and Flume Company employed over 1000 men to meet, “The increasing demands of the mines on the Comstock,” which required “double the amount of wood and timber that was out last year.”²⁶ Lumbering operations peaked in the

²⁴ Twain, *Roughing It*, 378.

²⁵ Dan De Quille, *History of the Big Bonanza: An Authentic Account of the Discovery, History, and Working of the World Renowned Comstock Silver Lode of Nevada* (Washington D. C.: American Publishing Company, 1876), 174. Dan de Quille’s real name was William Wright. Also, see Dick Wilson, *Sawdust Trails in the Truckee Basin: A History of Lumbering Operations*. (Nevada City: Nevada County Historical Society, 1992). Wilson provides a thorough, but brief, account of logging and lumbering industries in the Tahoe Basin and surrounding watersheds.

²⁶ *Weekly Nevada State Journal*, March 25th, 1876. Pacific Wood, Lumber, and Flume Company was a Truckee River operation. By the late 1870s, people began to experience some of the devastation wrought by the lumber industries. Regardless, there were few regulations to curb lumbering until the early 20th century.

late 1870s and 1880s—to say nothing of the demand for lumber to rebuild Virginia City after the Great Fire of October 26, 1875.

Transportation of supplies-in and products-out was critical to remotely situated mining towns. Both large and small towns rarely found themselves in ideal locations. One Comstock historian noted that locale was fundamental to the Comstock mining district: “...its location, perched high on a steep, desolate mountain that was inaccessible to the rest of the world, shaped its development and its nature.”²⁷ The location of the Comstock required a transportation system capable of moving people and resources in and out. Rarely did mining towns occur in ideal locations. Their urban environments made them anomalies amongst vast spaces of deserts and mountains. As one historical geographer noted:

In the case of mining towns, the isolation is both unintentional and ironic, for they are often the most cosmopolitan of our communities, bringing a great deal of sophistication to a region. We might say that mining communities represent urbanization in the absence of nearby cities.²⁸

The Comstock was a metropole in the remote region of western Nevada. Virginia City was the most cosmopolitan of the Comstock towns. People from around the globe arrived to the Comstock as they did to the California placer deposits a decade earlier.²⁹

²⁷ Ronald James, *The Roar and the Silence: A History of Virginia City and the Comstock Lode*. (Reno: University of Nevada Press, 1998), xx.

²⁸ Richard V. Francaviglia, *Hard Places: Reading the Landscape of America's Historic Mining Districts*. (Iowa City: University of Iowa Press, 1991), 69.

²⁹ Using census records, Ronald James identified diverse groups in Virginia City: “Comstock wealth attracted an international array of immigrants who enriched the district with their diversity. The oft-cited litany of representatives includes large numbers of Irish, Cornish, Chinese, Germans, English, Scots, Welsh, Canadians, Mexicans, Chileans and other South and Central Americans, Italians, Scandinavians, French, and Swiss. There were also a few Russians, Poles, Greeks, Japanese, Spaniards, Hungarians, Portuguese, Turks, Pacific Islanders, Moroccans, and Caribbean, as well as others. All these people provided contrast for the hundreds born in the United States, but even the North Americans included many with parents from Europe, as well as dozens of African Americans. In addition, there was an important Jewish population, itself with diverse nativities, and, of course, American Indians, the original inhabitants of the area, provided the ethnic bedrock for the Comstock.” Ronald James, *Roar and the Silence*, 143.

Moehring approximated that, “Nearly fifty towns created by the Comstock Lode helped meet these needs.”³⁰ Dan De Quille, journalist for the *Territorial Enterprise* wrote that in Gold Canyon, “from Silver City to Virginia City, a distance of five miles, may be said to be one town.”³¹

Although the center of activity was between Virginia City and Silver City, the influence of industrial mining extended across Carson and Washoe Valleys and the Truckee Meadows over the Carson Range and fanned out into the Sierra Nevada. Mills processed the ore along the Carson River. A gravity siphon transported water from Marlette Lake, just east of Lake Tahoe, to the divide between Gold Hill and Virginia City. Lumbering operations extended along the Carson Range, around Lake Tahoe, and along the Truckee River watershed.

Wagon roads first facilitated the transport of resources and goods, but railroads became essential for the movement of resources and people. In 1869, the transcontinental railroad connected Reno to the East and West Coasts by rail. Smaller railroads followed and tied together an intricate part of the extended Comstock urban network. Wealthy San Franciscans and eastern visitors availed themselves to travel to various destinations especially Lake Tahoe. Both residents and visitors to the Comstock escaped to the earlier summer time temperature of Lake Tahoe and its scenic alpine vistas.

The industrialized city or town could affect the health of its citizens. In 1870, landscape architect Frederick Law Olmstead argued that modern science proved the cities of America needed parks and green spaces to balance the crippling effects of the dirty and complicated urban environment. City planners in Boston, New York, Chicago, San

³⁰ Eugene Moehring, “Comstock Urban Network,” 341.

³¹ Dan De Quille, *Big Bonanza*, 161.

Francisco, and other large city-scapes created parks, country escapes, and an array of green spaces. Especially prominent in the late nineteenth century was the need for healthy spaces. Particularly problematic was the air in cramped spaces that had debilitating effects on the citizens of cities and towns.³² The center of the Comstock complex was a crowded environment subject to the stress that came with cramped dirty spaces.

Virginia City was dusty, bustling, and lacked green spaces for residents to escape the busy and cramped Comstock canyon and hillsides. In Gold Canyon between Silver City and Virginia City was an extended industrialized and urbanized complex. Sanborn maps identified residences, gathering halls, gas works, dumps, waste rock, battery mills, lumber yards, hoisting works, mine shafts, freight depots, and livery stables and corrals surrounded by designations that described the hillsides as barely passable, impassable, steep hill, and very steep hill.³³ The towns at the center of the Comstock had little space for parks and outdoor activities. The urban environment and its debilitating effects on the health of Comstock residents prompted some with means to seek restoration and recreation outside their industrialized environment. The spa at Steamboat Springs at the base of Geiger Grade offered relief in its hot waters from the afflictions of age and disease. Lake Tahoe became a destination for recreation and health seekers. In the words of Mark Twain there was “a paradise for invalids” at Lake Tahoe where, “Three months of camp life...would restore an Egyptian mummy to his pristine vigor....The air up there

³² Frederick Law Olmstead, “Public Parks and the Enlargement of Towns,” 303. Also see Mona Domosh, *Invented Cities: The Creation of Landscape in Nineteenth Century New York and Boston* (New Haven: Yale University Press, 1996), 152.

³³ Sanborn Maps (1890), Special Collections, University of Nevada, Reno.

in the clouds is very pure and fine, bracing and delicious.”³⁴ Little wonder that the Tahoe Basin became a tourist destination.

Tahoe tourism developed alongside lumbering throughout the late nineteenth century.³⁵ Removal of forests around the Tahoe Basin did not discourage visitors who enjoyed the cool summer temperatures and a relief from the concerns of their work-a-day lives. Tourists rejuvenated their bodies and spirits in the high Sierra or fished, hunted, and sailed in a place where sawmills roared and axes rang. Early tourism at Tahoe occurred in a mountain landscape where beauty and industry found common ground.³⁶ When the axes fell silent during the 1890s, the communities at Tahoe reorganized their economic base to benefit from the attractive amenities of the environment around the alpine Lake of the Sky. In 1899, the creation of the first Forest Reserve at the lake reflected the diverse interests of resource users that included water, forests, and scenery. There was even talk of making Tahoe a national park.³⁷

Access to Lake Tahoe

Alfred Doten, future editor of the *Gold Hill News*, traveled to Washoe (western Nevada Territory) in 1863.³⁸ His route was typical of the migration east to the Comstock.

³⁴ Twain, *Roughing It*, 170.

³⁵For a detailed description of the complex network developed around the geographic region of the Comstock, see Eugene Moehring, “The Comstock Urban Network.” Following the studies of William Cronon and Dean May, Moehring lays out the complex infrastructure surrounding the Comstock. The Comstock is often located as a hinterland of San Francisco. Moehring’s study details the local and regional network surrounding the Comstock. The Sierra and Lake Tahoe were fundamental to development.

³⁶ C. Elizabeth Raymond, “‘A Place One Never Tires of’: Changing Landscape and Image at Lake Tahoe,” in Peter Goin, *Stopping Time: A Rephotographic Survey of Lake* (Albuquerque: University of New Mexico Press), 20.

³⁷ Pisani, “Lost Parkland,” 10

³⁸ Doten kept a journal throughout his life. Nearly every day he made an entry into his journal from the early 1850s to his death in the early twentieth century.

At four in the morning, Doten saddled his horse and left, “San Francisco, en route for Washoe.”³⁹ He made good time in the cool morning air as he traveled the Placerville Road, sometimes simply referred to as The Grade. After five days, he “came in full view of Lake Valley and Lake Bigler [Tahoe] in the distance.” Doten descended the valley of the Upper Truckee River on the south side of the lake. He summed up his impression of the Tahoe landscape in one brief description, “rather barren of all but trees.”⁴⁰ In 1863, there were only a small handful of hostelrys on the south end of the lake. Doten’s only recorded stop was at Yank’s on the southwest side of Tahoe.⁴¹ Ephraim “Yank” Clement operated Yank’s, a popular hostelry and stage stop along the Placerville Road. After 1859, Yank’s prospered with development of the Comstock Lode.

Doten’s lackluster words about of Lake Tahoe in 1863, “rather barren of all but trees,” described a place with little development or signs of civilization. There were several hotels hidden in the trees, but Lake House stood out, where the first hostelry was built on the lakeshore.⁴² The early hotels accommodated more travelers and supply wagons on their way to the Comstock than tourists. The main route on Placerville Road skirted along the south end of Tahoe and crossed the Carson Range, descending to Genoa (Mormon Station). Although there are records of early sightseers at Tahoe, especially

³⁹ Doten, *Journals*, 708-709.

⁴⁰ Doten, 712. Admittedly, Doten was probably anxious to arrive at his destination in Virginia City. Regardless, Tahoe left little impression on him.

⁴¹ Doten found Yank’s to be a less than welcoming place. After furnishing feed for his animals, which Georgie and Peggy would not eat, he was still charged for the feed. Doten was perturbed, 712-713.

⁴² Before 1863, three other significant hotels hosted travelers along the southern end of Lake Tahoe: Lake House, Friday’s, and Lapham’s Hotel and Landing. Built in the 1850s to service travelers heading to California, Tom Rowland later purchased Lake House in 1868 (named Al Tahoe in 1907). Lake House became one of the finest hotels on the lake during the late 1850s and 1860s. Martin “Friday” Burke built Friday’s in the early 1860s, which was a station that accommodated travelers and Pony Express Riders. Later, in 1888, John Wales Averill purchased the station and renamed it Edgewood, thereafter home to the Lake Valley Meat Market. In the 1850s, William Lapham built Lapham’s Hotel and Landing. In addition to these three hotels, the Logan House and the Zephyr Cove House both offered accommodations south of Glenbrook on the southeastern shore.

Lake Valley and Emerald Bay, access to the lake was limited. In addition, entertainment was sparse and travel around the lake by road was slow.

Ten years after traveling the Placerville Road, Doten returned to the lake and expressed admiration for its beauty describing his experience as “Heavenly.”⁴³ In the midst of the pleasant experience, he proposed to the widow Mary Stoddard who was “rusticating” at her favorite location near McKinney’s resort.⁴⁴ Shortly after proposing, he was married at the lake near the shores of Glenbrook, Nevada. Between the years of 1863 and 1873, Tahoe became a developed place with seven significant towns accommodating workers, travelers, and tourists.

The timber industry supplied the Comstock with lumber and its urban network required wagon roads and later railroads throughout the region. The transport of resources opened access to remote places. In 1873, Doten traveled to Lake Tahoe by riding the Virginia & Truckee Railroad from Gold Hill to Carson City, and then to Reno. At Reno he boarded the Central Pacific Railroad that carried him to Truckee. From Truckee, he rode the daily stage for thirteen miles to Tahoe City. At Tahoe City he boarded a steamer and continued to McKinney’s where he spent several days relaxing and fishing. His experience at Lake Tahoe constructs an image of civilized beauty. Doten did not mention the lumber industry in his journal, but commented extensively on fishing, boating amongst floating bands (palisade barge), and relaxing with other tourists at McKinney’s resort and Glenbrook—the heart of the lumber industry.

⁴³ Doten, *Journals*, 1204.

⁴⁴ Doten, 1203. On July 15, 1873, Doten rose from bed and had a successful fishing venture. He then fashioned an instrument from an old soap box and named it “Boxelina.” In the evening, he took a stroll “to Mrs. Stoddard’s trees where she goes to rusticate and read in the cool shade....” Doten had an “interesting” talk with her, and then he “proposed and was accepted.”

Lumbering near Lake Tahoe began on the eastern slope of the Carson Range. Franktown was the first significant mill established in 1856, Utah Territory, by Orson Hyde.⁴⁵ Modest logging operations quickly transformed into major enterprises, dwarfed only by silver and gold mining on the Comstock. Lake Tahoe, from 1864 to 1900, went through a period of industrialized logging and milling—steam donkies spread throughout the woods to drag logs to rail or log boom, mills processed the timber, and steam boats and locomotives hauled the lumber out of the basin. Despite the loss of timber, visitors still came and delighted in the alpine setting of the lake. Nowhere was the tandem relationship between lumbering and tourism more evident than at Glenbrook, Nevada. Duane L. Bliss, following in the footsteps of Captain Pray, developed Glenbrook into major lumbering center and tourist destination.⁴⁶

In 1873, the Big Bonanza on the Comstock increased the demand for lumber.⁴⁷ In response, D. L. Bliss and H. M. Yerington established the Carson and Tahoe Lumber and Flume Company with the assistance of John J. Jones. For a serious lumbering enterprise to develop over the vast Tahoe Basin, “three principle divisions—logging, milling, and transportation—had to function efficiently and economically.”⁴⁸ Prior to 1875, oxen hauled milled lumber from Glenbrook to Spooner Summit. The Lake Tahoe Railroad,

⁴⁵ Orson Hyde traveled to Carson Valley under orders from Brigham Young. He helped to solidify the Mormon stronghold on the western side of Utah Territory, but only a year later, Brigham Young called the saints back to Salt Lake City. They left their infrastructure behind, including Hyde’s sawmill, which he would never receive compensation and this led to “Orson Hyde’s Curse.”

⁴⁶ Wheeler, *Tahoe Heritage*, 16, 21, 22. The company was named The Carson and Tahoe Lumbering and Fluming Company. In 1861, Captain Augustus Pray built a sawmill on the south end of Glenbrook Bay. Captain Pray, in 1873, witnessed scores of tourists to the lake and converted his planning mill into a hotel named Lake Shore House: “By the mid-1870s Captain Pray had built thirty cottages, a sawmill, a hotel, a store, a saloon, a livery stable, and a meat market.”

⁴⁷ Wilson, *Sawdust Trails*; Douglas H. Strong, *Tahoe: From Timber Barons to Ecologists* (University of Nebraska Press, 1984), 15-16.

⁴⁸ Wheeler, *Tahoe Heritage*, 27.

completed that same year, expedited transportation. The rail line was nearly nine miles in length and terminated at Spooner Summit. From the summit, workers loaded milled timber into a V-flume and floated the lumber to Carson City where the Virginia and Truckee Railroad waited to load and deliver the product.

The development of Nevada's western timber belt, which it shared with California in the Sierra, occurred so abruptly that by the time the Wheeler Surveys west of the 100th Meridian arrived, private enterprises dominated the Comstock urban network. George Montague Wheeler surveyed the region in 1876 during the height of Tahoe's logging and lumbering industries. The "Great Surveys" ordered the land into quadrants, assessed land-use potential, determined the condition and extent of the infrastructure, and collected scientific information.⁴⁹ In the government report of Party Two of the Wheeler Surveys, led by Lieutenant Montgomery M. Macomb, considerable effort went to detailing an infrastructure in service of the logging, lumbering, and tourism.

Lieutenant Macomb was "especially" assigned to the "survey of Lake Tahoe and the neighboring country."⁵⁰ The geographic extent of his Tahoe survey covered the watershed feeding the Upper Truckee River in Lake Valley and north to the town of Truckee. Included in the survey were the eastern and western summits on both sides of the lake—Nevada's Carson Range and California's Sierra Nevada. Macomb noted seven principal settlements at Tahoe. They were Glenbrook, Rowland's, Tahoe City, McKinney's, Yank's, Hot Springs, and State-line Point. He added, "At all these points accommodations may be found for tourists." Of the seven principal settlements,

⁴⁹ Richard A. Bartlett, *Great Surveys of the American West* (Norman: University of Oklahoma Press, 1989).

⁵⁰ George Montague Wheeler, *Annual Report Upon the Geographical Surveys West of the 100th Meridian*. (Washington: Government Printing Office, 1877), 1278.

Glenbrook was the most significant and the “center of the Lake Tahoe lumber-trade.” At Glenbrook, Macomb noted four mills, one planing mill, and a population of four hundred people. The lumber mills’ annual rate of production was “25,000,000 feet of sawed lumber.”⁵¹

Prior to the arrival of the Central Pacific Railroad, stage lines dominated travel across the Sierra at the southern end of the lake. In 1868, the Central Pacific Railroad made its way through the Sierra to Truckee and thereafter extended to Reno. The route passed approximately 13 miles north of Tahoe. Macomb described the road from Truckee to Tahoe City on the north shore as excellent with daily stages connecting the two locales. Likewise, a road from Carson City to Glenbrook was in excellent condition and also used by daily stages. In addition to the primary roads connecting Truckee, Reno, and Carson City to Lake Tahoe, were small steamers that made a “daily tour of the lake” often stopping at all seven principal settlements. The roads on the east and south shores were moderately good to excellent. The road to Tahoe City from Truckee was excellent but from Tahoe City to Glenbrook and McKinney’s there were rough sections. The worst section of road was between McKinney’s and Yank’s, especially at Emerald Bay. In most cases, water transportation was the preferred mode of transport around Lake Tahoe’s shore.⁵²

The Wheeler Survey described a substantial tourist industry at the lake noting potential for a major resort destination. Atop Mount Tallac Macomb remarked: “This peak is a most interesting one, not only on account of its own beauty as seen from the

⁵¹ Wheeler, 1279. There were multiple, smaller, lumbering operations in the Basin, in addition to the Carson and Tahoe Lumber and Fluming Company. See Dick Wilson’s *Sawdust Trails*.

⁵² Wheeler, 1279.

lake, but because of the beautiful view from its summit.”⁵³ Alfred Conkling, the survey geologist, echoed Macomb’s sentiments: “The scenery throughout the Western Summit is exceedingly picturesque.”⁵⁴ Conkling, in 1877, saw a future for Lake Tahoe very different from resource extraction:

In closing a report on the geology of Lake Tahoe and vicinity, a brief reference may be made to the lake as a resort for tourists and pleasure seekers. Since the completion of the Central Pacific and Virginia and Truckee Railroads, Lake Tahoe has become very accessible. A small steamer, carrying the mail, makes a daily tour of the lake. There are sufficient hotel accommodations for a large number of travelers...Grace Greenwood, writing from California, says: ‘Tahoe is the most beautiful lake I have ever beheld. I think Lake Tahoe must yet become a great pleasure resort. I have seen no more charming spot in all my tours for a summer’s rest and rambling.’”⁵⁵

Grace Greenwood became a newspaper correspondent in 1844 at the age of 21. She also wrote books, poetry, and published in periodicals. In *New Life in New Lands* (1873), she contemplated the future of Tahoe prioritizing its scenic beauty that emphasized tourism already underway at the lake. Three years later, the Wheeler Survey Party Two descended into Lake Tahoe where a developed and easily accessible mountain retreat thrived alongside a timber industry. The *Wheeler Report*, published in 1877, considered the tourist industry underway at Tahoe as a recognizable and accepted part of the landscape.

⁵³ Wheeler, 1281.

⁵⁴ Wheeler, 1291. An additional note, the lack of access and poor road systems on the steep western flank of Lake Tahoe provided the most picturesque scenery, especially due to less lumbering. In addition, Conkling published in *Journal of the American Geographical Society of New York*, 1877, “Synopsis of a Paper upon ‘A Summer’s Exploration in the Sierra Nevada. His synopsis reiterated both the beauty of Tahoe and its resort potential.

⁵⁵ Wheeler, 1295; Grace Greenwood, *New Life in New Lands*, 187. The Greenwood quote is striking for its publication in a Government document, which contained rather restrained and factual information.

Tourism at Tahoe

By the early to mid-1870s, access to Tahoe offered tourists an opportunity to rusticate or recreate at the lake. The *Oxford English Dictionary* describes a rusticator as a person who visits or retires to the country, assumes rural manners, and lives a country life.⁵⁶ In the nineteenth century, the rusticator sought rejuvenation in nature. Exhausted from the rigors of urban life and industrialization, people sought solace in countryside settings. Relaxation, rest, and reflection were orders of the day for the rusticator to rejuvenate mind, body, and spirit. Newspapers from the period frequently reported on politicians, businessmen, lawyers, judges, and journalists who sought refuge at Tahoe to rusticate. On July 19, 1882, the *Reno Evening Gazette* reported on the advantages of having Lake Tahoe within ten miles of Reno: “There is no way to estimate the advantage a community derives from having some place near at hand where tired and sick people can go to draw fresh strength from nature.”⁵⁷

Rusticators sought places to experience the rejuvenating qualities of the physical landscape—hot springs, pure air, pure water, or peaceful settings. The experience could last a few days or many weeks. For example, in the “Brevities” of the *Weekly Nevada State Journal*, 1884, “Mrs. Young and daughter are rustivating at Tahoe. They have their own camping outfit and are independent of the hotels. Mrs. Young writes that by reason of this fact their living costs no more than it would at home and they will therefore remain a month or six weeks.”⁵⁸ In 1886, the *Reno Evening Gazette* reported, “The Pacific Coast Press Association who have been rustivating in and about Lake Tahoe, and

⁵⁶ *Oxford English Dictionary* (1989), 299.

⁵⁷ *Reno Evening Gazette*, “Our Pleasure Resorts,” July 19, 1882.

⁵⁸ *Weekly Nevada State Journal*, “Brevities,” July 19, 1884.

who will pass through Reno in a few days, appear to be rejuvenating.”⁵⁹ Rusticators sought places in nature to recalibrate after civilization’s debilitating effects. To do so, tourists required access and modern conveniences to appreciate the experience.

In 1878, for the price of one dollar, a tourist could board the Governor Stanford Steamer, which began its journey at Hot Springs and departed every morning at six.⁶⁰ Hot Springs was one of the original tourist destinations, especially for the hot baths and surf bathing the springs provided. The Hot Springs Hotel was one of the most popular locales on the lake and often overcrowded (in 1901, Hot Springs was renamed Brockway).⁶¹

Local Captain Jim Green, an Australian sailor who lived in Hot Springs owned:

several of the fastest boats on the lake, and knows how to swing the tiller and handle the sheet to carry the reckless young man, who wants to sail fast, as well as the timid maiden. He is the only one on the lake, too, who can please the dissatisfied old woman, who growls at everything she comes in contact with....⁶²

Tahoe offered diverse recreating possibilities and at times rustivating and recreation blended together. The “Jottings” of the *Reno Evening Gazette* stated, “A Reno Old Maid says she likes to go to Lake Tahoe, where she can paddle her own canoe and hug the shore to her heart’s content, and no scandal results.”⁶³

After departing Hot Springs, Tahoe City was the first stop aboard the Stanford Streamer’s tour of the lake. The village boasted several stores, saloons, a dairy, blacksmith shop and a large hostelry, named the Grand Central Hotel. In addition, the

⁵⁹ *Reno Evening Gazette*, “Newspaper Tourists,” July 23, 1886.

⁶⁰ *Daily Nevada State Journal*, “Lake Tahoe: Excursion around the Lake, Places of Resort, Beautiful Springs, Fishing, Boat Riding, etc.,” August 13, 1878.

⁶¹ Barbara Lekisch, *Tahoe Place Names*, 10.

⁶² *Reno Evening Gazette*, “Carnelian Springs: A Beautiful Place of Resort” Aug. 13, 1883. The Tahoe Hot Springs Hotel was extensively remodeled in 1882 to accommodate the growing tourist business.

⁶³ *Reno Evening Gazette*, “Jottings,” August 29, 1882.

steamer Niagara was docked at Tahoe City. The Niagara carried the U.S. mail around the lake and tourists could join the route, but the price was more than a dollar and the trip more rapid than the Stanford. Nevertheless, the paper reported that the Niagara was always crowded. The Floating Palace was also anchored at Tahoe City. The Palace was used for dance parties on the lake. One of the many steamers towed the Palace and a floating band entertained tourists on the water and along the shore.⁶⁴

The next stop, McKinney's, was a favorite for Gold Hill and Virginia City residents. McKinney's was a hunting and tourist retreat. John McKinney was one of the first full time residents in the Tahoe Basin. He was a miner, hunter, and trapper in El Dorado County before building a small cabin on the north side of McKinney's Creek—the border between El Dorado and Placer Counties in California. By the 1870s and 1880s, McKinney's was a well-known and popular location for tourists. In 1881, McKinney's had a hotel and twenty cottages. John Muir was a frequent visitor of the small rustic resort.⁶⁵ After McKinney's, the steamer visited Rubicon Point, Emerald Bay, Lucky Baldwin's Place, Rowlands, and Glenbrook.

The Governor Stanford's tour of the lake stopped at all seven primary tourist destinations described by the Wheeler Party Two Survey. Most tourists traveled by steamer while at the lake, but used daily stages to access the Tahoe basin.⁶⁶ In 1882, the *Reno Evening Gazette* exclaimed, "Doc Benton's Carson-Tahoe Stage line is doing an immense business at present. Tourists desiring seats must engage them at least twenty-

⁶⁴ *Daily Nevada State Journal*, "Lake Tahoe: Excursion around the Lake, Places of Resort, Beautiful Springs, Fishing, Boat Riding, etc.," August 13, 1878. Floating bands are also described in the Alfred Doten journals in 1873.

⁶⁵ Barbara Lekisch, *Tahoe Place Names*, 78-83.

⁶⁶ By the mid-1880s there were at least seven steamers working the lake.

four hours in advance.”⁶⁷ The same year, the *Weekly Nevada State Journal* observed, “There is a regular rush of visitors and tourists to Lake Tahoe this season.”⁶⁸ *The Mountain Democrat* added, “The hotels at Lake Tahoe are again in full blast and the fishing is good.”⁶⁹ In 1887, the *Reno Evening Gazette* remarked, “large numbers of campers have pitched their tents in the vicinity of Yank’s and McKinney’s,” and the following year, “The rush to Tahoe continues unabated.”⁷⁰

As early as 1879, there were plans to build a railroad from Truckee to Tahoe City to accommodate the rush of tourists to the lake. *The Mountain Democrat* declared, “The last California Legislature granted a thirty year franchise to A. J. Bayley of the Grand Central Hotel, Tahoe City, and associates, including a right of way for a railroad from the town of Truckee to Tahoe City, Lake Tahoe.”⁷¹ Construction on the railroad did not begin until 1898, but serious attempts to build a narrow gauge for tourists and supplies had been considered for at least twenty years prior to the twentieth century.

In 1890, *The Mountain Democrat* recognized that Lake Tahoe, “is coming to the front... Under the high pressure of American progress, it is only a question of time when Lake Tahoe will have railroad communication with the outside world... hence great multitudes, during the summer months, will throng to this beautiful Lake, with its clear waters, pure atmosphere, and enchanting scenery.”⁷² Indeed, as the lumber industry began to decline because of less demand and dwindling stands of timber, the Carson and Tahoe Lumber and Fluming Company tore up the tracks of the Lake Tahoe Railroad in

⁶⁷ *Reno Evening Gazette*, “Jottings,” July 29, 1882.

⁶⁸ *Weekly Nevada State Journal*, “Brevities,” July 29, 1882.

⁶⁹ *The Mountain Democrat*, “Tahoe,” May 31, 1884.

⁷⁰ *Reno Evening Gazette*, “Brevities,” August 1, 1887 and August 29, 1888.

⁷¹ *The Mountain Democrat*, “Railroad to Lake Tahoe,” January 4, 1879.

⁷² *The Mountain Democrat*, August, 16, 1890.

1898. Duane L. Bliss had the rails hauled to Tahoe City where laborers connected the lake by rail to the Southern Pacific Railroad. Bliss created a new company, the Lake Tahoe Railway and Transportation Company and tourism at Tahoe supplanted logging and lumbering as the mainstay of economic prosperity.

As early as 1880, Tahoe began to fall under a shroud of economic uncertainty with the exhaustion of timber in the basin and “borrasca” on the Comstock. Western water historian Donald Pisani writes, “Protests over reckless logging occurred almost from the beginning of the Tahoe lumber boom,” and in the early 1880s, California newspapers and politicians began proposing legislation to preserve all or part of the lake.⁷³ Park proposals ultimately failed and Pisani concluded that the legacy left by the Tahoe lumber industry, “reinforced the assumption that the lake and all its resources should be private property rather than public and that scenic beauty was a commodity like other natural resources.”⁷⁴ Eventually the unclaimed portions of the public domain and the desire of private property owners to protect Tahoe water and forests helped to bring a forest reserve to the basin rather than a national park.

In 1889, Major George Montague Wheeler published the final *Report Upon the Surveys West of the 100th Meridian* and proclaimed, “It would have been well years ago had the General Government reserved the slopes leading to this lake as a permanent pleasure ground, to be regulated for the benefit of all people, as well as a specially beautiful spot for rest and recreation for travelers from all lands.”⁷⁵ As early as the 1880s, there developed a growing concern that the environment at Lake Tahoe was in jeopardy.

⁷³ Pisani, “Lost Parkland,” 10.

⁷⁴ Pisani, 17; Strong, “Preservation Efforts at Lake Tahoe.”

⁷⁵ Wheeler, *Report Upon the United States Geographical Surveys West of the 100th Meridian*, 103-104.

Regardless, visitors to the lake continued to arrive where the Tahoe tourist experience mingled with logging and lumbering.

Visions of Nature at Tahoe

The landscape historian Stephen Mills asked the question of nineteenth century westward expansion: “Was the West to be left as a primeval wilderness or turned into a cultivated garden?”⁷⁶ As people gained access to the West, the idea of wild nature, or wilderness, served three purposes: one, a place of natural resources for useful purposes such as industry and settlement; two, a romanticized scenic garden where tourists could come to rejuvenate in nature; and three, a conserved land for sustainable and useful purposes. For most settlers in the West, wild nature was not only dangerous, but uninteresting.⁷⁷ Between 1860 and 1880, industry and settlers civilized nature at Lake Tahoe and made it an accessible place for tourists to rusticate and recreate.

Lake Tahoe was a scenic place but also part of an industrial machine. In *The Machine in the Garden*, the literary historian Leo Marx described the garden as the pastoral ideal brought west. The garden ideal persisted throughout the nineteenth century at a time when technology had long blurred the prospect of a pastoral America. Marx argued that the nation found a way to have both progress and the ideal. Humans in the garden comfortably adjusted to the presence of machines:

In this sentimental guise the pastoral ideal remained of service long after the machine’s appearance in the landscape. It enabled the nation to continue

⁷⁶ Stephen Mills, *American Landscapes*, 50.

⁷⁷ Mills, 62. Mills suggests that, “Today’s interest in scenery seems less than instinctive: contemporary travelers have learned to enjoy what once seemed uncivilized and, therefore, uninteresting.” Also, consider Doten’s first impression of Tahoe, “rather barren of all but trees.”

defining its purpose as the pursuit of rural happiness while devoting itself to productivity, wealth and power.⁷⁸

Machines shaped a landscape at Lake Tahoe and, at the same time, tourists idealized their experience in nature—utility occurred in the framework of an idyllic wild nature.

As Marx pointed out, “It remained for our serious writers to discover the meaning inherent in the contradiction.”⁷⁹ Mark Twain represented one such writer. On his way to Carson City in 1861, Twain pondered the empty and barren landscape on the eastern side of the Great Basin. In this salt desert where the remnants of Ancient Lake Bonneville left a desolate place, he wrote, “. . .nothing helps scenery like ham and eggs, and after these a pipe. . . a fragrant pipe and a contented heart—these make happiness. It is what all the ages have struggled for.”⁸⁰ In other words, the wilderness experience was vastly improved with the accoutrements of civilization. A civilized wild nature, constructed with modern conveniences, was preferable to surviving in the wilderness.

At Lake Tahoe most people preferred the amenities offered by economic progress. The intrepid English equestrian traveler Isabella Bird, in 1873, sat at the south end of Lake Tahoe amidst the beauty and refreshing air and commented, “There is no sound but the distant and slightly musical ring of the lumberer’s axe.”⁸¹ Bird was not visiting Frémont’s Tahoe in 1844 or a Tahoe “rather barren of all but trees” in 1863 as described by Alfred Doten. She ventured around Lake Tahoe’s shores where Doten was touring the lake, throwing a wedding reception at Glenbrook, and enjoying the floating bands that entertained tourists. Western landscape historian C. Elizabeth Raymond points out that

⁷⁸ Marx, *Machine in the Garden*, 226.

⁷⁹ Marx, 226.

⁸⁰ Twain, *Roughing It*, 141. Also, see Leo Marx’s discussion on Mark Twain, *The Machine in the Garden*, 322.

⁸¹ Isabella Bird, *A Ladies Life in the Rocky Mountains*, 3.

the 19th century Tahoe experience melded comfortably with industry in a place where “Beauty and utility were not inconsistent.”⁸² Tourism at the lake benefited from the access gained by the lumber industry. In effect, where progress reigned, perception also messaged the wilderness ideal. Stephen Mills, a landscape historian, suggested wilderness was not the future of the West until it was almost gone.⁸³ Domination, exploitation, and a garden came first.

Western historian Earl Pomeroy comments on the contradiction between nature and civilization, “...for sixty or seventy years...tourists had to be reassured...that the West was no longer wild and woolly—until fashions changed and it was time to convince them that it was as wild as it ever had been.”⁸⁴ Anne Hyde outlines a similar argument in *American Vision* in which she concentrates on national perceptions of landscapes that shaped experiences in the American West. According to Hyde, European concepts of nature informed American landscapes. Most Americans who traveled to the West did not possess a language to describe the nature they encountered. Western explorers and later travelers and tourists appropriated European models of landscape interpretation. After Americans gained access to the West, especially tourists, photographers, and nature writers the nation awakened to the idea that wilderness, distinct from civilization (especially European), was part of their material culture.⁸⁵ As a result, they sculpted the physical environment to reflect an American nature to appear wild and woolly all the while making nature accessible and comfortable.

⁸² C. Elizabeth Raymond, “A Place One Never Tires of,” 20.

⁸³ Mills, *American Landscapes*, 50.

⁸⁴ Early Pomeroy, *In Search of the Golden West: The Tourist in Western America* (New York: Alfred A. Knopf, 1957) 89.

⁸⁵ Anne Hyde, *American Vision: Far Western Landscape and National Culture, 1820-1920* (New York: New York University Press, 1990).

Across much of the West by the 1890s, timber stands were under attack to supply the industrial machine that accompanied Euro-American settlement from the Atlantic seaboard to the shores of the Pacific. One of the hardest hit regions in the effort to extract the supposed limitless resources occurred in Nevada on the eastern shores of Lake Tahoe. Prior to the 1880s, the common perception suggested that access was the only significant limitation to western development. With access to water, timber, and ore, development would flourish. Development flourished with the proper infrastructure of wagon roads, railroads, and flumes to create an integrated system designed to extract and develop resources and settlements. This transport access also brought environmental degradation and threatened the possibilities for sustainable settlements. The perceptions of travelers and tourists, who used the access routes during the 1870s and 1880s, provided a medium to understand the cultural perceptions that legitimated the often devastating machine in the garden and how that infrastructure brought them to a privileged vantage point that would later influence the creation of conserved landscapes.

During the second half of the nineteenth century, settlers privatized the land in the Lake Tahoe Basin with visions of development and material progress. Tourists took advantage of the access routes around the lake. Early settlers, such as John McKinney, Joe Winters, and Augustus Pray recognized that Lake Tahoe's scenery and resource extraction were intertwined commodities. As tourism supplanted lumbering as the main industry, the landscape slowly reflected a new emphasis placed on nature—conservation and preservation. Tourism at Tahoe did not occur until nature reflected civilization, but by the 1880s people tried to save nature from civilization. The transformation of nature at

Lake Tahoe was part of a larger historical transition in America from a “machine in the garden” to a “garden in the machine.”⁸⁶

To create a garden at Lake Tahoe, order and control of nature offered a way forward. Tahoe environmental historian Douglas Strong argues, “Most local people expressed more interest in the acquisition of land for profit than protecting the [Tahoe] basin.” In the 1880s, residents at Tahoe began to ask why “lumber barons would spend thousands of dollars to visit the Alps but not a dollar to save Tahoe....”⁸⁷ Concerned citizens, especially local land owners began to question the value of a declining timber industry at the lake.

In 1883, California passed a resolution in the state assembly to “preserve natural scenery for the health, pleasure, and recreation of both residents and tourists.” This led to the Lake Bigler Forestry Commission, which went to work acquiring lands, specifically railroad lands from the Central Pacific in an effort to preserve the lake for residents and resort purposes. The Commission failed and was dissolved in 1892, but during the previous year the Congress passed a bill with a last minute rider, known as the Land Revision Act (1891). This act offered a solution to the forestry commission’s failed attempts to protect the lake.⁸⁸

The Land Revision Act granted the President power to proclaim forest reserves (discussed in Chapter Three). Local residents, the Sierra Club (created in 1892 by John Muir), and public officials from California and Nevada quickly petitioned for a forest reserve at Lake Tahoe. Forestry officers from the General Land Office inspected the

⁸⁶ Marx, *The Machine in the Garden*, p. 1.

⁸⁷ Douglas H. Strong, *Tahoe: From Timber Barons to Ecologists* (Lincoln: University of Nebraska Press, 1999) first published 1984, 34-35.

⁸⁸ Strong, 36-37.

Tahoe Basin for the possibility of a reserve in the mid-to-late 1890s. Using his proclamation powers on April 13, 1899, President William McKinley established the Lake Tahoe Forest Reserve. The reserve circumscribed the southwest portion of the Tahoe Basin where logging, particularly clear-cutting, had done the least damage.

Nevada's eastern side of the lake remained largely private and barren, but efforts to protect future stands of timber, watersheds, and Tahoe's scenic assets continued. In 1899, Senator William Stewart proposed the creation of a national park in an effort to protect timber growth, limit erosion, and promote the flow of water into Nevada for irrigation purposes. In 1903, Theodore Roosevelt stopped in Carson City on a tour of the West and noted the relation of the Tahoe Reserve to irrigation: "the extension of a forest reserve system, so that the source of supply for the great reservoirs and irrigation works may be safe from fire, from overgrazing and from destructive lumbering."⁸⁹ On October 3, 1905, the Reserve expanded to include a substantial portion of lands around the California side of the lake and a small section on the north side within Nevada's borders.⁹⁰

A complicated set of circumstances accompanied the creation of each forest reserve in the West. It would be premature to suggest that the protection of timber resources created the rationale for a forest reserve at Lake Tahoe. The reserves were not designed to preserve nature, but to integrate their resources into local economies and promote sustainable settlements through "wise use" of timber products and watershed protection. The 1897 Forest Organic Act provided guidelines for the creation and

⁸⁹ "California Water and Forest Association, Should the Forests be Preserved?" (1903) as described by Strong, *Tahoe*, 39-41.

⁹⁰ Strong, 40-43.

maintenance of reserves, especially the conservation of timber and water. The Act also emphasized the economic prosperity of local communities based on forest resources. At Lake Tahoe, the local economies prioritized a scenic retreat for wealthy residents and tourists. It was also an important water storage for users downstream along the Truckee River that flowed into Nevada. The policies of forest conservation were meant to ensure favorable conditions of water flows, timber protection, and eventually recreational resources that ultimately became the Tahoe Basin's primary economic engine.

In 1905, following the expansion of the Lake Tahoe Forest Reserve, the reserves became national forests administered by the new United States Forest Service in the Department of Agriculture. Under the leadership of Chief Forester Gifford Pinchot the national forest system came to Nevada when President Roosevelt proclaimed a series of forests within Nevada after 1906. The highest mountains in Nevada, including those in Nevada's timber belt, became national forests to conserve timber and vegetation cover that helped in the stabilization of watersheds for the economic benefits of the mining and grazing industries and the irrigation systems on which settlers depended.

Yet, when all is said and done, Lake Tahoe and its forest reserves were a Nevada anomaly. The scenery and abundance of natural resources at the lake offered a way for settlers to diversify their economic base out of mining and timber. In the rest of the state there was another story. By 1890, mining throughout the state appeared to be played-out. The ranching industry also suffered from an overgrazed commons where competition for forage threatened environmental collapse, particularly after the hard "white winter" of 1889-90. Few options existed for diversifying out of mining and ranching. There was much talk, however, of irrigated agriculture in small portions of Nevada that could be

realized by local cooperation or even the aid of the federal government. In either case, water was fundamental. In all cases national forests were essential not only for irrigated crop agriculture, but for livestock raising and mining communities. Protecting and conserving mountain watersheds became the first step toward sustainable communities of settlement in Nevada's outback whatever economic base emerged.

Chapter Three

National Forests and Mountain Grazing, 1897-1925

In 1925, Nevada Senator Tasker Oddie auto-toured through southeastern Oregon and into northwestern Nevada. Leland “Lem” Speers, a correspondent from the *New York Times*, rode along with the Senator. The travelers crossed into the north central portion of Nevada along the western side of the Santa Rosa Range and arrived in Winnemucca, one of several locales designated for a meeting of the 1925 Senate Subcommittee on Public Lands. Speers reported: “The Senator has lived most of his years in Nevada, yet it was his first contact with the Oregon-Nevada wasteland.” Speers described the region as a permanently, “unconquered residue of the desert” where there “is desolation indeed, with only sagebrush, greasewood, and the occasional ‘gin-fizz’ [Juniper] tree to break the monotony.” The sub-heading to Speers’ article in the *New York Times* read: “The Senate Public Lands Committee Inspects a Waste Like the Sahara, a Region where Cougars, Jackrabbits and Wild Horses Survive and Homesteaders Fail.”¹ Speers’ impression of Nevada’s high desert reinforced longstanding perceptions of a wild and worthless land, especially in the low lying desert basins. Yet, it was known by ranchers that national forests ruled the upper elevations along huge spaces occupied by the mountain ranges. In these ranges, a resource-use regime and order prevailed according to the rules and regulations of the Forest Service.

The very existence of national forests in Nevada during the early twentieth century suggests the contradictions inherent in irony. Provisions within the Land

¹ L. C. Speers, “Nevada-Oregon Desert Still Defies Pioneers: Senate Public Lands Committee Inspects a Waste Like the Sahara, a Region where Cougars, Jackrabbits and Wild Horses Survive and Homesteaders Fail.” *New York Times*, September 27, 1925. NARA II, College Park, Maryland, RG 95.

Revision Act of 1891 gave the President the power to proclaim forest reserves and protect timber stands in the face of a feared “timber famine.” With little harvestable timber, Nevada’s sparse timber stands hardly qualified. It was not until the passage of the 1897 Forest Organic Act that forest inspectors could find a *raison d’être* for national forests in Nevada. The Organic Act or Forests Use Act declared purposes for the creation and management of forests and announced two major management goals: to “promote favorable conditions of water flows” and “to provide a continuous supply of timber....” These two major goals, particularly to “promote favorable conditions of water flows” made the high mountain ranges of Nevada candidates for inclusion into what became the nation’s national forest system.²

Based on the 1897 Act, national forest lands in the state were largely designated for the protection of watersheds and their run-off from the snowpack reservoirs in the high mountain ranges. The gradual flow of water to lower elevations supplied irrigation and stock watering essential to the grazing economies of Nevada’s outback. Although forests were limited in Nevada, foliage helped to secure mountain soils from erosion and forests provided a critical canopy to slow the melting of snowpacks.

At the beginning of the twentieth century, U.S. Forest Service land managers wrestled with practical and theoretical ideas about how to regulate and use mountain grazing lands. They faced the tasks of balancing local needs and pressures for resource use with the mandated authorization to encourage the economic development of forest resources to serve the purposes for which the forests were created—water flows and timber protection.

² Sundry Civil Appropriations Act, June 4, 1897.

With the forests securely ensconced in the U.S. Department of Agriculture after 1905, Chief Forester Pinchot's administration ensured a utilitarian approach to forest management. While this meant a resource-use philosophy for the greatest good, it also meant the application of scientific findings and studies to sustain optimum uses. In the case of grazing, foresters sought first to determine "carrying capacity"—numbers and type of stock that could be optimally grazed without damaging the resources ability to maintain itself from season to season. All of which was designed to permit use, but also protect and sustain resources. Placing the forests in the U.S. Department of Agriculture meant the Forest Service had access to a growing body of agricultural scientists and economists in the Department. An emphasis on agriculture also reinforced the assumption in the western and eastern conservation circles that there was a relationship between forests and water supplies. The periodical *Forestry and Irrigation* (1902-1908) best expressed the connection between protecting forests in the mountains to offer snow pack and also protection against erosion for a slow release of water supplies to farmers and various water users in the valleys and low lands of the western arid states.

The dependency of an agricultural enterprise on water from the high mountain ranges underlined the need to protect and correlate resource use in the basin and range environments of Nevada. As the argument emerged that forests protected snowpack, watersheds, and natural catchment reservoirs, a complementary effort emerged to create human-made reservoirs in the lower elevations. The U.S. Forest Service acted in the mountains and the U.S. Reclamation Service built dams and reservoirs on streams and rivers located at lower elevations. The Forest Service's actions in the mountains meant regulation on grazing in Nevada's high mountain pastures and the application of science

to justify the limitation on stock numbers and the determination of “carrying capacity” through scientific understanding of vegetation communities and their ability to sustain grazing.³

Water reclamation arose at the same time that the conservation of forests promised sustainable water supplies. An early western lands historian, E. Louise Peffer argued that the Reclamation Act of 1902 (Newlands Act) was a harbinger that signaled the beginning of the end for the public domain. The Reclamation Act suggested implicitly that the only federal lands available to homestead in the West were, “unfit for cultivation.” By the turn to the twentieth century, “it was generally accepted as fact that the best days of the public domain had passed.”⁴ According to Peffer, the public domain was left to an uncertain future at the turn of the twentieth century and by extension, the largely unsettled and remote regions of Nevada remained a precarious desert without order. An idealistic vision of this union between national forests and valley floors, suggested that the public domain would become settled private lands while the mountains served as government protected water storage.

Nevada’s Great Basin environment presented struggles for the conservation of water. Very little of the desert could be made to bloom and the majority of the state

³ Paul H. Roberts, *Hoof Prints on the Forest Ranges: The Early Years of National Forest Range Administration*, (San Antonio, Texas: The Naylor Company, 1963), 1-5. Roberts began a conversation about the history of grazing on western ranges, which brought order and control to western rangelands. William D. Rowley, *U.S. Forest Service Grazing and Rangelands: A History* (College Station: Texas A&M University Press, 1985), 21. Rowley takes up the conversation started by Roberts and develops the themes of management and science on the national forests’ western ranges. Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Pittsburgh: University of Pittsburgh Press, 1999), 1-4. Hays provides the theoretical foundations for the Conservation Movement’s search for order and control during the Progressive Era. The Forest Service and the Reclamation Service provided the bureaucratic pathways for technicians to order and control an efficient, and hence conserved, nature.

⁴ E. Louise Peffer, *The Closing of the Public Domain: Disposal and Reservation Policies 1900-50* (Stanford: Stanford University Press, 1951), 3.

remained largely unsettled. Successful reclamation of the desert was minimal contrary to the hopes inspired by boosters and water developers who championed federal water projects.⁵ Vast lands outside of riparian areas, reclamation projects, privately irrigated lands, and the national forests remained in the public domain. The free and open public domain rangelands of Nevada continued to offer free-use of the lands and remained unregulated after the establishment of the national forests. Despite generous land sales and donations of Congress, the public domain lands remained unsettled and part of open range grazing. In the early twentieth-first century, approximately only 12 percent of Nevada lands were in private ownership.⁶

On the unregulated public domain, those who claimed water use rights on the few and far between water sources sought to monopolize access to grazing lands, but competition continued to devastate range resources.⁷ The U.S. Forest Service became a moderator amongst the competing resource users—mainly stock operators that included both cattle and sheep outfits. The Forest Service employed the drawing of boundaries, applying science, and even “rule of thumb” regulations to bring order to the land and its use. Historian Thomas Alexander, in his study of the Forest Service’s Intermountain Region, described the situation when he wrote, “Unlike timber where they managed an abundant resource with a small demand, in range management, demand far exceeded

⁵ John Townley, *Reclamation in Nevada, 1850-1904*, Dissertation (Reno: University of Nevada, 1976), 2; William D. Rowley, *Reclaiming the Arid West: The Career of Francis G. Newlands* (Bloomington: Indiana University Press, 1996), 4-5.

⁶ Thomas R. Harris, et. al. “Public Lands in the State of Nevada: An Overview” (Reno: University of Nevada Cooperative Extension and the Center for Economic Development, 2000). Accessed March 2017, <https://www.unce.unr.edu/publications/files/cd/2001/fs0132.pdf>

⁷ Romanzo Adams, “Public Rangelands—A New Policy Needed” *American Journal of Sociology*, 22, 3 (Nov., 1916): 324-51; James A. Young and B. Abbot Sparks, *Cattle in the Cold Desert* (Reno: University of Nevada Press, 2002).

supply.”⁸ In other words, overgrazing was an endemic problem in the Great Basin and the Forest Service faced the task of restricting, limiting, and ordering the region’s high mountain forage resources.

When the resources of the American West proved finite, a new era of efficient sustainable-use began. For example, in the Great Basin, managers and technicians began experimenting on range resources with the control of cattle and the study of productive grasses, also known as agrostology. These land managers and scientists compartmentalized nature by bringing the lab to the wilderness where invested users tried to adjust to Forest Service policies that included control, efficient use, and erosion prevention. Foresters also experimented with more productive grasses and grazing cycles to increase forage productivity. Nowhere were these challenges greater than on the lands of the Great Basin high desert where federal land management occurred on the high mountain national forests.

The rise of the U.S. Forest Service in the Department of Agriculture brought federal land management and agricultural principles together on marginal lands. In 1863, the first Commissioner of Agriculture, Isaac Newton, placed the responsibility of efficient production on farmers when he stated: “It should be the aim of every young farmer to do not only as well as his father, but to do his best; ‘to make two blades of grass grow where but one grew before.’”⁹ At the turn to the twentieth century, Forest Service range managers brought Newton’s agricultural rationale to the mountains of the Great

⁸ Thomas G. Alexander, *The Rise of Multiple-Use Management in the Intermountain West: A History of Region 4 of the Forest Service*, FS-399, May 1987 (Washington D.C: United States Department of Agriculture), 79.

⁹ Isaac Newton, “Annual Report Commission on Agriculture,” (1863), 16; T. Swann Harding, *Two Blades of Grass: A History of Scientific Development in the U. S. Department of Agriculture* (Norman: University of Oklahoma Press, 1947), ix.

Basin's rangelands. Land managers and scientists set out to control nature on the range and maximize efficiency within boundaries of the forests.

Since 1876, a Forestry Division had been operating in the Department of Agriculture with the appointment of a federal forestry agent, Franklin B. Hough.¹⁰ Hough had long been concerned with issues of forest depletion, from at least the time he read George Perkins Marsh's *Man and Nature*, which argued for the importance of forests and watersheds.¹¹ Hough had an eclectic background as a physician turned historian and afterward a statistician. After retiring as a physician in 1852, Hough wrote histories on the Adirondack region of New York and in 1865 became a statistician working for the United States Census Bureau. When analyzing timber data, he discovered that the returns on lumber from forests were rapidly decreasing from one region to the next. His conclusions based on forest depletion suggested that timber stands needed protection with better management standards.

In a paper presented to the American Association for the Advancement of Science in Portland, Maine (1873), Hough argued that the United States Government had an obligation to manage forests so timber resources would not be consumed and abandoned beyond repair. His presentation titled: "On the Duty of Governments in the Preservation of Forests" initiated the government's official interest in maintaining timber resources after successfully appropriating monies for the creation of a forestry agent within the Department of Agriculture (created in 1862). After considerable effort to establish a place for forestry in the United States, Hough was briefly put in charge of the Division of

¹⁰ On August 15, 1876, Congress appropriated 2,000 dollars for the creation of a Forestry Agent (19 Stat. 143, 167).

¹¹ George Perkins Marsh, *Man and Nature; or, Physical Geography as Modified by Human Action* (New York: Scribner, 1864).

Forestry in 1881. Friction within the politics of governing the public domain forests, particularly with Commissioner of Agriculture George B. Loring, caused Hough's demotion in 1883 and Nathaniel Egleston replaced him as Chief of the Division.

Egleston proved a somewhat ineffectual leader at managing forests on the public domain. Conversely, Bernhard Fernow who replaced Egleston in 1886, was a trained forester educated at the Prussian Forest Academy, University of Königsburg, Münden. Between 1886 and 1898, Fernow was the Head Forester who initiated methods of conservation management for American forests. He carved an initial place for forestry professionals in the political framework that concerned public domain resources. During the 1890s, the U.S. Government established the foundations for the creation, management and use of the fast expanding forest reserves.¹²

Prior to the 1891 Land Revision Act there was no long term management mission for forests on the public domain. Previously, the General Land Office concentrated on the disposal of government lands into the hands of private owners. For example, after the American Revolution, the United States Government treated newly acquired lands as a commodity for sale in an effort to encourage western settlement and as a source of revenue for the federal treasury. Thomas Jefferson was an architect of the Land Ordinance of 1785, which provided the foundations for a grid system of survey that marked off townships and ranges still employed today. The grid system was an ordered pattern of six by six mile townships stacked on one another along longitudinal rows known as ranges. This arrangement of the land allowed the U.S. Government's General

¹² Harold Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 2004), 9-10.

Land Office to order the land with markers, represent it on paper, and sell it at local land offices or wherever buyers could be found.

The disposal of land from marginal environments placed settlers in precarious situations. Land disposal, or the alienation of the public domain, suffered from many problems, but arguably nowhere was the disposal of land more difficult than in the arid regions acquired in the 1848 Mexican Cession provided for in the Treaty of Guadalupe Hidalgo that ended the Mexican-American War. The acquisition of Mexico's lands followed by the discovery of gold in California seemed to confirm the belief in the Manifest Destiny of the United States to become a continental nation.¹³ Throughout the second half of the nineteenth century, Congress passed a multitude of acts to facilitate the disposal and use of resources on the western public domain into private ownership. These attempts included the Desert Land Act, the Timber Culture Acts, Timber and Stone Act, Mining Laws, and Coal Mining Laws.

In 1862, the Homestead Act passed to provide prospective settlers 160 acres of land if improvements could be made within five years. The Act initiated a change in land disposal efforts by the General Land Office from selling land to simply promoting settlement with the promise of free land. In Nevada, marginal lands did not accommodate permanent settlements, or private land ownership, unless the settler controlled an adequate water source and these were sparse.¹⁴ Most of Nevada's privatized lands were not the result of direct purchases from the General Land Office's public domain. Over

¹³ John O'Sullivan's, "Annexation" (1845) afforded editor O'Sullivan of the *United States Democratic Review* an opportunity to coin the term "Manifest Destiny" after the United States admitted Texas as a state in the Union.

¹⁴ Young and Sparks, *Cattle in the Cold Desert*, 90-92.

half of alienated lands in Nevada came indirectly through the purchase of state lands that Congress donated to the state *en masse*.

In 1864, statehood came early to Nevada largely because of factors related to political support for the north during the Civil War. When this occurred, most of the state had not been settled or surveyed. Regardless, the state owned by federal law, sections 16 and 36 of each thirty-six square mile township for state school lands. These sections, adding up to 3.9 million acres, could be sold in support of the state's common schools. In addition, the state was granted 635,308 additional acres for internal improvements, public buildings, prisons, and asylums. The problem for the state's school fund was that the lands remained un-surveyed. With no survey there could be no sales, if indeed any sales could occur on these remote and arid lands. In 1880, the Nevada legislature convinced Congress to give the state a block grant of 2 million acres of land to select and sell to buyers on whatever terms the state required. Revenue from these select lands was now possible for the public school fund. With the filings of buyers under generous credit terms the state, in consultation with prospective purchasers, chose lands in Elko, Humboldt, Lincoln, and Washoe counties. Most of the available lands were bought by established ranchers along the Humboldt River who secured remaining water sources and added to their valley floor livestock empires.¹⁵

Settlers who secured water sources were able to monopolize large swaths of land on the public domain. A 160 acre farm with irrigation potential translated to forage on hundreds of thousands of acres. Under these circumstances, the majority of the public domain never came into private ownership. Peffer suggested that despite all the various

¹⁵ Young, 95-96; John Townley, "Management of Nevada's State Lands, 1864-1900," *Journal of the West*, 17, I (January, 1978): 68.

congressional acts to dispose or develop land, and especially the ensuing optimism about federal reclamation projects, “that at best there was little water to be utilized.”¹⁶ The difficulties of land disposal in the West prompted Congress to pass the 1891 Land Revision Act that not only suspended the Desert Land Act in most states but also gave the President the power to proclaim forest reserves. President Benjamin Harrison used this new presidential power seventeen times to establish forest reserves on approximately thirteen million acres. The Act pronounced a partial reversal of policies from alienating the public domain to the government’s retention of the land. Presidents Grover Cleveland and William McKinley followed suit and established another thirty-two million acres of forest reserves.

Gifford Pinchot, successor to Forester Bernard Fernow as head of the Division of Forestry in 1898, recalled that the Land Revision Act (1891) was “the most important legislation in the history of forestry.... This was the beginning and basis of our whole National Forest system.”¹⁷ The Act passed as a last minute rider to a bill in Congress and stipulated that the President, “might from time to time set aside forest reservations in any state or territory having public lands wholly or in part covered with timber or undergrowth.” Simply worded, “wholly or in part covered with timber or undergrowth” offered considerable leeway for the proclamation of forest reserves, but there was no mention of how the reserves would be managed.¹⁸

¹⁶ E. Louise Peffer, *The Closing of the Public Domain: Disposal and Land Reservation Policies, 1900-50* (Stanford: Stanford University Press, 1951), 21. Peffer points out that in 1896, “F. H. Newell, later the head of the Reclamation Service, noted and warned against such enthusiasm.”

¹⁷ Gifford Pinchot, *Breaking New Ground* (New York: Harcourt, Brace and Company, 1947), 85; John Ise, *The United States Forest Policy*, (New Haven, Yale University Press, 1920), 109.

¹⁸ Ise, *The United States Forest Policy*, 109

In the West, the ability of the President to proclaim forest reserves by executive order received a shrug of the shoulder from cattle ranchers who knew there could be little enforcement. In response to the lack of enforcement and the uncertainty about the status of forest reserves, Congress took action in 1897. In a Sundry Bill containing the Forest Organic Act of June 4, 1897, “provisions were promptly made for the administration and protection of the forest reserves.” The Forest Organic Act added regulations especially that the forest reserves, “must be made to perform their part in the economy of the nation.”¹⁹ The Act stipulated: “No public forest reservation shall be established, except to improve and protect the forests within the reservation, or for the purpose of securing favorable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of the citizens of the United States.”²⁰ This act established the reserve as a place for use as well as protection of the forest and water supplies to promote efficient use of resources and economic security.

Federal Boundaries and Nevada Mountains

The creation of National Forests in Nevada followed quickly on the heels of the 1905 Transfer Act. This Act removed forest management from the Department of the Interior by placing forest reserves in the Department of Agriculture.²¹ In many instances

¹⁹ Ise, 17; Peffer, *The Closing of the Public Domain*, 33-34. Peffer refers to the 55th Cong., 1st sess. 1897, S. Doc. 105 (Forest Policy for the Forested Lands of the United States).

²⁰ Gifford Pinchot, *Breaking New Ground* (New York: Harcourt, Brace and Company, 1947), 258.

²¹ The Transfer Act of 1905 moved the forest reserve lands from the Department of Interior to the Department of Agriculture. A month later the Bureau of Forestry (formerly the Division of Forestry) became the United States Forest Service within the Department of Agriculture. Finally, remarked Gifford Pinchot, *service* came to the American People, “I never liked the name ‘Bureau’.... So when ‘Bureau of Forestry’ disappeared from the Agricultural Appropriation Bill and ‘Forest Service’ took its place, no one was more pleased than I.” The Agricultural Appropriation Act of March 3, 1905 included the word “service” that Pinchot championed as a mission for the federal government to benefit the people as opposed

graziers using high mountain pastures welcomed the forest proclamations and the designation of forest boundaries. The transition suggested a more ordered use of the resource rather than the helter-skelter competition for the grazing lands as stock operators rushed to exploit a resource open to all comers. By 1905, Nevada ranges suffered from the overgrazing of thousands of head of sheep that left only dust in their wake. Cattle contributed to this devastation, but cattle stock operators were most often local land owners of home ranches and grazed stock on the open public ranges both at lower elevations and in the high mountains. The locals charged that many of the sheep herds came in from the outside, owned by corporations based in Boise or San Francisco, and tended by low paid Basque immigrants. If the Forest Service could establish regulations and management to exclude these herds and competitors, they were more than welcomed by established in-state ranchers who operated from their home ranches and water sources.

To designate the new forests, Forest Service inspectors assessed the land, determined if the primary economic industries could benefit from a reserve, and then circumscribed those boundaries based on the justification for the forest. Land managers in the Forest Service recognized the importance of what would eventually be called multiple uses, but prioritized the most economically beneficial industry as required in the 1897 Forest Organic Act. Between the years of 1905 and 1909, presidential proclamations, signed by Theodore Roosevelt, created twelve national forests in Nevada. After 1909, through Acts of Congress, three more forests came to the state. In 1917, the

to the monopolies and wasteful practices of nineteenth century private industry. In his *Breaking New Ground*, Pinchot idealized the work of the Forest Service by aggrandizing his legacy, arguing for the importance of public lands, and criticizing the environmentally destructive tendencies that preceded his tenure as Chief of forestry in the United States. Gifford Pinchot, *Breaking New Ground*, 254-62.

forests in northern Nevada, excluding the California-Nevada border forests combined into three forest systems: the Humboldt, Nevada, and Toiyabe National Forests.²²

Prior to the arrival of the Forest Service, the local livestock ranchers and itinerant sheep herders competed on an overgrazed commons. Large cattle operations arrived to Nevada in the 1870s, many from Texas and California. These operations brought Anglo-American, Mexican, and Spanish cattle cultures into the intermountain region of the West. By 1870, cattle operations quickly dominated the northern portions of Nevada, southeastern Oregon, southern Idaho, western Utah, and southwest Wyoming.²³ Cattle ranchers, among others, created large and small operations that commanded many of the irrigable portions of the Great Basin. The severe “White Winter” of 1889-90, however, wiped out many of the large cattle outfits using the free and open range. Overgrazing in the 1880s, followed by drought, and the devastating winter caused huge losses for the grazing industry. In 1890, Elko newspapers estimated that the losses to large cattle operations reached up to 95 percent in some locales.²⁴ What was disaster for some was opportunity for others. By the early 1890s, the ravaged cattle industry created a vacuum on the range and opened the door to sheep graziers.

²² Only two national forests would be created after Gifford Pinchot retired as Chief: the Santa Rosa National Forest in 1911 and the Ruby National Forest in 1912 (both temporary forests until they were consolidated with the Humboldt National Forest). Henry Graves, the successor of Pinchot, was chief of the USFS when the three main forests in northern Nevada consolidated under Presidents Taft and Wilson.

²³ Terry G. Jordan, *North American Cattle-Ranching Frontiers: Origins, Diffusion, and Differentiation* (Albuquerque: University of New Mexico Press, 1993), 265; James Young and B. Abbot Sparks, *Cattle in the Cold Desert*, 99; David Iglar, *Industrial Cowboys: Miller & Lux and the Transformation of the Far West, 1850-1920* (Berkeley: University of California Press, 2005), 123; Nancy Langston, *Where Water & Land Meet: A Western Landscape Transformed* (Seattle: University of Washington Press, 2003), 17; Edna Patterson et al., *Nevada's Northeast Frontier* (Sparks, Nevada: Western Printing & Publishing Company, 1969), 207.

²⁴ Young and Sparks, *Cattle in the Cold Desert*, 134.

By 1900, the number of sheep on the range increased exponentially. Afterward, cattle and sheep dominated the ranges, competing for the same resources. When forestry inspectors came to the mountains of the Great Basin to determine potential locations for forest reserves, they found the mountains overstocked and severely overgrazed. To justify forest reserve designations forestry experts wrote of the importance of snowpack and the forest canopy to serve as a protective cover to increase and conserve water run-off into the summer months. They also pointed to the importance of vegetation and shrubs to prevent harmful erosion of mountain pasture, prevent floods in massive run-offs, and to preserve water quantity coming from the mountains. For all of these reasons, the presence of forest reserves in the high mountain ranges was essential for the beneficial flows of water and local economies.

In 1905, F. W. Reed, inspector for the Forest Service, assessed the Ruby Mountains. He reported that tree growth in the Ruby Mountains was “meager” with “no commercial value.” Regardless, according to “favorable conditions of water flows” in the Forest Organic Act, Reed argued that agriculture was the primary economic engine for Elko Country and that a forest reserve should be created to protect the forest and ensure a slow run-off of the snowpack. His report concluded: “Every drop of water, therefore, which flows off from the Ruby Range is of value, and it is necessary that none of it should be wasted.” Reed recognized the importance of a canopy to protect the snowpack’s slow dispersion of water into the watersheds surrounding the Ruby Mountains and added:

The Great value of the thickets of aspen along the canyons and the patches of chaparral on the slopes in protecting the watershed, in insuring a slow melting of the snow drifts which accumulate in winter, and a gradual and steady discharge

of the water onto the valleys below at a time that it is most needed is self-evident, and is fully realized by the settlers.²⁵

Although the Ruby Mountains had little harvestable timber, the fact did not prevent recommendations from the forest inspector for a national forest.

The first forestry inspector to eastern Nevada's Snake Range was Lage von Wernstedt. He was a Swiss born and trained forester who came to the United States and continued his education at the Yale School of Forestry before joining the newly created United States Forest Service. Wernstedt reported, as did Inspector Reed, that livestock on the summer grazing lands exceeded sustainable numbers.

In 1906, inspector Wernstedt investigated the mountain ranges in White Pine County. He described the Snake Range as the most "conspicuous range...between the Wasatch Mountains and the Sierra." He determined that the mountains were probably the most heavily timbered section of Nevada, second to Mt. Charleston and portions of the Sierra Nevada, amounting to approximately 75,000 acres. According to Wernstedt, the forests on the Snake Range provided necessary protection for the water supply of ranchers and miners and that the creation of a forest reserve had no immediate urgency due to the inaccessibility of the range. In other words, the forest timber and water resources were not in danger of export and likely to serve modest local needs.

Despite his assessment, Wernstedt recommended that, "...control [by federal management] of the timber would insure a permanent supply [of water]," and that the forest, forage, and water supply could be improved, extended, and developed. He concluded: "Government control would be of a decided benefit to the country." He

²⁵ Franklin W. Reed, "The Proposed Ruby Mountains Forest Reserve, Nevada," Inspection Report-1905; Alexander, *The Rise of Multiple-Use Management In the Intermountain West*, 33.

admitted that the benefits would be small and probably not justify the cost to the government unless a larger forest with scattered boundaries bypassed the basins and circumscribed multiple and disparate ranges.²⁶

Water, timber, and overgrazing occupied much of Wernstedt's report. From discussions with cattle ranchers, he wrote:

There is some complaint about the effect of the lumbering operations and the sheep in relation to the stream flow, and the range here as elsewhere is overstocked. It is not believed that the lumbering up to the present has injured the supply but evidently the forests on the Snake Range are acting effectively as a protection to the water supply and if cut a great change would be noticeable.²⁷

Wernstedt considered the limited water supply as the most compelling reason for a forest reserve. Critical for Wernstedt was that the forest served as the only reservoir in the Snake Range. He explained: "There are no good reservoir sites in these mountains and a great deal of water in the early spring goes to waste."²⁸ Still the forests were essential to ensure that the mountains served as natural reservoirs where a slow dispersion of water from their snowpack limited waste. Wernstedt's recommendations echoed inspector Reed's assessment in the Ruby Mountains that a slow dispersal of water based on healthy forest covers necessitated an urgency to create forest reserves and stabilize local grazing economies. This same rationale occurred throughout Nevada, except in the central mountains of the state.

In the central portion of the state, the creation of the Toiyabe National Forest proved more critical, but controversial. While other mountains in Nevada had significant

²⁶ Lage von Wernstedt, "Report on the Proposed Ely, Steptoe, Osceola, and Snake National Forests," RG 49, National Archives and Records Administration I, Washington D.C., 1906; Harlan Unrau, *Basin and Range: A History of the Great Basin National Park*, (U.S. Department of the Interior: National Park Service, 1990), 236-41

²⁷ Ibid; Unrau, *Basin and Range*, 239.

²⁸ Ibid; Unrau, 239.

timber resources to justify the creation of national forests, the Toiyabe, Toquima, and Monitor complex of ranges had less timber. Mining operations threatened the remaining timber stands and prompted forest inspectors to secure forest reserves as quickly as possible. These three ranges entered the national forest system as separate forests in 1907, but the following year they were consolidated into the Toiyabe National Forest. The forest was a productive grazing area for the local economy. The forests and water supplies also benefitted the local mining operations, especially Tonopah, Round Mountain, and Manhattan, which threatened the remaining stands of timber. In Nevada, disagreement over whether the forest should continue to exist quickly developed after the creation of the forest.

In 1912 Thomas Cahill, a settler near the boundaries of the Toiyabe National Forest, sent a letter of complaint to Nevada Senator Francis Newlands. He argued that the “homebuilder” was at the “mercy” of forest rangers and forest reserves were a “detrimental obstacle” to mining interests.²⁹ Senator Newlands, a supporter of the Conservation Movement, responded with much sympathy for his constituent Cahill, writing that he had, “little personal knowledge of the Reserve” and that the purpose of the reserves were designed for, “the interests of the people generally, and particularly the small man who has little property.” If, Newlands added, the federal government created a national forest as a, “grazing reserve under the guise of a forest reserve,” then this would be, “indefensible under the law.” In an effort to tread lightly and maybe even straddle the fence, Newlands added: “I am inclined to think that the overstocking of our grazing lands will require some action on the part of the General Government in the interest not only of

²⁹ Thomas Cahill to Francis G. Newlands, January 28, 1912, NARA Regional Branch, San Bruno, RG 95. O Boundaries, Toiyabe National Forest.

the cattle and sheep men, but of the range itself as property of the Government.”

Newlands took the inquiry to Chief Forester Henry Graves (successor to Gifford Pinchot).³⁰

Newlands wrote to Chief Forester Graves: “I must say that from my knowledge of Nevada I think that a considerable area of the forest reserves is unjustified and that in some instances the reservation looks like an endeavor to create a grazing reserve under the guise of a forest reserve.”³¹ Chief Forester Graves responded by reminding Senator Newlands that the reserve was a response to developments in mining at “Tonopah, Manhattan, Eureka, Austin, and other camps.” The reserve focused on remaining stands of timber, which provided five to six cords of wood per acre. The reserves protected the remaining stands from the uncertain cycles of mining interests. Grazing he added was, “purely secondary, as it is now. The assumption of control of grazing was but a necessary consequence of the inclusion of the area within a National Forest for the preservation of the timber supply.”³²

According to the Forest Service, conserving the remaining stands of timber justified the creation of the Toiyabe National Forest. Once forest supervisors began managing the forests, they came into contact with operations on the ground that often complicated the intentions of forest inspectors. In 1911, Toiyabe Forest Supervisor

³⁰ Francis G. Newlands to Thomas Cahill, February 10, 1912, NARA Regional Branch, San Bruno, RG 95, O Boundaries, Toiyabe National Forest.

³¹ Francis G. Newlands to Chief Forester of the United States, February 10, 1912, NARA Regional Branch, San Bruno, RG 95, O Boundaries, Toiyabe National Forest.

³² Henry S. Graves to Francis G. Newlands, February 28, 1912, NARA Regional Branch, San Bruno RG 95, O Boundaries, Toiyabe National Forest.

Herbert Graff admitted: “In serving the purpose for which National Forests were primarily created, it is our honest conviction that the Toiyabe will prove a failure.”³³

Supervisor Graff referred to the lack of timber, productive soils, and moisture in the region, which was less than both the Humboldt and Nevada National Forests. As a result, he continued: “From a standpoint of practical forestry, and from a strictly business standpoint it would seem that the Toiyabe will never be a success, consequently the entire forest might be eliminated, nevertheless, it is not our intention to make any such recommendation.” Graff, while clearly questioning the legitimacy of a national forest in central Nevada, considered its presence essential to the welfare of the majority of the permanent local population and saw an unpleasant consequence if abolished:

...more than a hundred ranchers, who have spent a greater part of their lives, built up their homes, and raised families out of here in this most dismal god-forsaken desert waste, would be wiped out of business entirely, consequently the settlement of this section of Nevada would be forever impeded. In attempting to hold their range rights against large stock corporations and tramp Basco sheep herds, range wars, blood shed and murder would be inevitable.

Graff argued that a departure of the U.S. Forest Service would subject the agency to criticism for its failure to exercise the, “strongest efforts to promote the welfare of Nevada and the people at large.”³⁴

During the first decade of the twentieth century, the Forest Service recommended the creation of national forests to protect resources for an array of reasons. The agency protected valuable stands of timber from industry and to promote favorable conditions of water flows for local communities. Forests, no matter their usefulness as timber products,

³³ Herbert Graff to District Forester, October 12, 1911, NARA, San Bruno Regional Branch, RG 95, O Boundaries, Toiyabe National Forest.

³⁴ Herbert Graff to District Forester, October 12, 1911, NARA, San Bruno Regional Branch, RG 95, O Boundaries, Toiyabe National Forest.

protected the favorable flow of water for sustained and efficient use of forage for the grazing industry and by extension assisted the needs of communities on or near the basin floors. The significance of federal reservations cannot be underestimated in the state. While mining and ranching have dominated historical research, the introduction of federal land management and its role in supporting settlement and use of Nevada's outback resources has been overshadowed by other topics in the historiography.³⁵

The original boundaries of the forests reflected efforts not only to optimize forage protection in the mountains, but also to encourage and protect water flow for use on the public domain. By 1917, the Forest Service assembled the timber belt into three forests in the northern half of the state. In 1908, central Nevada's Toiyabe, Toquima, and Monitor complex of ranges/forests became the Toiyabe National Forest. In eastern Nevada the Nevada National Forest (1909) remained a conglomeration of its six original ranges. In 1917 northern Nevada's Ruby/Humboldt, Jarbidge/Independence, and Santa Rosa National Forests became the Humboldt National Forest. According to Forest Service managers, the changes to administrative units were "part of a service wide program to increase the efficiency of operation and to give better service to the people who use the national

³⁵ Historical investigations concerned with the first two decades of the twentieth century have focused on Nevada's second mining boom in Tonopah, Goldfield, and Ely. Russell Elliott, *Nevada's Twentieth Century Mining Boom: Tonopah, Goldfield, Ely* (Reno: University of Nevada Press, 1966). Like other mining booms these would fade (excepting the Copper Mines of Ely that continue to resurge with productive energies). The rise of the Forest Service in Nevada has received much less attention. In fact, it is almost nonexistent, which is especially surprising due to the friction between public land users in a state where the federal government owns almost eighty-six percent of the state.

forests.”³⁶ Presently, the entire Nevada federal forest system is part of a combination between two forests, the Humboldt-Toiyabe National Forest.³⁷

During the first half of the twentieth century, Nevada forests were spread over great distances and exposed to disparate boundaries susceptible to trespass from all sides. In this way, Nevada’s island biogeography translated to island bio-management for federal forest managers. The national forests in Nevada went through multiple transitions, combining and breaking apart as the administrative logistics conformed to the remote outback of Nevada.

Managing the Forests

Forest grazing expert, and Assistant Director of the Division of Grazing in the U.S. Forest Service, Will C. Barnes asserted, "...the grazing men of the forest service were the shock troops who won the West for Forestry."³⁸ The need for management of contested grazing lands and the creation of national forests in the Intermountain West brought federal forestry practices and managers to unlikely places. Between 1906 and 1910, the fees collected for grazing on forest rangelands exceeded timber revenue and

³⁶ “News Service, Forest Service,” Release, June 27, 1957, Notebook—“HNR History, Information & Education,” Historical Files, USFS, Elko. Harlan Unrau, *Basin and Range*, 251-52

³⁷ The Toiyabe National Forest composes approximately 56 percent of reserved lands, located in parts of western Nevada’s Nye, Lander, Mineral, Lyon, Eureka, Washoe, Douglas and Clark Counties along with a portion of the Carson City Township. It also has boundaries extending into Nevada from eastern California’s Mono, Alpine, Sierra, Nevada, Lassen, and El Dorado Counties. The Lake Tahoe Forest Reserve that later became the Tahoe National Forest (now on the western slope of the Sierra) is no longer in Nevada or part of the Lake Tahoe Basin. Reserves around Lake Tahoe are part of the Lake Tahoe Basin Management Unit, which spans over two states and five counties. The Humboldt National Forest is composed of parts of Elko, White Pine, Humboldt, Nye, and Lincoln Counties, which makes-up the remaining 44 percent of the Humboldt-Toiyabe National Forest. One regional forest and many districts now represent the original fifteen forests created between 1899 and 1912. Together, the Humboldt and Toiyabe National Forest is the second largest forest reserve in the United States (second to the Tongass National Forest in Southeast Alaska).

³⁸ Will C. Barnes, *Apaches and Longhorns: The Reminiscences of Will C. Barnes* (Los Angeles: The Ward Ritchie Press, ca. 1941) 202; Rowley, *U.S. Forest Service Grazing and Rangelands*, 58.

would continue to do so on occasion for the next decade.³⁹ The initial success for the Forest Service, especially in the Intermountain West, came by collaborating with ranchers whom the Service encouraged to organize into local livestock associations.⁴⁰ This brought a local contingent to the table, but also often excluded other individuals and groups who either had used the forests or had aspirations to do so.⁴¹ The need for management arose out of the well-documented rangeland wars and the tragedy of the commons, both of which occurred during the late nineteenth century spurred by competition to use a resource open to all with the consequence of environmental degradation that often occurred on grazing commons.⁴²

The 1897 Forest Organic Act outlined a loose management plan for the Division of Forestry within the Department of Interior to address the use of resources on forest reserve lands. Specifically mentioned were the timber, water, and mineral resources. Open range grazing was the most common renewable resource use in the Great Basin, but there was no specific provision in the 1897 Act that mentioned grazing or forage resources. The closest the Act came to authorizing grazing control on the forest reserves were the words that authorized “regulation and occupancy” of forest lands. In 1905, Secretary of Agriculture James “Tama Jim” Wilson recognized grazing as part of the Forest Service mission when he approved a regulation (30 Stat. 35; 16 U.S.C. 551) to levy grazing fees, which according to the Secretary was within his purview of authority

³⁹ Rowley, *U.S. Forest Service Grazing and Rangelands*, 64.

⁴⁰ Peffer, *The Closing of the Public Domain*, 72.

⁴¹ Kevin Hatfield, *We Were Not Tramp Sheepmen: Resistance and Identity in the Oregon Basque Community, Accustomed Range Rights, and the Taylor Grazing Act, 1890-1955*, Dissertation (Eugene: University of Oregon, 2003).

⁴² Harry Sinclair Drago, *The Great Range Wars: Violence on the Grasslands* (New York: Dodd, Mead & Company, 1970); Garrett Hardin, “The Tragedy of the Commons,” *Science* (1968), 1234-8; Young and Sparks, *Cattle in the Cold Desert*, 119.

based on the Forest Organic Act.⁴³ While many ranchers favored regulation, not all livestock operators were willing to pay fees on lands where their livestock had grazed for years or decades.

Discontent arose not only because of fees, but more importantly because the fees implied that the grazing community had no “rights” to graze beyond what was granted to them under the issued grazing permits. Public lands historian William D. Rowley points out that, “The assumption of these new powers, especially the nebulous authority to levy a grazing fee, inevitably caused a backlash out West.”⁴⁴ Two Supreme Court cases are typically recognized as legal precedents in support of forest management, permits, and fees: *United States vs Grimaud* and *United States vs. Light*. In 1911 the Supreme Court settled both cases.

In the Grimaud case, the Supreme Court affirmed that the Secretary of Agriculture could regulate and charge for grazing on the National Forests.⁴⁵ Pierre Grimaud and J. P. Crajous grazed sheep on the Sierra National Forest in 1906 without a permit. In effect, the graziers were in violation of trespass. Grimaud’s defense argued against the U.S. Forest Service on the basis that the Secretary of Agriculture did not have the authority to require permits or to levy fees. Grimaud based his argument on the 1897 Forest Organic Act and the Transfer Act of 1905. Neither act explicitly stated that the Secretary of Agriculture could issue permits and levy fees for grazing. The ruling in favor of the U.S. Government was based on the government’s role as a manager of resources

⁴³ W. L. Dutton, “History of Forest Service Grazing Fees,” *Journal of Range Management*, 6, 6 (November 1953): 393.

⁴⁴ Rowley, *U.S. Forest Service Grazing and Rangelands*, 64.

⁴⁵ Rowley, 63-68; Glen O. Robinson, *The Forest Service: A Study in Public Land Management* (Baltimore: Johns Hopkins University Press, 1975), 199.

able to make decisions in the best interest of the forest and forest-user. The Grimaud case provided a legal way forward for the Forest Service to regulate the land through the process of issuing permits (allowances) and collecting fees.⁴⁶

The case of Fred Light proved more troublesome. Light homesteaded during the late nineteenth century in Colorado near the borders of what became the Holy Cross Forest Reserve. He chose the location of his homestead for summer grazing because the higher elevations offered his cattle ample forage. He allowed his cattle to graze on the forest reserve without permit, which also placed him in violation of trespass. Light feared that if the government could charge him grazing fees, then he would have no security for his cattle or homestead because fees could be raised to a confiscatory level or grazing simply prohibited.

Light was president of the Grand Valley Stock Growers Association and commanded some respect in the community. He argued with substantial local support on the basis that because Colorado state laws established a fence-out state he was not responsible for his cattle trespassing on federal lands. As the land owner, the Federal Government must then assume the obligation to build a fence around the entire national forest and fence-out open range cattle. In *United States vs. Light*, the court once again ruled in favor of the U.S. Government, thus supporting the authority of the Forest Service to regulate reserved federal forest lands and placed responsibility on the cattle rancher to avoid trespass.⁴⁷

In both the Grimaud and Light cases, the U.S. Forest Service achieved regulatory legitimacy from the U.S. Supreme Court to issue permits and levy fees for the use of the

⁴⁶ Roberts, *Hoof Prints on the Forest Ranges*, 80.

⁴⁷ Roberts, 81-83

forage in the forests—a resource deemed and judged to be federal property. Justice Joseph Lamar stated that the management of the forests were consistent with the Forest Organic Act to “improve and protect the forest and secure favorable conditions of water flows.” In addition, and especially with reference to the Grimaud Case, the Secretary of Agriculture had the “power to fill up the details.”⁴⁸ Although legal precedent only provided legitimacy for what was already unfolding on forest grazing lands (the Forest Service had begun collecting grazing fees in 1906), it was a significant step toward creating a regulatory system that required cooperation from invested forest users. On Nevada National Forests, permit fees fluctuated but remained consistently lower than for private lands of equal value. These below market value rates for grazing were an early standard until the Forest Service tried to establish a fee system closer to market value and three to ten-year permits during the 1920s.⁴⁹

To create a permit system there needed to be boundaries—within the boundaries—of the forest. Allotments established grazing sections within the forests that were further categorized by vegetation (discussed later in the chapter with regard to reconnaissance, carrying capacity, and seeding). These allotments, along with numbers and types of stock permitted on them, became the basic units of management for grazing on forest ranges. Allotments numbers of permitted livestock could be designated for either cattle and horses or sheep and goats—sometimes a combination of the two

⁴⁸ U.S. Forest Service, Range Management Staff, *Court Cases Related to Administration of the Range Resource on Lands Administered by the Forest Service*, 9-18. Rowley, *U.S. Forest Service Grazing and Rangelands*, 67-68

⁴⁹ William D. Rowley, *U.S. Forest Service Grazing and Rangelands*, 121-23. Rowley points to the report by Christopher E. Rachford, who detailed an extensive study on fair market compensation for grazing fees on forest rangelands. Rachford argued that the services provided by forest management justified comparable market prices for renters of forage on public lands.

classifications of stock. Each allotment was subject to the conditions of the forest environments, the users of the forests, and the type of stock grazing on the forest forage.

Permittees, i.e. forest users, applied for a grazing permit based on their historical use of a forest. The Forest Service created a three-tiered scale to classify potential graziers seeking permits. Class A permittees owned property adjacent to the forest and received priority permit status. Class B permittees lived near the forest and historically used the forest for grazing but did not own adjacent property. Class C permittees possessed no local property near the forest, but used the forest in a transient capacity. Each forest ranger had to determine the class of permits for an applicant, which led to a multitude of problems and opportunities, especially when issues over commensurate property came to bear on Class A and B permit holders. A justification for favoring A and B Class permittees for access to the forest over Class C applicants was the ownership of commensurate property. In addition to adjacent property ownership, the Forest Service adopted a requirement that permittees own enough property and winter feed production to provide for their stock through winter months outside the national forest and the season of graze—hence commensurate property.

An important part of the permit system included the opportunity for beginners. Beginners could apply for class A, B, or C, but the issuance of a permit remained at the discretion of the forest ranger who had to consult records on grazing capacity, protective and maximum limits, allowances related to permittees, possible reductions of other users, and a multitude of other contingencies in an effort to provide opportunity for new forage users. The considerations for a beginner applicant were built into the allowances issued by the district supervisor and the necessary signatures from the Washington office. All

had to take into account the overall numbers of stock allowed on the forest and reduce traditional users to accommodate newcomers. The unpopularity of reductions most often made forest administrators reluctant to admit newcomers unless they could acquire already existing permits. These acquisitions presented another host of problems, which suggested the Forest Service prioritized monopolies over new or marginalized forest users.

The supervisor's annual working plans and the accompanying allowances shed light on the administrative and environmental conditions of the range during the first three decades of the twentieth century. These reports provide a trove of information related to the management of forests. In Nevada, the "Grazing Chapter" of the "Supervisor's Annual Working Plans" detailed the yearly struggles and successes of establishing an administrative body amidst the chaotic conditions of open range grazing. The reports clearly show that Service personnel worked to favor local economies, organized livestock associations for forest users to work out disputes among various permittees, and sought to solidify an organized system of grazing for sustained resource use.

Bureaucratically, the forest supervisor's annual working plan offered a way forward for the district supervisor to sign off on allotments and allowances after authority was granted from the Chief Forester's Office in Washington. The working plan described the range, livestock, permits, livestock associations, game protection, and various other concerns as they related to the evaluation, conservation, and development of divisions on the forest range. The working plans justified the rules and regulations attached to a given allotment, including changes on a given forest, but it was also a report on the condition of

the range as it related to use and abuse. Forest supervisors, in consultation with the forest rangers in their respective forest divisions, wrote the working plans. Rangers provided individual reports and comments that were compiled by the forest supervisor and sent to the district forester (later known as regional forester). The district forester drafted a proposal of allowances for the given forest for approval from Washington. In most cases, at least in the Nevada forests, the Office of the Chief Forester accepted the working plan by district supervisors and approved livestock allowances with few modifications.

The annual working plan report was the most thorough document related to management of a specific division within a given national forest. The working plan not only detailed boundary issues and management decisions, it also integrated scientific efforts to manage the range including vegetation reconnaissance (to create consistent terminology) and reseeded (to manage plant succession). The legitimate presence of the Forest Service management on Nevada's outback mountain ranges provided a platform for rangeland scientists and the Bureau of Plant Industry to influence grazing practices within the boundaries of national forests.

Bureau of Plant Industry and Mountain Forage

During the first two decades of the twentieth century, range scientists became mediators between management, resources, and land use practices on Nevada National Forests. In 1927, Fred Wilbur Powell detailed the "history, activities and organization" of the Bureau of Plant Industry. He suggested that the Bureau had been through a development process that could be broken into four distinct periods: "anticipatory,

preliminary, formative, and development.”⁵⁰ The history of the bureau, he argued, could be traced back to late 18th century when studies conducted on sugar cane, indigo, and mulberry trees anticipated a need for research on marketable crops—especially ones that could not be grown in England. This period began in 1764, the year Benjamin Franklin moved to England as agent for the colony of Pennsylvania and began sending seeds to the American colonies that could not be cultivated in England’s climate.

The preliminary, or second period according to Powell, put down concrete roots in the form of congressional appropriations. The period began in 1839 when Congress approved an act appropriating a thousand dollars for the collection of agricultural statistics and other agricultural purposes, such as seeding. The Act’s primary supporter was Henry Ellsworth, of noted fame for traveling with Washington Irving to Indian Territory to resolve land disputes that arose after Indian relocation in the early 1830s. To his credit, and after his trip across the Mississippi with Irving, Ellsworth became superintendent of the Patent Office in 1835 and a year later he became commissioner. Afterward, and independent of his office, he began “to distribute seeds and plants of foreign origin” to American farmers.⁵¹ Although Ellsworth leaned toward Jacksonian politics, he recognized that government control over the issue of seed cultivation provided a service to the “common man.” In this way, the government could offer a service to farmers and the Act provided a modest sum for the creation of the Division of Agriculture.⁵² According to agricultural historian Philip Pauly, “The division’s primary

⁵⁰ Fred Wilbur Powell, “The Bureau of Plant Industry: Its History, Activities, and Organization” *Institute for Government Research: Service Monographs for the United States Government, No. 47* (Baltimore: The Johns Hopkins University Press, 1927), 1.

⁵¹ Powell, 3

⁵² Act of March 3rd, 1839; 5 Stat. L., 353-354

task was to collect and publish agricultural statistics so that dispersed farmers were not victimized by metropolitan speculators with inside information.” Embedded within this primary task, Ellsworth promoted the use of foreign seeds in North America and the experiments continued after 1839, which Pauly described as a “national geoplasm exchange” to “improve productive capabilities for both individuals and the nation.”⁵³

The “formative period” began with the creation of the Department of Agriculture in 1862. The Department’s mission placed an importance on agriculture, specifically, “to procure, propagate, and distribute among the people new and valuable seeds and plants.”⁵⁴ In 1881, the divisions most related to the plant industry were Seed, Garden and Ground, Botanical, and Microscopy.⁵⁵ In 1883, Congress appropriated monies to secure a pomologist and a horticulturalist. By 1886, Congress established the Division of Pomology and the Botanical Division with missions focused on field investigations with “respect to the discovery and introduction into cultivation of forage plants and grasses suitable to increase the grazing capacity of the arid districts of the South and West.”⁵⁶

In 1889, the Department of Agriculture acquired Cabinet status with Nathan J. Coleman as the first Secretary. Divisions within the Department organized during this period, especially after 1895 when the “Division of Vegetable Pathology was reorganized as the Division of Vegetable Physiology and Pathology and a Division of Agrostology was created for the investigation of grasses and forage plants.” In 1901, Congress authorized a Bureau of Plant Industry and began what Powell described as the fourth

⁵³ Philip J. Pauly, *Fruits and Plains: The Horticultural Transformation of America* (Cambridge: Harvard University Press, 2007), 105.

⁵⁴ Act of May 5, 1862; 12 Stat., L., 387.

⁵⁵ Act of June 16, 1880; 21 Stat., L., 292.

⁵⁶ Act of May 19, 1882; 22 Stat. L., 89, 91.

period of development. He wrote, "...the Bureau of Plant Industry was created to centralize and develop the work which had been done by the Divisions of Botany, Pomology, Vegetable Pathology and Physiology, Agrostology, Gardens and Grounds, and Seeds."⁵⁷ Accordingly, the Bureau of Plant Industry had a long and complicated history. Given the need for range improvement, there was early collaboration between research scientists and land managers to bring theory and practice together.

Frederick V. Coville was one of the first botanists employed by the Department of Agriculture to evaluate the resources of the forest reserves. In 1887, Coville graduated from Cornell with a B.S. degree in botany. He quickly went to work for the Department of Agriculture in 1888 as an assistant botanist at the National Herbarium. After the death of George Vasey, Chief Botanist, Coville took over the botanical work at the Herbarium. When the U.S. Government established the Bureau of Plant Industry in 1901, Coville took charge of the Office of Botanical Investigations and Experiments. He was well groomed for the position. Coville had already been developing field investigations for the Department of Agriculture in an effort to assess the effects of livestock on the forest reserves. On June 24, 1897, Coville received authorization from the Secretary of Agriculture to study the effects of sheep on forest reserves.⁵⁸ The field work accomplished by Coville in 1897 led to the government publication, *Forest Growth and Sheep Grazing*, which outlined preliminary methods and concerns for sustained livestock operations using forest forage.⁵⁹

⁵⁷ Powell, "The Bureau of Plant Industry," pp. 5-10.

⁵⁸ Secretary of Agriculture to Frederick Coville (United States Department of Agriculture: Office of the Secretary, Office of the Secretary).

⁵⁹ Frederick V. Coville, *Forest Growth and Sheep Grazing in the Cascade Mountains of Oregon* (Washington: Government Printing Office, 1898).

In 1905, the Public Lands Commission approached “the question of attaining the largest practicable disposition of the public lands to actual settlers, and the equally important question of securing the most effective use of these lands....”⁶⁰ The Commission discussed at length the grazing problem in the West, which was outlined by Albert Potter, first Chief of Grazing with the U.S. Forest Service, and Frederick Coville. The two discussed the difficulty of managing places of marginal resources and encouraging settlement on the remaining public domain. They recognized that an increase of grazing capacity was essential to this endeavor.⁶¹

After 1907, efforts to secure scientific experts to study rangelands coincided with increased interest in the management of sheep and reseeding. On March 30, 1907, Charles Vancouver Piper, an agrostologist with the Bureau of Plant Industry sent a letter to Chief of the Bureau, Beverley Thomas Galloway. Piper relayed to Galloway a meeting that he had with Gifford Pinchot and Albert Potter. Pinchot and Potter sought the Bureau of Plant Industry’s expertise in addressing the problem of stock numbers on national forests that had been “badly overstocked.” They wanted to “increase the carrying capacity of the summer ranges and consequently the allotment of stock to each district as rapidly as possible.” Specifically, the Forest Service wanted to know what seeding efforts would bring about the most “economical administration of the ranges” to “increase the carrying capacity and maintain the maximum.” The bulk of knowledge concerned with

⁶⁰ W. A. Richards, F. H. Newell, and Gifford Pinchot, “Partial Report of the Public Lands Commission” *Report of the Public Lands Commission* (Washington: Government Printing Office, 1905), IV.

⁶¹ Albert F. Potter, “Questions Regarding the Public Grazing Lands of the Western United States,” *Report of the Public Lands Commission* (Washington: Government Printing Office, 1905), 5-25; Frederick Coville, “A Report on Systems of Leasing Large Areas of Grazing Land: Together with an Outline of the Proposed System for the Regulation of Grazing on the Public Lands of the United States,” *Report of the Public Lands Commission* (Washington: Government Printing Office, 1905), 26.

forest grazing practices was based on the “experience of the stockmen themselves,” which needed “to be supplemented by the most careful investigations.”⁶²

Chief Galloway quickly responded to Chief Pinchot on April 2 and offered a Bureau expert, Mr. J. S. Cotton, to be in charge of the investigation.⁶³ After consultation with Potter and Piper, Pinchot wrote back to Galloway with the desired mission for a study: “The object of this study shall be to develop an increased forage crop in the overgrazed National Forests by artificial seeding, or by the temporary closing of grazing areas, or through a modification of the present system of running stock, or by some other means.” Pinchot set about assigning technicians in the Department of Agriculture the task of increasing grazing capacity to effectively limit reductions of livestock. Clearly, he wanted to avoid conflict with the forest users who relied on the forests for their livelihoods. Pinchot urged that Frederick Coville be in charge of the initial studies on three national forests.⁶⁴

Coville’s investigations embraced input from the Bureau of Plant Industry and managers of forest rangelands in the field. His work was instrumental in setting the stage for the development of the new discipline of rangeland science that sought practical application of botanical science to the problems of range productivity. One of the pioneers of this new discipline was Arthur W. Sampson, first director of the Great Basin Experiment Station (1912-1922), graduate of the University of Nebraska with a M.S. in

⁶² C.V. Piper to B.T. Galloway, March 30, 1907, NARA II, College Park, RG 54, Bureau of Plant Industry, Soils and Agriculture.

⁶³ Gifford Pinchot to B. T. Galloway, March 30, 1907, NARA II, College Park, RG 54, Bureau of Plant Industry, Soils and Agriculture.

⁶⁴ Gifford Pinchot to B. T. Galloway, April 29, 1907, NARA II, College Park, RG 54, Bureau of Plant Industry, Soils and Agriculture. On May 1, 1907 Galloway signed off on the investigation with Coville as lead investigator on studies to be undertaken on the Imnaha National Forest, Oregon; Sawtooth National Forest, Idaho; Pikes Peak National Forest, Colorado.

Botany, and a student of Frederick Clements who was arguably the founder of American plant ecology and certainly a major figure in the prairie school of American ecology.

The concept of dynamic plant ecology came to fruition in the United States under the guidance of Clements and his work related to botany in the early twentieth century.⁶⁵ Clements studied under Charles Bessey at the University of Nebraska and in 1898 he received his doctorate. Bessey introduced a science of ecology that started in Europe to a generation of students who refined concepts and research methods in an American context. Clements was Bessey's most famous and dedicated student. Clements believed that knowing ecological processes offered opportunities to improve and control nature in the interests of human endeavors. He introduced experimental methods to understand the relationship between plant communities and their environments that concluded plant communities followed a pattern of succession in their progress toward a stable climax that favored the dominance of one species type. Experimentation and quantitative analyses concerning vegetation types in the field was the way forward for the new science of ecology to offer information about the optimum use of forest resources.

Sharon Kingsland, a historian of American ecology remarked, "Clements's earliest work was conducted in a land under siege."⁶⁶ After the construction of the transcontinental railroad in 1869, livestock numbers increased exponentially west of the 100th meridian, and as a result, open range grazing expanded and caused the rapid

⁶⁵ Ronald C. Tobey, *Saving the Prairies: The Live Cycle of the Founding School of American Plant Ecology, 1895-1955*, (Berkeley: University of California Press, 1981). In contrast to Tobey's arguments, J. Ronald Engel provides a convincing argument for Henry C. Cowles as the founder of American ecology. J. Ronald Engel, *Sacred Sands: The Struggle for Community in the Indiana Dunes* (Middletown: Wesleyan University Press, 1983).

⁶⁶ Sharon E. Kingsland, *The Evolution of American Ecology, 1890-2000*, (Baltimore: Johns Hopkins University Press, 2005), 142.

depletion of forage on the range. For example, the prairies in Nebraska, prior to the 1890s, could support up to fifty different species of grasses on one square mile. In the final decade of the nineteenth century, grasses rapidly decreased in numbers and diversity. Cornelius Shear, an early collaborator and colleague of Clements, sought to counteract the rapid depletion of botanical diversity and supported controlled experiments to better understand prairie recovery and diversity. To maintain both agriculture and plant diversity, carrying capacity was a concept intended to balance human control of livestock and environmental uncertainties, including climatic tendencies, soil variations, and plant communities undergoing succession. The studies radiated from research institutions such as the University of Chicago and the University of Nebraska.⁶⁷

In 1898, Clements and Roscoe Pound co-authored, *The Phytogeography of Nebraska* that focused on a descriptive study of botany similar to the work of the German botanist Oscar Drude.⁶⁸ In *Phytogeography*, Clements began to quantify plant geography on the prairie using variations of the meter plot method, later known as the quadrat. Clements used the quadrat as a way to supplement the limitations of reconnaissance surveys that relied too heavily on the senses. The quadrat offered a mathematical component to forage use and forage growth that was extrapolated to far larger scales of range.

⁶⁷ Kingsland, 142. Cornelius Shear, *Fieldwork of the Division of Agrostology: A Review and Summary of the Work Done since the Organization of the Division, July 1, 1895* (Washington DC: Government Printing Office, 1901); Tobey, *Saving the Prairies*, 9; J. Ronald Engel, *Sacred Sands: The Struggle for Community in the Indiana Dunes* (Middletown, Connecticut: Wesleyan University Press, 1983), 137-39. Tobey and Engel provide a historical comparison between Frederick Clements, the founder of American Ecology at the University of Nebraska and Henry Cowles, the first professional ecologist from the University of Chicago.

⁶⁸ Tobey, *Saving the Prairies*, 7.

For Clements, reconnaissance surveys of plant diversity tended toward regional descriptions aided by little more than descriptions of the landscape. Naturalist, Alexander von Humboldt refined these surveys during the nineteenth century by combining quantitative “cartographic devices for the analysis of plant distribution,” such as the *isotherm* (sustained plant growth at different elevations or temperatures) and a unified description of how the individual parts come together to form the whole—physiognomy, or face of the landscape.⁶⁹ Throughout the nineteenth century, quantitative methods sharpened in Europe, especially Germany and later in the United States. In the U.S., Clements complemented reconnaissance surveys with the use of the quadrat as a way to determine “indexes of frequency” that could be expressed mathematically based on an “interval variable.”⁷⁰ The quadrat marked off an area and varied in dimensions where there was to be no grazing. From time to time, rangers counted plant types to determine numbers that prevailed and others that failed to reappear. Range experts and managers considered the quadrat as a way to quantify successive stages from which a sub-climax was the desired outcome on the grazing rangelands of the West, including Nevada. Clements broke with the general assessments of range, or the physiognomy of the landscape, and brought the laboratory to nature. The quadrat offered a laboratory where grass communities could be scrutinized at the smallest detail.

Clements sought to control plant communities and their succession in such a way that humans could design and promote the maximum diversity of useful plants by minimizing nature’s tendency to waste forage. His first publication that brought him

⁶⁹ Tobey, 49-53. Tobey points to Alexander von Humboldt as the nineteenth century naturalist who founded scientific methods for early twentieth century quantitative plant geography.

⁷⁰ Tobey, 51-54.

international acclaim was *Research Methods in Ecology* (1905), which transformed the descriptive science of botany into a theoretical structure of ecology. To do so, Clements focused on the term reconnaissance, which was the first step toward understanding a given plant community, or as he came to call it: complex organism. His *Research Methods in Ecology* was not remarkable for reconnaissance or referring to plant communities as organisms, but it did provide the idea that plant communities could be studied in a similar way to a physiologist who researched the function of parts that create the whole. As a scholar of ecosystems history remarked:

One purpose of *Research Methods in Ecology* was to acquaint ecologists with new quantitative and experimental techniques. Physiological theories, notably cell theory, provided an explanatory model for ecologists. Just as the physiologist could explain the functioning organism in terms of cellular activity, Clements hoped to explain the functioning of the ‘complex organism’ in terms of the activities of its parts.⁷¹

Clements has been criticized for falling into a reductive science at a time when physiologists were moving away from such reductionism. Though his experiments sought to alter communities by “simple, stimulus reaction responses,” his work brought a rigorous experimental component to botany and ecology that prioritized the environment over the individual response to change.⁷² In other words, botanical evolutionary change occurred at the cellular level as changes to the environment operated upon an individual. In this way, competition, in the Darwinian sense, did not operate as a primary mechanism for Clements’s plant ecology. In 1907, Clements argued: “Competition is merely a physical process. With few exceptions...an actual struggle between competing plants never occurs. Competition arises from the reaction of one plant upon the physical factors

⁷¹ Joel B. Hagen, *An Entangled Bank: The Origins of Ecosystem Ecology* (New Brunswick: Rutgers University Press, 1992), 22-23.

⁷² Hagen, 23.

about it [perhaps, disturbances in the form of grazing] and the effect of these modified factors upon its competitors.”⁷³ Conversely, and similar to Darwin, Clements initiated a break with nineteenth century botanists by denying the credibility of sensory experience. Reality was too complex to understand the full variation of complex organisms, and as a result, ecology under the guidance of Clements, “had taken leave of the senses and hitched its intellect to mathematics.”⁷⁴

In 1916, Clements published his most influential tome on the subject of dynamic plant ecology, *Plant Succession*. In this work, Clements reiterated a reductive argument that suggested change began at the embryonic community, proceeded through a series of stages (seres), and concluded in a climax community, or super-organism. In this way, succession was a response to changes at the cellular level as a stimulated response to the environment. One could argue, as did some of Clements’s contemporaries that he brought Jean Baptiste Lamarck back to the evolutionary discussion, at least in plant communities.⁷⁵ Jean Baptiste Lamarck’s theory of evolution placed the environment as the critical force behind change in species.

Clements’ version of dynamic plant ecology made Nebraska the incubator of an applicable science of forage or vegetation resources that offered the path forward to measuring carrying capacity.⁷⁶ He developed loyal disciples and ardent critics.

⁷³ Frederick E. Clements, *Plant Physiology and Ecology* (New York: Henry Hold, 1907), 252-53; Frederick E. Clements, John E. Weaver, and Herbert C. Hanson, *Plant Competition: An Analysis of Community Functions* (Washington DC: Carnegie Institution of Washington, 1929), 10-12. This argument flew in the face of the University of Chicago botanist Henry Chandler Cowles, who was also an influential botanist and contemporary of Clements.

⁷⁴ Tobey, *Saving the Prairies*, 68-69.

⁷⁵ Tobey, 84-85. Clements was also associated with the philosopher Herber Spencer and the sociologist Lester Frank Ward. Tobey suggests a plausible influence on Clements, but not directly.

⁷⁶ Joel Hagen, “Clementsian Ecologists: The Internal Dynamics of a Research School,” *Osiris*, 8 (1993): 178-195.

Regardless, Clements created a discourse around ecology that was influential to grassland studies in environments around the globe. Arthur Tansley at Cambridge University in England was an early supporter of Clements, but later in 1935, Tansley developed the *ecosystem* concept as a direct challenge to Clementsian ecology, especially the idea of a plant community as an organism.⁷⁷ In South Africa, John Phillips developed numerous studies of grasslands based on Clementsian ideas, but later lost favor because of an association with Jan Smuts, the Prime Minister of South Africa, who articulated a philosophy of holism, which some have viewed as a precursor to apartheid in South Africa.⁷⁸

In the United States, Clements influenced a new generation of scientists, first as a professor of botany at the University of Nebraska from 1897 to 1907, then at the University of Minnesota where he became head of the botany department until 1917. Afterward, he became a research fellow at the Carnegie Institute in Tucson and later Santa Barbara. His research group focused on the discipline of plant ecology, but according to Joel Hagen a historian of ecosystems, Clements never fully developed a paradigm capable of forming a synthesizing discourse.⁷⁹ Regardless, historians agree that Clements sharpened the scientific discourse on plant ecology and rooted it in experimental and quantifiable methods. Clements, not entirely satisfied with descriptive or reconnaissance work, developed an experimental method (quadrat) to support a

⁷⁷ Donald Worster, *Nature's Economy: A History of Ecological Ideas* (Cambridge: Cambridge University Press, 1994), 301-302; Arthur G. Tansley, "The Use and Abuse of Vegetational Concepts and Terms," *Ecology*, 16 (July 1935): 284-303.

⁷⁸ Peder Anker, *Imperial Ecology: Environmental Order in the British Empire* (Cambridge: Harvard University Press, 2001), 31.

⁷⁹ Hagen, *An Entangled Bank*, 79-80. Hagen challenges Ronald Tobey's claim that Clements formed a scientific discourse within Kuhn's formulation of a paradigm, or as Tobey cautiously referred to it as a "micro-paradigm;" Joel B. Hagen, "Clementsian Ecologists," 178-195.

theoretical framework for botany known as dynamic plant ecology (plant succession) that saw vegetation in the process of succession from one community to another, with the process moving toward vegetation climax or stasis.

These methods came to rangeland studies in the western United States from an array of scientists who concentrated on plant reconnaissance, succession, and communities in an effort to understand stages of vegetation growth and the impact of use (grazing) upon the successive plant communities. Arthur Sampson, a student of Clements and graduate of Nebraska (BS, 1906 and MS, 1907 in botany and plant ecology) became first director of the Great Basin Experiment Station in 1912, after working for the United States Department of Agriculture as a plant ecologist. At the Great Basin Experiment Station, Sampson began applying successional theories to range studies and the understanding of impacts of grazing on forage resources. As the first range ecologist for the Forest Service, Sampson, according to one study, promoted “deferred and rotational grazing strategies. He was also the first to explore range conditions with how a rating system correlated with plant succession.” In addition, Sampson developed the use of an indicator species for quick evaluation of range conditions in the field.⁸⁰ In his article, “Succession as a Factor in Range Management,” Sampson used the theory of plant succession as a way to explain the dynamics of vegetation communities on the semi-arid rangelands of the Intermountain West (Region Four of the USFS that included Nevada’s Great Basin). In effect, Sampson carefully evaluated the range as a place where stages, when understood, could provide the forest land manager (Forest Service Inspectors, Supervisors, and Rangers) with indicators as to whether over-grazing or under-grazing

⁸⁰ David Tippets, ed. “Range Father Arthur W. Sampson” *INTercom*: Jan/Feb (Ogden: Intermountain Research Station, 1991), 2.

had occurred and from this knowledge conclude whether to increase or decrease the number of livestock on the range according to a determined carrying capacity.⁸¹

Sampson was but one of the prominent figures in the Clementsian school to guide the development of range science in the early twentieth century. Another figure who worked in accordance with Clementsian methods in the managing of grasslands on the range of the Great Basin was William R. Chapline, examiner and later Chief of Rangeland Grazing with the USDA Bureau of Plant Industry. He was also a graduate of the University of Nebraska. At the University of Minnesota, John Weaver was one of five Ph.D. students who graduated under the guidance of Clements. Weaver later became the President of the Ecological Society of America and came to be regarded as the foremost authority on North American grasslands.⁸² These scientists gained credibility among the ranks of the Forest Service grazing administration and the forest rangers in the field even in the remote regions of the West. The Forest Service collaborated with USDA scientists to evaluate forage production and estimate the proper carrying capacities for various ranges. By World War I and after, Clementsian concepts of succession in vegetation communities guided scientific work in range studies and added authority to the emerging schemes of range regulations and estimates of secure grazing numbers.

By 1920, the Bureau of Plant Industry promoted certain practices such as deferred and rotation grazing. Deferred grazing kept an allotment closed until the seed crop matured or the vegetative reproduction occurred. Rotation grazing split a specified rangeland into units to be grazed periodically over the course of a season. Often, forest

⁸¹ Arthur W. Sampson, "Succession as a Factor of Range Management," *Journal of Forestry*, 4, (May, 1917): 593-96; Rowley, *U.S. Forest Service Grazing and Rangelands*, 103-104.

⁸² Hagan, "Clementsian Ecologists," 188.

inspectors recommended a combined system of deferred and rotation grazing. For these practical systems of grazing procedures to be effective, grazing inspectors made excursions into each forest to identify the most productive grasses and their reproductive cycles. These excursions were ordered reconnaissance surveys by the grazing inspectors and provided the necessary authoritative knowledge that could be invoked to justify what appeared to many users as arbitrary decisions on the part of the Forest Service to move livestock and limit numbers. While drawing on science to support their grazing plans and allowances for the forest, rangers in turn gathered information from the field for range scientists by sending samples of forage plants to experimental stations and reporting on seasonal characteristics of the range and its response to erosion threats and floods.⁸³

Local rangers relied upon reconnaissance surveys by teams of forest technicians and sometimes research scientists to make estimates on the carrying capacities of a given forest. A systematic approach to surveys and reconnaissance covering all national forest regions emerged in 1911, when the Office of Grazing Studies expanded into the U.S. Forest Service's western districts. By 1915, the Forest Service became the national leader in range research when the Bureau of Plant Industry was transferred into the Forest Service's grazing operations. By the early 1920s, range research efforts proliferated, especially in range reconnaissance and range-management plans through the work performed by the Office of Grazing Studies.⁸⁴ Reconnaissance surveys gained priority as a result of knowledge about plant succession that was either moving forward as an organism to climax or retrogressing according to the use and abuse of the range by

⁸³ Correspondences of Will C. Barnes, Arthur W. Sampson, James T. Jardine, Frederick Coville, W. Chapline, and C. V. Piper, Talbot, NARA II, College Park, Maryland, RG 95.

⁸⁴ Rowley, *U.S. Forest Service Grazing and Rangelands*, 106-108. In addition, by 1925 two-thirds of the Office of Grazing budget went to range reconnaissance and range management plans.

graziers or weather. It was understood that proper range management related to the development of plant communities could influence and even control range deterioration or promote restoration. In 1923, the Chief of Rangeland Grazing, William Chapline, contemplated the range management plan as it related to reconnaissance. He wrote to the Intermountain Grazing Assistant D. A. Shoemaker, "The plan is merely a substantial foundation for systematic development which will lead to the most efficient use and management from the standpoint of National Forest resources, as well as from the standpoint of stock." He emphasized, "All Forest officers must realize that the management plan is never finished."⁸⁵

In Nevada, Forest Service grazing inspectors, forest rangers, and Bureau of Plant Industry botanists identified a diverse "dovetailing of flora," especially along the more mountainous east-west cross sections of Nevada and Utah. The 39th Parallel from Lake Tahoe to the Southern Snake Range in Nevada was of particular interest to Ivar Tidestrom, Bureau of Plant Industry botanist and protégé of Frederick Coville. He commented that the center of Nevada "lies at a higher elevation than either the eastern or western portions." In his 1925 publication *Flora of Utah and Nevada*, Tidestrom organized the state into elevational belts of flora. He altered C. Hart Merriam's classification system and split the flora of Utah and Nevada into six different belts consistent with the elevational trends of the regional plant life. The Pinyon Belt to the Subalpine Belt represent the forested regions that John Muir referred to as Nevada's timber belt. Tidestrom illustrates:

⁸⁵ Chapline to Shoemaker, "Reconnaissance and Management Plans," February 17, 1923, NARA II, RG 95, District 4, Reconnaissance Surveys.

MERRIAM.	PRESENT WORK.
Arctic.	Alpine.
Hudsonian.	Subalpine (<i>Pinus albicaulis</i>).
Canadian.	Spruce (<i>Picea engelmanni</i>).
	Aspen (<i>Populus aurea</i>).
Transition.	Yellow Pine (<i>Pinus ponderosa</i> and <i>P. brachyptera</i>).
Upper Sonoran.	Pinyon (<i>Pinus monophylla</i>).
	Sagebrush, or Artemisia (<i>Artemisia tridentata</i>).
Lower Sonoran.	Creosote-bush, or Covillea (<i>Covillea tridentata</i>).

Image 2: Ivar Tidestrom's Use of Merriam's Classification Scheme in Nevada.

Tidestrom identified 3,600 species of vascular plants trending at certain elevations, or belts, but at times distributing erratic patterns such as Aspen stands that could descend farther than usual toward the valley floors under certain conditions. The Artemisia Belt (sagebrush plains) consisted of 45 percent of the plants in Utah and Nevada, which amounted to the greatest number of species in all six of the belts ranging from the Covillea (creosote-bush) Belt to the Alpine Belt.⁸⁶

As part of his efforts, Tidestrom considered the difficulties of settlement in Nevada and the arid to semi-arid Southwest. He recognized that remote regions could present difficulties for species collection. He acknowledged the Forest Service in particular by adding that, “tribute should be paid to that most faithful and efficient body of public servants, the Forest Service.” Tidestrom’s systematic treatment of flora benefitted from Forest Service field officers and reconnaissance technicians, but he also hoped that forest personnel with an elementary knowledge of botany could continue sending specimens to add to what was admittedly still an incomplete study (perhaps one that could explain carrying capacity on the range). After all, reconnaissance and the

⁸⁶ Ivar Tidestrom, “Flora of Utah and Nevada,” *Smithsonian Institution: Contributions from the United States National Herbarium*, Vol. 25 (Washington D. C.: Government Printing Office, 1925), 7-9.

process of identifying diverse communities of plants was the beginning of understanding how to manage preferred plant species. As part of these efforts, Tidestrom recognized that understanding southwestern plant communities and their value for stock operations added to the Forest Service commitment to encourage stable grazing settlements in the marginal lands of the Nevada outback.⁸⁷

When Tidestrom compiled his study of flora in Utah and Nevada with the help of H. L. Shantz and Arthur W. Sampson, he also made comparisons to similar regions around the world where civilization succeeded in sustaining successful land use traditions. Tidestrom pointed to Spain as a model of civilization's successful integration into arid and semi-arid environments. In the Preface to *Flora of Utah and Nevada*, Frederick Coville wrote, "Mr. Tidestrom has shown conclusively that the hand of science points toward Spain as a fertile field for the American agricultural explorer, who can expect to learn there, from well-established practices resulting from many centuries of experience, much that will be valuable in our similar but new Southwest."⁸⁸ In other words, land managers in the United States Department of Agriculture continued the process of settlement into the American Southwest including Nevada armed with scientific studies and even experiential evidence from similar environments from around the world.

⁸⁷ Tidestrom, 13.

⁸⁸ Tidestrom, 4.

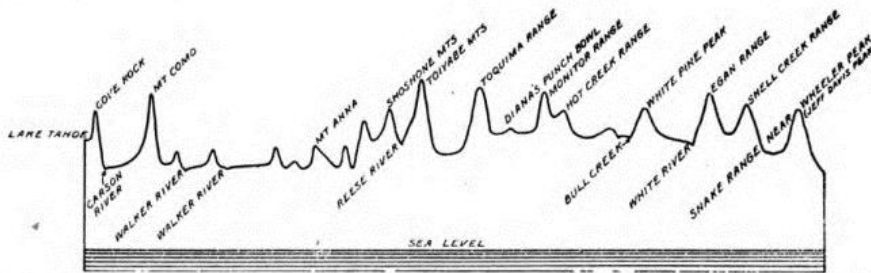


Image 3: Ivar Tidestrom's Profile of the 39th parallel.

Scientific forest management came slowly to Nevada national forests and mainly in the form of range science and studies related to forage and water. Assessments and working plan reports support the actions of forest officers who diligently worked toward their utilitarian goals.⁸⁹ For example, various management tactics and strategies were pursued: salting to lure cattle away from riparian areas; deferred and rotation allotment plans; the bedding of sheep only three nights in one location; and adjustments to the seasonal opening and closing of the season of graze. These efforts sought to optimize forage potential with consequent economic benefit for the local populations.

Lem Speers, the *New York Times* correspondent traveling with Senator Oddie to Winnemucca described Nevada as a “haunt of desolation” in a “wilderness of sand and lava ashes of which the National Government is fee simple owner.” On their way to Winnemucca and the Senate Public Land Committee meeting, Speers and Oddie traveled on a one hundred and twenty mile stretch of road between Denio and Winnemucca. According to Speers, they passed “over a waste as forbidden as the Sahara. On both skies

⁸⁹ Herbert Kaufman, *The Forest Ranger: A Study in Administrative Behavior* (Baltimore: Johns Hopkins Press, 1960). Kaufman points out the difference between rhetoric and actions and argues that the rangers of the forest service were zealous actors in the promotion of the ideals of the Forest Service.

[sic] were the mountains from whose crests the snow waters trickle in little streams....”⁹⁰

The mountains to the east of the travelers were the Santa Rosas, part of the Humboldt National Forest, where a managed landscape supported summer grazing ranges for approximately 14,000 cattle and horses and 20,000 sheep. The forest rangers on the Santa Rosas enforced the recommendations of forest inspectors, encouraged the movement of livestock, assisted with building drift fences, established quadrats to analyze vegetation trends, and enforced trespass regulations. Their working plans outlined these procedures that sought to establish a proper and efficient use of forage resources for the stock animals—cattle, sheep, and horses—permitted to graze in the forests.

The 1925 Senate Public Land Committee came to Nevada as part of an effort to determine if the U.S. Forest Service was overstepping its regulatory powers in its grazing administration of the forests. At the meeting, all but two members of the Senate Subcommittee on Public Lands arrived by train in Winnemucca. Tasker Oddie and Robert Stanfield of Oregon came by automobile. Senator Stanfield was already a noted critic of Forest Service grazing policies. He was the primary force behind the hearings on the public lands and was leading an effort to recognize rancher’s vested rights on the grazing lands of the national forests. Senator Stanfield argued that grazing permits without land use rights placed the owners of livestock in a precarious position, one where outside influences could detrimentally impact the real pioneers and stewards of the land. Stanfield’s campaign attacked the entire authority of the Forest Service to enforce a grazing control program in the forests that rested upon its permit system. The Forest

⁹⁰ L. C. Speers, “Nevada-Oregon Desert Still Defies Pioneers: Senate Public Lands Committee Inspects a Waste Like the Sahara, a Region where Cougars, Jackrabbits and Wild Horses Survive and Homesteaders Fail.” *New York Times*, September 27, 1925. National Archives and Records Administration II, College Park, Maryland, RG 95.

Service, for its part, believed the permit system worked for interests of ranchers and the long term protection of the resources upon which the ranchers depended.

By 1925, the Forest Service found itself on the defensive as it fended off challenges to its range regulations in the Nevada outback and elsewhere in the West. In Oregon U.S. Senator Robert Stanfield carried on a campaign against its authority that rested upon its power to grant or deny grazing permits that required adherence to grazing regulations and the payment of grazing fees as conditions for the continuation of the “grazing privilege” granted by the permit. After the conclusion of the subcommittee hearings, Senator Stanfield introduced the so-called Stanfield Grazing Bill in January of 1926. The Bill was designed to restrict Forest Service authority by undermining the status of the grazing permit and the power of the Forest Service to grant or rescind. Any recognition of vested rights by ranchers to the range meant the power to ignore Forest Service rules. Such claims also fixed grazing as part of the permanent use for the land.⁹¹

The Stanfield Grazing Bill revealed tensions between the resource user community and the Forest Service, the latter representing the original goals of the Conservation Movement and its efforts to bring order and protection to fragile forage and watershed resources. Ultimately, the question posed was who deserves to drive policy on rangelands: users or land managers? The Stanfield bill failed, but the Forest Service was put on notice that it faced discontent in the resource-use community it served. One response from the Forest Service was that it was already in the process of issuing ten-year permits to assure users of their long-term access to the resources. In addition, the effort to distribute grazing to more forest users was all but suspended. The modification of

⁹¹ Rowley, *U.S. Forest Service Grazing and Rangelands*, 135-36.

policies often came in response to the Forest Service's cooperation with local advisory boards, made up of ranchers and their interests, and supported by Forest Service personnel with their engagement on each national forest.⁹² The advisory boards at the local, state, and national levels exerted influence on the Forest Service and range management generally. Still the Forest Service maintained its reputation of holding to the higher goals of conservation in the administration of the forests in accordance with the Forest Organic Act to protect the forest through wise utilitarian resource use.

In Nevada, forest rangers and supervisors built a working relationship with ranchers who relied on continued access to mountain meadows and grazing lands. Many petitioned the Forest Service during the decade of the 1920s to expand the boundaries of the forests to prevent further deterioration of the public domain lands that continued to be subjected to the influx of thousands of head of sheep from outside Nevada. The Forest Service also found itself in a strategic position in its administration and mandate to protect the high mountain water resources. Run-off from the mountains, the inverted reservoirs of the arid West, could serve multiple economic interests such as enterprises that included irrigated agriculture, mining, grazing, and stock watering—all requiring water. It was clear from the beginning that forest management and forest use would be an ongoing negotiation.

⁹² Rowley, 134-35.

Chapter Four

Nevada National Forests at Close Range

After 1906, range controls came to Nevada in the form of National Forests nearly thirty years prior to federal grazing regulations on the remaining public domain.¹ In 1901, head of the Bureau of Forestry in the Department of Agriculture, Gifford Pinchot, created the Division of Grazing and placed the Arizona livestock operator Albert Potter in charge. Conservation historian Samuel Hays asserts that Potter's, "role in federal range affairs symbolized the new working relation between Western stockmen and the Roosevelt administration."² Pinchot understood that settlers who were western livestock operators on the new Forest Reserves required a voice in Washington. Potter was a respected figure in Arizona and an excellent choice to facilitate grazing regulations on Forest Reserves in the West. Eventually, the Forest Service Grazing Division brought many western stockmen in line with federal grazing efforts to order and control western rangelands both through livestock associations and as federal land managers.

U.S. Forest Service range regulations were part of a pioneering efforts to regulate resource-use in the National Forests and on all public lands.³ The undertaking brought a conservation ethic to forest rangelands that included a resource use rationale to increase settlement opportunities, promote stable economies, and secure a productive nature

¹ After 1934, the United States Grazing Service (established 1936) began regulating the public domain in Nevada in a concerted effort with the General Land Office to manage western lands. The Taylor Grazing Act initiated this coordinated effort to bring order to the public domain. In 1946, the U.S. Grazing Service and the General Land Office combined, by Executive Order, to create the Bureau of Land Management. Unlike the United States Forest Service, which was housed in the Department of Agriculture after 1905, the BLM remained in the Department of Interior.

² Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920* (Pittsburgh: University of Pittsburgh Press, 1999), 57.

³ William D. Rowley, *U.S. Forest Service Grazing and Rangelands: A History* (College Station: Texas A&M University Press, 1985), 21.

designed by and for humans. Pinchot and a dedicated entourage of government officials, foresters, and range scientists established boundaries, organized a management regime, and applied scientific practices to conserve and use grazing resources. These lofty goals and an ordered agenda worked well on paper, but adjustments to Pinchot's land-use schema required customization to the varied western landscapes. Forest supervisors and rangers were critical to tailoring an acceptable fit—including on Nevada forests.

Following the June 4, 1897 Forest Organic Act, Pinchot constructed a regulatory conservation management regime to integrate with the existing order of land uses. For the first decade, the success of Pinchot's conservation efforts on forest reserves (national forests after 1905) might best be measured as a function of persistence. According to Thomas Alexander's history of Region 4 in the Forest Service, which encompasses the Great Basin, range management, "was undoubtedly the most difficult and pervasive problem with which Region 4 officers had to work." By 1906, many western Senators applauded Pinchot's increased "consideration of state interests" and "greater decentralization" which acknowledged local influence and input.⁴ In 1907, Forest Supervisor Fred S. Breen published an article in the pro-conservation journal, *Forestry and Irrigation*. Breen explained what he saw as the most difficult obstacle for forest supervisors over the first ten years of management following the 1897 Forest Organic Act—to integrate a federal land use agenda into local economies.

In 1898, President McKinley proclaimed the San Francisco Mountains Forest Reserve in northern Arizona. After arriving at the reserve, Supervisor Breen sympathized

⁴ Thomas G. Alexander, *The Rise of Multiple-Use Management in the Intermountain West: A History of Region 4 of the Forest Service* (United States Department of Agriculture: Forest Service, FS-399, 1987), 79, 34.

with the local settlers who feared: “With one fell swoop freedom had been hogtied, lammed into a corner and branded with ignominy.” Breen remembered settler anxiety when the federal forest reserves arrived to the West with a regulatory force “where land was free.” Now, he continued, “after years of hardships incident to pioneer life, the Government stepped in and took away their free range and timber and put them on a reservation the same as Indians.”⁵

Supervisor Breen lamented his role as a “go between” with the “Washington machine” and “settler interests,” a position that was “exceedingly delicate.” Forest rangers and supervisors were the men in the field. “At close range” these men implemented the Washington agenda and struggled to gain the respect and acceptance of locals: “It was plainly up to the supervisor to utilize all the old, mislaid, scientific terms he could gather up, to look exceedingly wise, and complain bitterly of the sad and benighted condition of the settler.” The machine in Washington was no easier for the supervisor, especially when “misfit instructions” could not integrate with local conditions. Breen, with an air of resolution continued:

There was small wonder that supervisors would have much preferred sending instructions from Washington to taking the matter up tête-a-tête, as it were. It required tact, diplomacy, and persistence to convince the stockman that it was all for his ultimate good. Time alone could fully convince him, and it did.

Despite the difficulty of working at close range with settlers, Breen expressed optimism moving forward beyond his previous years in the field. By 1907, Washington was coming to grasp the difficulty of the situation: “The days of such trouble are nearing an end. Experience has taught ‘the machine’ that the field and office must be brought into

⁵ F. S. Breen, “Forest Reserves as Seen at Close Range,” *Forestry and Irrigation*, XIII, 4 (April, 1907):180-83. President McKinley proclaimed the San Francisco Mountains Forest Reserve on August 17, 1898 in the Territory of Arizona.

closer contact with each other; the supervisor should see the ‘wheels go round,’ and be made to feel that he is a part of the machine rather than of the grist.” In this way, the field officers and stockmen could better access the “great mechanism” and find encouragement in the fact that the “Washington end is human.”⁶

Will C. Barnes, assistant to Potter in Washington became an ambassador in the Forest Service for the human side of grazing regulations stemming from Washington. Soon after he was born in 1858, his family joined the Rush to Washoe (1859-60) and he spent his earliest years in the mining town of Gold Hill, Nevada. At the age of seven, he moved with his widowed mother to Indiana and later Minnesota. He returned to San Francisco at the age of eighteen and found employment in a music store selling sheet music. An intense interest in ships coming and going from San Francisco Bay brought his attention to a United States Revenue Cutter and he began his studies at the Revenue Training School. He did not acquire a position in what is now the United States Coast Guard, but the experience sent him on a new course. He found employment through connections in San Francisco with the United States Signal Corps. This path led him to Arizona where he became a decorated Indian fighter, successful cattle man out of Holbrook, and Territorial legislator for Apache County, Arizona.

In 1897, Barnes was on a round-up in the Mogollon Mountains. He came upon two odd looking fellas wearing “funny clothes” in the northern Arizona mountain range. After learning that they were foresters, Barnes joked about yodeling and funny green uniforms. Given that they were not wearing green uniforms or feathers in their caps, Barnes admitted that he knew very little about foresters. The two men, outfitted with

⁶ Breen, 180-83.

“tenderfoot plunder” and urban outdoor clothing were Gifford Pinchot and Frederick Coville.⁷ Pinchot and Coville remained for a time with Barnes in an attempt to better understand the grazing situation in the West. Later, in 1905, Barnes would again cross paths with Pinchot in Denver where the Chief Forester asked him to join the Forest Service. Barnes declined, but in 1907 as circumstances would have it, he joined with Pinchot and Potter, whom he already knew from Arizona, to spend the next two decades shaping Forest Service grazing policy.

If, as Barnes argued, the “grazing men of the forest service were the shock troops that won the West for forestry,” then they did so as men who, “knew the livestock business from the ground up.” Frank Lockwood, longtime friend of Will Barnes remembered some of these shock troops:

...many of his [Will Barnes] most prized associates were westerners, of his own rough-and-ready type: John H. Hatton, raised on a farm in North Dakota; Thomas P. Mackenzie, who grew up in a sheep camp in New Zealand; “old John Kerr from West Texas, who cut his teeth on a handle of a branding-iron and wore high-heeled cowboy boots to his baptism;” Jesse E Nelson, a Wyoming cowboy, a trick rider in Buffalo Bill’s great Wild West Show, “who could ride anything that had hair or horseshoes;” Homer E. Fenn, born and raised in the mountains of Idaho—suave, diplomatic, and handsome—a born politician and a first-class stockman; Charles H. Adams, “a lanky, red-haired, hard-headed Montana sheepherder;” and, high on the list, Albert H. Potter who was Barnes’ partner in a picturesque but futile campaign for the Arizona Legislature from Apache Country in 1888.⁸

⁷ Will C. Barnes, *Apaches and Longhorns: The Reminiscences of Will C. Barnes* (Los Angeles: The Ward Ritchie Press, ca. 1941), 197-98.

⁸ Barnes, 202, xvi-xvii; Rowley, *U.S. Forest Service Grazing and Rangelands*, 58. Frank C. Lockwood wrote the introduction to the 1941 publication of *Apaches and Longhorns*. First and foremost, the success of grazing policy in the Forest Service came from men that Pinchot integrated into Washington so that after 1905 the United States Forest Service could implement policy. Rangers and Forest Supervisors thrown onto western reserves in the late 1890s and early twentieth century were well aware of these administrative changes as the Washington machine began to take notice and speak the language of western settlers. James T. Jardine is a notable exclusion from Lockwood’s list of shock troops. He was an Idaho cowboy and later in charge of grazing studies. The reference to Albert Potter in 1888 concerned a simultaneous candidacy for the county legislature which both Barnes and Potter were involved in. They were both handily defeated. In 1894, Barnes was elected legislator of Apache County and promptly created Navajo County.

These were the men who shaped grazing policy for the Forest Service and conditioned grazing regulations to fit the mountain Forest Reserves, later National Forests, of the West.

Forest officers brought forest users into the discussion of policies and regulations streaming from far-off Washington offices. On Nevada National Forests, in locales where settlement proved difficult, the USFS officers assisted in stabilizing local home ranches and economies. Their efforts prioritized local land uses for the economic benefit of ranchers and communities. Ranchers, in turn, invested in their property at or near the forest boundaries and in improvements within the National Forests. As a result, between 1915 and 1925, the Forest Service, in cooperation with local livestock operators, succeeded in implementing a management scheme that brought order to the highest mountains in Nevada.

In addition to boundaries, management, and professional technicians, forest managers sought cooperation with users of the forest forage. The grazing chapter of the annual working plan reports by forest supervisors details the process that brought cooperation into the mountains of Nevada. Above all else, managers prioritized favorable conditions of water flows, sustainable forest forage, and positive relations with local livestock operators. From the high mountain ranges of Nevada, this order crept down into private property, also known as commensurate property able to sustain cattle and sheep through the winter, and extended onto the public domain two decades prior to the 1934 Taylor Grazing Act. The Taylor Grazing Act may have brought federal management to the remaining public domain in an official capacity, but the systematic ordering of

National Forests in Nevada by 1915 began this transition in conjunction with propertied graziers.

By 1917, National Forests occupied three parts of northern Nevada east of the Sierra Nevada. The Humboldt National Forest was the northern-most forest. Along the 39th parallel, however, the bulk of the National Forest system took hold, including the Toiyabe National Forest in the central portion of the state and the Nevada National Forest in eastern Nevada. In addition, there remained the California and Nevada border forests in the west and the Charleston and Vegas/Moapa National Forests in the south. Most relevant to this discussion were the Forest Service officers' efforts in the Humboldt, Toiyabe, and Nevada National Forests to bring some order to resource-use and protection in the high mountain outback. This order often brought the interests of private land holders at or near forest boundaries into contact with the rules and regulations on National Forests.

The historian of public lands, Karen Merrill, argues that with a permanent management system of public grazing lands, “the federal government brought land managers and ranchers together in a political relationship fully defined by the structures and meaning of private property.”⁹ The political discussions surrounding private property in states where the federal government reserved lands from disposal into private or state holdings was indeed a political football at the state and national levels. At local levels near Nevada National Forests, property within this discourse came to mean affordable

⁹ Karen Merrill, *Public Lands and Political Meaning: Ranchers, the Government, and the Property Between Them* (Berkeley: University of California Press, 2002), 4. Also consider alternative arguments such as Mathew Pearce, *Discontent on the Range: Uncovering the Origins of Public Lands Grazing Politics in the Intermountain West*, Ph.D. Dissertation (Norman: University of Oklahoma, 2014).

security. In other words, ranchers desired use privileges and if possible rights to grazing on the land without incurring substantial taxes or high lease costs. In Nevada, private property was sparsely distributed in small holdings. Regardless, private property became the basis of public land-use privileges over an expansive area—both public domain and the newly reserved lands designed to conserve forests and waters.

The attempts to establish a conserved landscape in the West would take time. In 1891, at the beginning of the Forest Reserve system disorganization and misunderstandings abounded at local levels, which caused confusion for settlers about the meaning and purpose of the Forest Reserves. After 1897, the beginning of regulatory management started to emerge in the Department of Interior. As forest managers feared the tasks of implementing regulations confronted traditional range-use practices and outlooks in a climate of suspicion as described by F. S. Breen.

The 1897 Forest Organic Act helped to construct management guidelines and the Department of Interior aimed regulations at sustainable uses of resources that often recognized the essential place and protection of water flows from the mountains for all enterprises of whatever type. Announcing the purposes of the Forest Reserves, as the 1897 Act did, was the simple part. The great challenges came in implementing the purposes and provisions of the Act in the localities out West. It was first of all the administration's problem of the Department of Interior, but with the 1905 transfer of Forest Reserves to the Department of Agriculture, the newly minted U.S. Forest Service (successor to the Bureau of Forestry) took up the gauntlet in the local western forests. Writing in 1907, Charles Howard Shinn, Supervisor on the Sierra National Forest in California, commented: "More than any of us have realized, his [the forest officer's]

opportunities to deal with the whole community and to make many new friends for the Service are especially great.”¹⁰ Fred Breen added to Shinn’s optimism that “time alone could fully” create a working relationship between resource users and managers.¹¹ These difficulties of forest management on forest grazing reserves of the National Forests were substantial in the Great Basin portion of the Intermountain Region (District 4). As one Forest Service historian argued: “Grazing administration was undoubtedly the most difficult and time-consuming problem in District 4.”¹² To expedite management in the field, the *Use Book* offered rangers and supervisors a reference guide for implementing rules and regulations.

Forest rangers took their newly printed *Use Book* into the field—or at least referenced it with regard to forest management. The *Use Book*, or *Regulations and Instructions for the Use of the National Forest Reserves*, was first published in 1905 and succeeded the General Land Office’s *Forest Reserve Manual for the Information and Use of Forest Officers*. The *Manual* was published in 1902 and provided Forest Reserve officers a general outline of forest management and, most important, established the foundation for the *Use Book* and its subsequent and frequent updated editions. While the *Manual* had a terse authoritarian tone, the *Use Book* tempered the language outlining the rules and regulations related to managing National Forests.¹³

¹⁰ Charles Howard Shinn, “Work in the National Forest: Inspectors,” *Forestry and Irrigation*, XIII, 10 (October, 1907), 524.

¹¹ Charles Howard Shinn, “Work in the National Forest: Inspectors,” 524; Breen, “Forest Reserves as Seen at Close Range,” 182.

¹² Alexander, *The Rise of Multiple-Use Management in the Intermountain West*, 41.

¹³ *The Use Book: A Manual of Information About the National Forests* (Washington D.C.: Government Printing Office, 1918).

Rangers and supervisors referenced the *Use Book* for specific rules and regulations that applied to the forests. The application of this regulation reference guide not only established managerial assistance, but also provided a language tempered toward the sensibility of forest users. Forest Service leadership under Pinchot and his grazing officers knew that allies in the grazing industry were essential to any forestry management agenda in the West. In Nevada, the *Use Book's* chapter on grazing, "Use of National Forests for Grazing Stock," shaped grazing administration, planning, and regulations as they were pursued and implemented in the various forests.¹⁴

The supervisor's annual working plan report provided forest officers the ability to discuss federal regulations and interpret the applicability of the guidelines where local conditions including the environment and diverse forest users created uncertain circumstances not always addressed in the *Use Book*. Nevada's mountainous rangelands created conundrums and opportunities for forest officers to work out issues of rangeland regulations not specifically detailed in the *Use Book*. Although rangers and forest supervisors did not have the authority to create policy, they did freely interpret with oversight the rules and regulations for the best fit and expressed these struggles in working plan reports.

Forest Supervisors' Annual Working Plan Reports

The summer grazing regions of Nevada's mountains offered a reprieve from the heat of valley floors that could reach temperatures in excess of one hundred degrees.

¹⁴The 1918 edition provided the rules and regulations related to grazing most pertinent to this study. This is true, especially for understanding the discussions about grazing regulations in the grazing chapters of the supervisor's working plan reports. A researcher will not fully grasp the discussions in working plan reports and allowances granted from Washington D.C. without consulting the grazing section in *The Use Book*.

Stock operators of cattle and sheep herded livestock to mountain forage where shade and water on productive ranges provided forage and an escape from the summer heat at elevations approximately between 6,000 and 10,000 feet. If the movement of stock from the mountains during the fall was, according to one rangeland scientist and historian, “akin to dropping into the ranges of hell, then ascending the mountains to summer ranges must have been the cowboy’s version of a journey to heaven.”¹⁵ Indeed, mountain rangelands were prized grazing areas where, by the early twentieth century, competition for forage created a critically overgrazed environment.

By 1900, livestock overgrazed large portions of rangelands throughout the state of Nevada both in the mountain highlands and in the lower basins. Mountain rangelands were not alone in carrying the brunt of environmental degradation. The mountain highlands, however, were critical for maintaining healthy plant life to limit erosion and mountain torrents that could mean flooding for settlements. Adequate vegetation—grasses, shrubs, and trees—also meant protection for the snowpack at higher elevations that could guarantee favorable conditions of water flows and the recharge of groundwater. The high mountains, in short, amounted to inverted reservoirs that captured moisture, particularly in the form of snow during winter, and whose cool summer temperatures permitted the snow to melt at steady diurnal rates so as to promote vegetation reproduction and growth.

By 1906, forest officers throughout the West worked at “close range” in the field to find ways to integrate management, water, and grazing places in the highlands with local conditions. While still rife, suspicions of reservations to the exclusion of stockmen

¹⁵ James A. Young and Abbot Sparks, *Cattle in the Cold Desert* (Reno: University of Nevada Press, 2002), 64.

and miners, or simply the exile of a homesteader and his modest agricultural plot, began to quiet. The Forest Homestead Act of June 11, 1906 offered a concession within forests for homesteading settlers. Writing in 1907, Charles Howard Shinn remembered how fear on both sides created volatile situations and much posturing. The only way to remove chaos from the range was for the cooperative participants to remain on the forest and both rangers and stockmen either fell in line or disappeared from the landscape.¹⁶

Shinn, writing as a Forest Supervisor, conveyed the impression that the implementation of forest conservation policies began to successfully integrate with land uses by 1907. He admitted that in most problematic cases people liked to tell tales, brandish their ignorance in a crowded market of consumers, or simply cuddle-up to the sensibilities of the American public. According to Shinn, sheep operators were particularly susceptible to confrontations inspired by prejudice. While some sheep operators had been around longer than others, most arrived late to the western rangelands.¹⁷ They competed with established operators of cattle and engaged in a struggle to use the land in accordance with their own needs and economic purposes.

The initial organization of Nevada forests proved a challenge for Forest Service personnel. While many forest users welcomed management, some considered rules on the forest an illegitimate restriction of their rights and consequently ignored grazing regulations and allotment boundaries. On the Humboldt National Forest in 1909, Supervisor C. Sydney Tremewan complained that certain, “companies seem to have concluded that the regulations were only a farce, for they trespassed repeatedly after

¹⁶ Shinn, “Work in a National Forest: Inspectors,” 524.

¹⁷ Charles Howard Shinn, “Work in a National Forest: Sheep in the High Sierras,” *Forestry and Irrigation*, XIII, 11 (November, 1907), 592-95.

warnings by Rangers.” He continued by adding: “The main body of stockmen, however, were very considerate...they seemed to realize that the best was being done.” In closing his report, Tremewan mentioned the “good will expressed and shown by the people of the county [Elko] in general, and the users of the Forest in particular, in return for the advantages they have derived by the protection of their natural resources and the permanency assured to their livestock industry.”¹⁸

Thomas Alexander’s study of Region 4 confirms Tremewan’s positive relations with graziers, but the Forest Service Inspectors from the Washington office questioned some of his management decisions on local forests. For example, in 1908, more sheep grazed on the Humboldt National Forest than any other division in the Intermountain Region (District Four at the time). Estimates suggest that 560,000 sheep grazed in the Jarbidge and Mountain City Ranger Districts. Tremewan, “reduced permits by 38 percent” down from 560,000, “to allow 350,000 sheep, several thousand cattle, and 2,000 horses.” In 1909, Grazing Inspector E. H. Clarke found that over 400,000 sheep and more than 40,000 cattle and horses grazed on the Ranger Districts of the Humboldt National Forest at distributions inconsistent with established allotments, which meant the numbers altered in each category of stock. Regardless, Tremewan maintained the same total number of sheep and increased cattle and horses to 40,000. Tremewan recognized both the need for reductions and to maintain order on the grazing lands. While Forest Service inspectors may not have agreed with Tremewan maintaining high numbers of stock on

¹⁸ C. S. Tremewan, “Annual Grazing Chapter, Humboldt National Forest, 1909,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

the forests, they also recognized that local support for regulations required negotiation and slow reductions to livestock numbers: “The stockmen were generally pleased.”¹⁹

In 1914, Forest Supervisor Thompson on the Nevada National Forest reported, “The general policies of the Forest Service are meeting more or less favoritism in this locality.... This is evidenced by the fact that most of the users have expressed themselves as favoring Government control of all public lands.” Of course “most of the users” were graziers given preferred status by forest officers based on historical use and commensurate property.²⁰

By 1915, these positive sentiments of forest users echoed throughout Nevada’s National Forests as organized forest management systems took hold. No longer were the mountain ranges a chaotic commons during the summer months. Elko County historian Edna Patterson noted that with the arrival of the Forest Service the, “deterioration of the summer grazing was slowed and more orderly utilization of the range resulted.”²¹ In 1918, the Agricultural Extension Division of the University of Nevada conducted a survey of the livestock divisions that included, “practically all of the stockmen of the state.” Humboldt Forest Supervisor Clarence E. Favre reported that the Agricultural Extension survey concluded, “Approximately 70% of the Nevada Range Stockmen favored Government control.”²²

¹⁹ Alexander, *The Rise of Multiple-Use Management in the Intermountain West*, 42.

²⁰ Thompson, “Supervisor’s Annual Working Plan, Nevada National Forest, 1914,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances. Thompson used “public lands” here to include the public domain.

²¹ Enda B. Patterson et. al, *Nevada’s Northeast Frontier* (Sparks, Nevada: Western Printing & Publishing Company, 1969), 292-293.

²² C. E. Favre, “Supervisor’s Annual Working Plan, Humboldt National Forest, 1918,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

Still management did not come without criticisms. Ranchers continued to lobby for their interests, especially low fees, the number and kind of stock they could graze, and most importantly the length and security of their permits. When considering the Forest Service mission, rancher interests were not always met. Forest Service officers prioritized the health of grazing rangelands while maintaining the bottom-line priority, which concentrated on favorable conditions of water flows. They also issued permits on an overstocked range, which meant reductions and sometimes outright exclusion of livestock. And, of course, they levied fees. There would be an initial backlash, but by 1915 Forest Service management established priority-based users of forest forage who shared an invested interest in maintaining an ordered system of sustainable forage for livestock.

The grazing chapter of the supervisor's annual working plan reports can be seen as early environmental statement on the conditions of mountain rangelands. When rangers first arrived to newly created forest reserves, they wrote working plan reports on an annual basis and consequently created an institutional memory for forest management that informed rangers about local rangelands and forest users. Working plan reports also standardized managerial discussions and decisions guided by the "Grazing Chapter" of the *Use Book*.

In the working plans, supervisors began with a description of annual precipitation, initially based on the availability of meager data, which was often supplemented by the experiences of local livestock operators. To compensate, they consulted what little precipitation data existed and sometimes installed rudimentary precipitation gauges to provide a base for comparing annual rainfall amounts. This data proved useful to

determine the upcoming productivity of the forest forage and to establish baseline knowledge related to average annual carrying capacities on forests.

Baseline parameters established long term estimates designed to limit decreases or overly optimistic increases to livestock numbers. By 1915, forest supervisors included tabulated data to support their long-term efforts to sustain consistent stock numbers—within maximum and protective limits—for the allotted carrying capacities of the mountain rangeland divisions. Maximum and protective limits protected land users from monopolies and limited the number of reductions that could be placed on any given permitted grazer.²³

Weather on the high desert was consistently unpredictable. Even in average years of precipitation, rainfall could be sporadic and snowpack uncertain. Every year, rangers commented about the difficulties of range management in a place where the difference between only a few inches of annual precipitation, including the time of year the precipitation occurred, could dramatically affect summer range forage. Frosts could also wreak havoc on forest forage and occur well into June after the start of the summer grazing season. In addition, isolated cloudbursts could bring torrential rainfall to one forest division and leave the neighboring divisions high and dry. If the cloudburst was

²³ Regulation G-16 of the *Use Book* explains maximum limits as the maximum number of stock any one permittee may graze on a forest. Maximum limits were not specifically established to protect forage, but to restrict monopolies on the range. The Forest Service designed protective limits to secure the permittee from reductions to stock. In other words, maximum and protective limits were designed to provide an equitable distribution of forest forage among users and to ensure limits to reductions of any livestock operator on allotted grazing sections of a national forest. The allotted carrying capacity referred directly to the number and type of livestock that the grazing divisions of a forest could ideally sustain. Grazing inspectors quantified carrying capacity as a permanent number, but often required adjustments especially on new forests. To maintain the maximum became a phrase often repeated as a goal for foresters to achieve maximum carrying capacity and should not be confused with maximum limits, which was designed for an equitable distribution adding up to the maximum. *The Use Book*, 1918, 108

intense enough, flooding could wipe out forage, kill livestock, and remove productive soils.

In 1918, Ranger Paul Travis who was stationed in the Santa Rosa Range of the Humboldt National Forest, witnessed a “terrific cloudburst” that caused considerable flooding to the headwaters of Willow and Rebel Creeks. Travis reported: “By the time the run off reached the main channels of the streams...that all the tree growth and underbrush and forage was completely cleared out for a width of from 50 to 150 feet.” The flooding damaged the farms on the foothills, such as the Whitaker Place on Rebel Creek. On Willow Creek significant damage was done to the homes of T. L. Miner, George Scot, and Alan Remusat. Within the forest, the flooding damaged Charles W. Young’s forest homestead to such an extent that he abandoned his claim. The flooding also took the life of a prospector camped along Willow Creek and killed 28 cattle and 300 sheep.²⁴

Flooding was not just a product of weather that caused erosion, but a direct result of overgrazed mountain forage, overused riparian areas along perennial and annual stream beds, extensive trailing along routes, and trampling of saplings critical for maintaining the integrity of the soils. For Service rangers, erosion was one of the most critical problems to address for a sustainable carrying capacity on the forest. Reports from Utah forests noted similar erosion damage in the highlands that produced flooding and torrents in the low lands. Clearly the destruction of vegetation in the highlands was critical to the maintenance of favorable conditions of water flows. Overgrazing caused retrogression in the process of succession in the view of Clementsian range scientists and

²⁴ C. E. Favre, “Supervisors Annual Working Plan, Humboldt National Forest, 1918,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

managers. To better understand how and at what rate the ranges might recover on the road to succession, forest rangers and inspectors guided by their “scientifically” informed assumptions employed quadrats to determine or measure the degree to which the resource could again be subjected to use by stock grazing.

By 1915, quadrats had been established on parts of the forest system in Nevada to study the regrowth of plant life. The 1918 floods on the Santa Rosa Range provided rangers with an example of how overgrazing could intensify the loss of forage and soils when the range was not properly managed. Forest rangers managed grazing on the forest so that a subclimax could balance the most sustainable utility between forage use and waste. Waste occurred when the carrying capacity was either under or over the maximum. This difficult balance between maximum use and a conserved environment was the ideal forest officers and grazing inspectors sought to achieve without creating conditions susceptible to erosion or other permanent forms of rangeland degradation. All required calculations, experienced judgements, and guesses on what the Forest Service believed to be the conditions of the range and its carrying capacity.

Precipitation data helped forest service grazing personnel to expect deviations or problems with allowed carrying capacities on allotments. Once allotted, carrying capacities began to show the effects of forage use helping the forest ranger to determine the condition of the range at the close of the season, such as overgrazed and damaged allotments, partially or wholly underutilized sections, and the condition of the stock upon leaving a forest division. These efforts were part of evaluating the successes or failures of maximum carrying capacities. At the end of the grazing season rangers counted stock and

an analysis of weights, market prices, and sales helped to quantify the value of flesh from forest forage.

Working plan reports and their respective allowances approved in Washington disseminated through district (regional) offices. These reports were a collaborative effort to manage rangelands and concentrated on quantifiable information. In particular, the numbers of grazed livestock provided a quantity from which environmental conditions could be appraised. Rangers and supervisors recorded weather, rangeland conditions, forage types, market prices, and improvements in the working plans as variables that could affect the allowances of cattle, horses, sheep, and goats on forest allotments. As a result, the working plans provided an institutional memory for the reasons why specific numbers and kinds of livestock were allowed to enter the forest under permit. A maximum carrying capacity was the ideal number of stock grazed that rangers and the forest supervisor attempted to balance between livestock and the varied forest environments. To complicate management, these variables were not only specific to each National Forest, but also to individual divisions and allotments.

When stock entered the forests, rangers counted the numbers in the herds and reported a general assessment of their conditions. A state inspector was sometimes present to check for diseases, such as scabies and blackleg. Rangers recognized that on the public domain the stock sometimes intermingled with transient sheep herds and wayward cattle, which had the potential to infect herds. In Nevada, public domain lands were never far from the national forests. These extensive public domain lands where free-use of the range still occurred, created management difficulties for forest supervisors and rangers.

The Public Domain

In 1901 Congress continued its long consideration of the possibilities of leasing public domain lands for grazing purposes. Prospective bills met with immediate opposition based on the argument that leasing excluded homesteaders and farmers from settling and developing the country. Opponents to a leasing system argued that the western livestock industry sought to monopolize the West to the exclusion of all other enterprises. Leasing flew in the face of forty-years of land disposal policy, beginning with the Homestead Act of 1862 designed to settle Euro-Americans on western lands.

In 1903, the Public Lands Commission considered the possibility of organizing the Forest Reserves as grazing districts, but Pinchot cautiously avoided the suggestion that grazing regulations and a system of leasing be expanded onto the public domain. By 1905, however, Pinchot brought the Forest Service directly into the conflicting arguments that concerned western settlement by proposing portions of the public domain be ordered for grazing purposes.²⁵ These considerations were pertinent to Nevada for the purposes of recognizing the relationship between the public domain and National Forests.

Nevada National Forest boundaries formed a system of island bio-management where a single forest consisted of multiple ranges unconnected to one another. For example, the Toiyabe National Forest complex consisted of the Monitor, Toquima, Toiyabe, Shoshone Ranges, and a southern portion of the Paradise Mountains. Basins and smaller mountains separated the ranges on all sides. As a result, management reflected

²⁵ Hays, *Conservation and the Gospel of Efficiency*, 60-62. Hays points to Representative Bowersack from Kansas as presenting a major leasing bill to Congress in 1901.

not only dispersed forest divisions often assigned to a different forest ranger, but also the settlement patterns of ranchers who resided in isolated home ranches close to available water sources. The most significant dispersal of forest divisions included the Santa Rosa Range of the Humboldt National Forest and the Quinn Canyon Range of the Nevada National Forest. Hundreds of square miles of public domain sprinkled with disconnected home ranches created expansive domain rangelands outside the mountains of a given forest. In the grazing chapter of the working plans, the forest supervisor had to bring often disparate forest divisions together as part of one annual report.

It would be a mistake, however, to conclude that all the mountains in Nevada became national forests. Hundreds of mountain ranges spanned across the public domain where competitive mountain summer grazing still occurred. National forests were simply the tallest ranges with the most potential to contribute to favorable conditions of water flows for the economies of settlers and communities outside the forest boundaries. On many of the higher elevations mountain forage remained a competitive arena for unregulated livestock grazing. The situation inspired attempts by ranchers, federal forestry officers, and Nevada legislators to bring order to the remaining rangeland commons.

The forest ranger assigned to a division of the forest was never far from the competitive and often over-stressed environment of the public domain, which was a cause for concern. In 1916, Forest Supervisor Fred Mott of the Nevada National Forest proposed expanding the forest boundaries to be all inclusive and if united new apportionments for grazing could be made to connect basin and range into one national forest. Mott explained, "As it [Nevada National Forest] exists, we may as well consider

the Divisions [separate mountain ranges] as individual Forests.”²⁶ Because of this inconvenient patch-work pattern of Nevada National Forests, rangers and forest users began to call for regulations on the public domain by extending National Forest boundaries.

In 1916, Forest Supervisor Mott came to believe: “There is little doubt that the general sentiment of the users [forest users] is favorable to the Forest Service.” According to Mott, forest users shared with Forest Service managers the “same problems of vital interest.” He continued by explaining: “This is particularly evident among the broader-minded and more serious thinking class of users who frequently express a desire to have the entire public domain brought under Government supervision.”²⁷ Broad-minded and more serious thinking class of forest users were property based permittees near the forests. These livestock operators had dual interests in securing their operations with summer grazing rights on National Forests and by extension desired to have the same privileged status on the winter grazing ranges of the public domain. At the very least, they desired some sort of order to control public domain dependent cattlemen and transient sheep herders—which essentially meant the exclusion of the latter.

Trespass

The remote location of Nevada national forests, their dispersed boundaries, and adjacencies to the public domain posed problems of trespass. Forest Supervisor Favre on the Humboldt National Forest remarked: “Perhaps our most difficult problem on this

²⁶ Fred Mott, “Supervisors Annual Working Plan, Nevada National Forest, 1916,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

²⁷ Mott, 8

Forest is the continued menace of trespassing stock.”²⁸ According to legal precedent and subsequently outlined in the *Use Book*, trespass along marked boundaries was against the law and forest rangers had legal authority to issue citations for violations.²⁹ Regardless, the Forest Service did not have the personnel to enforce trespass violations throughout the forests. In addition, trespass that did occur required the ranger, who was rarely witness to the offense, “to collect affidavits adequate to allow successful prosecution by the United States Solicitor General.”³⁰

Cattle trespass often occurred but without the knowledge of the rancher. Conversely, sheep required a shepherd who could be directly tied to intentional trespass violations when the livestock crossed onto forest boundaries or wandered into neighboring allotments. Even in these instances, ignorance of existing boundaries could exempt the stock operator from a citation and a successful prosecution. The Forest Organic Act provided the Secretary of Agriculture the power to “regulate occupancy and use” of forest reserves after 1897, but trespass initially proved problematic as a deterrent to illegal grazing. At the time, the reserves were still under the Department of Interior and there were few personnel to enforce rules and regulations. In 1898, two Supreme Court Cases compounded the trespass problem with the decisions *United States vs. Blasingame* and *United States vs. Camou*. These decisions held that prosecution of trespass was

²⁸ C. E. Favre, “Supervisors Annual Working Plan, Humboldt National Forest, 1919,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances. In the 1920s, Chester J. Olson was sent to the Humboldt National Forest to investigate trespassing which led to the prosecution of nine trespassers by the Justice Department. Thomas Alexander, *The Rise of Multiple-Use Management in the Intermountain West*, 84.

²⁹ *The Use Book*, 72-3. Trespass, or REG T-4, in the grazing chapter preceded grazing regulations G-1 through G-29.

³⁰ Alexander, *The Rise of Multiple-Use Management in the Intermountain West*, 83.

unconstitutional because an administrative officer could not enforce what was a legislative power as stated in the Forest Organic Act.³¹

The Transfer Act of 1905 helped to circumvent the administrative versus legislative power issue by giving the Secretary of Agriculture full jurisdiction over the use of forest reserve resources. The Secretary was cast as protector of resources under the law. Trespassers who grazed their stock on the forests were guilty of stealing pasture and forage resources. Secretary of Agriculture James “Tama Jim” Wilson stressed the use of resources only under regulations to ensure benefits for all: “The continued prosperity of the agricultural, lumbering, mining, and livestock interests is directly dependent upon a permanent and accessible supply of water, wood, and forage, as well as upon the present and future use of those resources under business-like regulations, enforced with promptness, effectiveness, and common sense.”³² This administrative rationale according to Secretary would be later upheld in the 1911 decisions *United States vs. Grimaud* and *United States vs. Light* (see Chapter 3). Consequently, Forest Service officers possessed the right to issue citations for trespass with every expectation of backing from the courts.

When cattle were in violation of trespass on the Nevada National Forests, the offending party—who was the permit holder—often received several warnings (even for flagrant violations). After all, the permit holder of cattle allowances retained the option of ignorant neglect and forest rangers who had the administrative power to issue citations often took a sympathetic stance in the spirit of cooperative relations with ranchers,

³¹ Rowley, *U.S. Forest Service Grazing and Rangelands*, 51-52.

³² Letter in U.S. Congress, Senate, Doc. 84, 57th Cong. 1st Sess., 1902; Rowley, *U.S. Forest Service Grazing and Rangelands*, 53; Darrell H. Smith, *The Forest Service: Its History, Activities and Organization* (Washington: The Brookings Institution, 1930), 33-34. Scholars tend to agree that this congressional address was probably written by Gifford Pinchot.

especially if they possessed commensurate property. To solve the problem of cattle trespass on the forests, rangers marked the allotment and forest boundaries. They worked in conjunction with permittees to build and pay for drift and division fences, developed water sources, organized appropriate salting locations away from water sources, and tagged stock. Forest Service managers and permittees on the National Forests worked together to bring order to the high mountain rangelands.

The grazing of sheep was the thorniest of problems for Nevada national forests (as was the case in many parts of the West). Sheep proved remarkably adaptive to Nevada rangelands and could be herded long distances across the public domain in search of water and forage. These transient abilities enabled sheep bands to move throughout the public domain without a home ranch as a base of operations. Such nomadism contributed to romanticized figures in both literature and histories on the western rangelands of people who carved-out free and independent frontier lives.³³

Yet both cattle and sheep graziers chart the imposition and local adjustments to an ordered grazing regime from faraway offices in Washington to the District Forest Offices

³³ Harry Sinclair Drago's novels such as *Following the Grass* helped to shape the perception of the frontier minded free-range sheep herder in Nevada. Both literature and history have taken advantage of the frontier image in Nevada to help expose the struggles of sheep herders in the state prior to the 1934 Taylor Grazing Act. In conversations with sheepmen in the 1960s, many of whom had been in the business over the first half of the twentieth century, Byrd Wall Sawyer considered both owners and herders of sheep as engaged in the frontier experience on the range. These sheepmen she pointed out, "owned not an acre of ground or a building. They had not the smallest bit of land to raise hay against the winter feeding. It was easier to move south when winter approached. Seldom was the right to use the public domain questioned before 1934 in Nevada" In *Sweet Promise Land*, Robert Laxalt detailed the life of his father Dominique Laxalt, an immigrant shepherd in western Nevada. Laxalt explained in his opening, "My father was a shepherd, and his home was the hills." Dominique lived a semi-isolated life in Nevada where he raised and grazed sheep for the better part of the first decades of the twentieth century. Mary Austin's *The Flock* also described the struggles and opportunities of shepherders, especially Basques, as parks and reserves began to exclude sheep from the Sierra Nevada where tourism and new ideas about nature proliferated across the mountain landscape. Byrd Wall Sawyer, *Nevada Nomads: A Story of the Sheep Industry* (San José, California: Harlan-Young Press, 1971), 82; Robert Laxalt, *Sweet Promised Land* (New York: HarperCollins, 1957); Mary Austin, *The Flock* (Boston and New York: Houghton, Mifflin & Company, 1906), 191-212.

and to the Forests themselves. While literary works and reminisces fit well with the idea of freedom and independence on the public domain in Nevada and California, wherein the lonely sheep herders were attacked and persecuted by large cattle outfits, there stands a parallel narrative that glossed over the unregulated and unsustainable land uses associated with sheep herding into the early twentieth century. The romanticized independent sheep herder often engaged in political and legal struggles to secure privileges during the transition from the public domain to managed public lands.³⁴ While sheep operators could be the most transient of livestock graziers in the state, they often leased private and railroad lands and many were landholding stock operators of cattle and horses. Forest Service rangers in the field often commented on the trust-worthy and hard-working “basco” shepherd, but also complained about these transient operators on the public domain who consumed grazing resources and competed with the preferred Forest Service clientele on and near National Forest boundaries. The glib application of racial categories often placed all Basques into a class of itinerant tramp herders ignoring the Basque stock operators who owned land and enjoyed grazing privileges on the National Forests.³⁵

Most graziers of sheep engaged in the legal and political land use debates during the early twentieth century. There is, however, another image that idealizes the noble,

³⁴ Kevin Hatfield, *‘We Were Not Tramp Sheepmen’: Resistance and Identity in the Oregon Basque Community, Accustomed Range Rights, and the Taylor Grazing Act, 1890-1955*, Dissertation (Eugene: University of Oregon, 2003), 4.

³⁵ Guy Saval represents one such figure who established a ranch in White Pine County along the eastern flank of the Snake Range. His success as a cattle and sheep operator inspired resentment after 1914 when he purchased Phillip Baker’s Ranch near Baker, Nevada. The town came to be regarded as “Basque Town” due to Saval’s preference of Basque livestock operators, which did not sit well with the well-established Anglo-settlers of the region. He was pushed out of the region after 1922 and moved to Elko County where his brothers operated a large cattle empire. Saval attained citizen status upon his arrival in 1897 and learned the sheep business from his brothers who had worked for Joseph Taylor and subsequently started livestock operations of their own.

lonely shepherd overcoming insurmountable difficulties to eventually become a citizen and landowner. The actual herders of transient sheep were often disenfranchised employees of livestock owners without citizen status and vulnerable participants in the livestock industry as new immigrant arrivals seeking temporary employment.³⁶ Some never moved beyond herders and died alone in boarding houses never to see their homelands or families again. Others obtained land and succeeded within a system of competitive domain grazing that had been raging for decades on the Nevada rangelands.

During and after WWI further alienation occurred when the Forest Service started denying permits on National Forests to stock operators without U.S. citizenship. The move against immigrant permit holders intensified after the war giving the Forest Service an additional reason to restrict access to the ranges. After the War, decreased demand for mutton and beef, drought, and anti-immigrant expressions gave the Forest Service opportunity to expand and deny grazing permits to many.³⁷ In 1920, Supervisor Favre of the Humboldt National Forest commented: "There is considerable agitation in Nevada, as I suppose there is elsewhere against the alien holding permits to graze stock upon National Forests." Favre pointed out that when issuing permits, "one of our main difficulties is the explanation of why aliens are allowed to have permits while citizens are denied privileges...I believe the citizen should be provided for at the expense of the alien."³⁸ Many transient sheep operators gained Class C status because of historical use of the mountain forage, but Class C status was the easiest to deny forage access, especially

³⁶ A similar arrangement still exists on Nevada's public lands, but the temporary workers come mainly from Peru.

³⁷ Rowley, *U.S. Forest Service Grazing and Rangelands*, 112-114.

³⁸ C. E. Favre, "Supervisors Annual Working Plan, Humboldt National Forest, 1919," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

if the permittees or applicants were not citizens. Excluding graziers on the basis of citizenship qualifications increased the Forest Service's popularity among those with continued access through the permit system of forage use.

In many cases, Forest Service personnel pointed to lack of commensurate property to whittle away at transient sheepherders' prior use rights that might qualify them for a Class C permit. Although commensurate property was an uncertain measurement, it typically referred to private property adjoining or near the forests and served as a preferred basis for sliding scale reductions across the forest and prioritized Class A and B beginners. Forest Service officers often supported these exclusionary measures in the spirit of cooperation from dominant local interests. This process of squeezing-out transient herders from forest rangelands occurred throughout the Intermountain Region making competition for public domain grazing all the more competitive.

Nevada's extensive public domain lands, which included mountains trending north and south along narrow spines and sparse settlement, provided an inviting geography for transient herders to flood into the basins and smaller mountain ranges. Seasonal livestock trailing routes moving north during the summer into Nevada's higher elevations and then back south into to lower elevations during the winter allowed the mobile sheep operators to dominate the public domain (southern Nevada is on average 3000 feet lower in basin elevation than northern Nevada). They could travel with greater speed than cattle, use the existing forage, and move on with relative ease.

Between 1906 and 1925, two land use practices met on the edges of Nevada National Forests. On the public domain, a less organized and open system of first-come

first-in-right still operated outside the incongruous borders of the ordered National Forests. From the standpoint of mobility, sheep operators held the advantage. From another standpoint, stationary home ranches began to exert their influences on both the National Forest range and the surrounding boundaries.

Prior to the creation of forest reserves during the first decade of the twentieth century, Nevada's suitable locales for home ranches were taken first by cattle ranchers. Over time, sheep herding proved a successful alternative to late-comers for livestock operations. They often had no secure home ranch to produce winter feed. With the creation of National Forests in Nevada, the success of sheep flocks posed a conundrum for Service personnel. While sheep contributed to the local economy and benefitted from forest management when operated from a home ranch, other sheep operations based outside the state essentially stole from the local economy. The ability of these operations continued without home ranches and brought commensurability to the fore as a critical issue on Nevada National Forests.

Commensurate Property

Common problems in the working plan reports on the forests addressed the relationship between National Forests and the public domain and the disorganization of the propertied livestock operators. The former became an issue of commensurate property and the latter pointed to the need for livestock associations and advisory boards. In both cases, the Forest Service sought to maintain forest uses for the most beneficial economic benefit of local communities and settlers.

Commensurate property promoted a co-dependence between National Forest managers and graziers. Grazing regulations in the *Use Book* used commensurability to describe a preference for a permittee to own property next to or near the forest rangeland. The use of commensurate property to measure preferences prioritized ranchers with a home base. Samuel Hays argues that this policy of “equitable claim” favored the stock operator, “whose home base lay near his pasture lands. Stockmen from far away, especially in the sheep industry...received lower priority.”³⁹ Forest service managers argued against the suggestion that they favored monopolies, but as Forest Service grazing historian William Rowley observed, “new and stricter standards for commensurate property would come into effect to make it more difficult to obtain Class A permits.”⁴⁰ Often, Class A permittees next to the forest boundaries also controlled water sources outside and inside the forests. In Nevada with cattle ranchers as the preferred recipients of privileged land uses, the monopolization of access to Forest grazing emerged.

Several problems with commensurate property developed on Nevada National Forests. Because commensurate property formed a basis for Class A and B grazing privileges, the Forest Service was able to extend its authority onto private property and in some cases onto the public domain. Home ranches not only controlled a water source, but in most cases brought a sedentary land user into the federal agenda which was so important to control and order. Sedentary users could be monitored and quantified not only for their forage-use but also for their water needs. A reverse condition also existed

³⁹ Samuel Hays, *Conservation and the Gospel of Efficiency*, 59.

⁴⁰ Rowley, *U.S. Forest Service Grazing and Rangelands*, 135. Discussions of commensurate property are conspicuously absent from the secondary literature, especially considering its widespread use in “Annual Working Plan Reports” by forest supervisors on Nevada national forests. Admittedly, commensurate property was not a well-defined concept in the grazing regulations.

because forest forage users could secure their permit status based on private property when they invested in personal property and in improvements on the forest, in the form of watering troughs and fences. As long as the Forest Service continued to prioritize grazing as the most economic forest use, graziers recognized the benefits of forest management when their investments in property and range secured their forage use privileges. Summer grazing allotments on Nevada National Forests were a welcomed order for propertied graziers with established histories of forage use, and they preferred cooperation with a federal entity willing to prioritize their economic endeavors.

In 1916, Interim Forest Supervisor Vernon Metcalf on the Santa Rosa National Forest posed an important question concerning commensurate property. Metcalf, who was put in charge of the problematic and disorganized Santa Rosa National Forest during its administrative transfer to the Humboldt National Forest, argued that reductions of any kind, including allowance transfers to make room for beginners, were unjust to the propertied grazier. According to Metcalf, reductions could be avoided altogether and priority given to owners of commensurate property. Accordingly, he argued: “The question concerns ‘commensurate.’ I believe that it has been decided that the ‘custom of the locality’ should be used as our guide in deciding this matter. The question then is which custom? The custom of the sheep men or the custom of the cattle men?”⁴¹

Metcalf reiterated the purpose of Nevada National Forests that focused on the priority of water flows and stable economies. He proposed sending out a circular to cattle and sheep operators to bring “their attention to the fact that the Forests were not primarily created for the protected grazing of livestock, but for the protection of the watersheds.”

⁴¹ Vernon Metcalf, “Supervisors Annual Working Plan, Santa Rosa National Forest, 1916,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

Because Forest Service officers and cattle men considered sheep more destructive to springs and stream beds, Metcalf doubled down on both commensurate property and forage use priorities to favor the customs of cattle men. Healthy watersheds promote settlement and cattle men who owned property were dependent on the watersheds to produce winter feed and more likely to work with the Forest Service. Cattlemen, moreover, practiced the customs of the locality and privileged use of the Forests insured the protection of vital watersheds based on a favorable conditions of water flows. This preference for local land owners' access to forests were part of what Metcalf referred to as a "yardstick" to measure forest use privileges.⁴²

In his discussions on "grazing qualifications" with the District Forester Leon Kneipp (Region 4), Metcalf claimed, "we at least seemed to agree that whenever it came to a question of deciding between sheep, with no relation between range and land property owned by the permittees, the sheep would have to give way."⁴³ Kneipp, an experienced administrator of national forest management by this time, cautiously wrote about the 1917 allowances, "In the distribution of grazing privileges on national forests, the relation of the grazing lands within the Forest to the agricultural lands outside should be given careful consideration." Kneipp suggested that distance from the forest, "should perhaps not be as important as the actual character of the commensurate land itself and the practical possibility of its actual use in connection with permitted stock." Unable to explicitly agree with Metcalf in writing, Kneipp clearly thought along the same lines deferring to more studies on the matter:

⁴² Vernon Metcalf, "Supervisors Annual Working Plan, Santa Rosa National Forest, 1916," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁴³ Vernon Metcalf, "Supervisors Annual Working Plan, Santa Rosa National Forest, 1916," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

However, in our work to make the resources of the forests contribute to a maximum public benefit, we should begin a careful study of the agricultural lands surrounding the Forests with a view of determining the degree of dependence of the different types of land on grazing resources of the forest for their best permanent development. Sudden changes in policy should be avoided but the matter should be constantly kept in mind in connection with the grazing administration with the ultimate aim of making the grazing lands within the Forest contribute to the maximum development and greatest possible production of agricultural products on lands outside the National Forests.⁴⁴

Kneipp recognized the core of the problem on Nevada national forests. Permits for transient sheep herders with historical use to the forests destabilized local livestock operators, including their willingness to cooperate and invest in range improvements. Further disruptions threatened to occur from the Forest Service's open-door policy on new users, which created an unknown variable for managers and well-established permittees.

The general sentiment at the time was that sheep placed undue strain on watersheds, especially increased erosion because they were such efficient consumers of vegetation. Condemnation of sheep did not suggest that cattle placed no similar strains on the environment. Commensurate property, however, seemed to mitigate cattle's impact, especially if the owners cooperated with forest regulations. The Forest Service saw stock operators who possessed commensurate property, usually cattle people, as land owners with the means to achieve the agricultural potential of their holdings. In 1919, Supervisor Favre wrote in the working plan: "Stock is handled in connection with range lands i.e. private property to sustain stock outside the forest." In other words, commensurate property was not simply ownership of land outside the forests but ownership of productive land for sustainable livestock numbers. Property ownership meant equal feed

⁴⁴ Leon Kneipp, "Allowances, Santa Rosa, Permits for 1917," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

and water outside the forest to ensure that stock operators possessed a means of feeding their cattle during the winter season and not simply relying on the unregulated public domain.⁴⁵

Supervisor Favre complained about the uncontrolled domain: “To control the Forest, livestock must be controlled on the winter range where...cattle are simply existing.” Favre argued that the public domain continued to suffer from overgrazing, which could affect the management of national forest rangelands and placed livestock throughout Nevada in jeopardy of starvation. To compensate, Favre proposed that all permittees be required Class B status or better to ensure that graziers had winter feed either by property based agriculture or privately owned rangelands to sustain livestock numbers.⁴⁶ Forest supervisors looked to commensurate property requirements to also exclude new Class A and B applicants—necessary action because Class C permits were rarely considered.

On the Nevada National Forest in 1919, Supervisor Alexander McQueen wrote: “The permanency of the [livestock] business in the future will depend more on the ability of the owner to feed his cattle.” McQueen pointed out that a sustainable order in Nevada mountains required graziers to provide equal feed: “We could, I think, consistently base our Class A established preference on his ability to produce one-half ton of hay per head or its equivalent in other forage, as commensurate ranch property.”⁴⁷ Put simply, the forest supervisors argued that ranchers and their cattle using the forest forage must

⁴⁵ C. E. Favre, “Supervisors Annual Working Plan, Humboldt National Forest, 1918,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁴⁶ C. E. Favre, “Supervisors Annual Working Plan, Humboldt National Forest, 1918” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁴⁷ Alexander McQueen, “Supervisor’s Annual Working Plan, Nevada National Forest, 1919,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

demonstrate the ability to operate independent of the public domain during the winter. These measures helped to organize preferred users based on productive irrigated hay lands of home ranches. These operations were also dependent on the protection of favorable conditions of water flows from the mountains that regulated grazing assured. The strategic position of the Forest Service across the high mountain watersheds placed it in a strong position to influence private land holdings by encouraging permanent land uses that fit well with their forest grazing rules and regulations—especially from the standpoint that sedentary users were easier to measure.

Livestock Associations

The definition of commensurate property and how it could apply to regulations in the *Use Book* remained a nebulous appendage to Class-based permittees. These interpretations were left to the forest rangers and supervisors of the Nevada National Forests to address in the most consistent manner possible. Livestock associations provided assistance and shaped policies that even Washington appeared to follow in terms of flexibility about its commitment to keeping forest grazing lands open to newcomers.

Forest Service preferences for local property based users encouraged the formation of livestock associations. *The Use Book* regulations under G-3 and G-4 provided detailed instructions for the inclusion of an advisory board of local livestock associations to cooperate with Forest Service grazing management. The advisory board, once recognized by a district forester, “shall then be entitled to receive notice of proposed action and have an opportunity to be heard by the local forest officer in reference to

increase or decrease in the number of stock to be allowed for any year, the division of the range between the different of classes stock or their owners, or the adoption of special rules to meet local conditions.” In addition to local livestock associations, state or national associations could also appoint an advisory board to be heard by the District Forester or the Office of the Secretary of Agriculture respectively.

According to the *Use Book*, a local advisory board for a given livestock association could apply to construct improvements on a forest, such as “corrals, drift and division fences, roads, trails, sources of water supply, and other forms of permanent improvement designed to protect Forest lands or to facilitate the handling of permitted stock.” Upon approval of a permit to improve the range, the Forest Service could contribute funds *pro rata* for the construction and maintenance of the improvement.⁴⁸

In Nevada, few local livestock associations existed when management came to the newly created national forests. Advisory boards could not be established until livestock operators came together to assist and influence the rules and regulations on the national forests. Whether by Presidential Proclamation or an Act of Congress, the creation of National Forests in Nevada entailed a period of establishing forest boundaries, allowances on allotments, and settling any range controversies. Improved user and Forest Service relations ensued and most interested parties seemed to agree to better management practices when permit holders had input into the decision-making processes and the implementation of regulations.

By the beginning of the second decade of the twentieth century, there was only one recognized livestock association in the Nevada National Forest (White Pine

⁴⁸ *The Use Book*, 1918, pp. 76-7, 83. Regulation G-3 details the organization and influences of advisory boards and Regulation G-4 describes the permit process for the construction of range improvements.

Woolgrowers Association) and one in the Toiyabe National Forest (Central Nevada Stockman's Association). The Supervisor of the Ruby National Forest, which was the closest forest to both the railroad and a community of significant size also reported only one association (Clover Mountains Livestock Association). On the Humboldt and Santa Rosa National Forests there were no livestock associations reported shortly after their creation (the Humboldt National Forest at the time was restricted to the Jarbidge and Independence Mountains in the northeast corner of the state).

In 1916, Forest Supervisor Thompson on the Nevada National Forest wrote that stockmen, "are but slightly intermingled and consequently have but few common interests." He referred to the "remote and scattered locations of the various ranchers," who suffered from "practically no communities."⁴⁹ Lack of community was especially true along the timber belt's Toiyabe and Nevada National Forests. The Humboldt National Forest's Ruby Division was located near the ranching community of Elko a center of livestock activity because of the trans-continental railroad through Nevada which was commonly referred to as the Central Pacific Railway at the time.⁵⁰ The forest divisions of the Humboldt developed the most extensive network of livestock associations by the end of the second decade.

In 1917, Forest Supervisor Mott proposed, "to hold meetings at points convenient to the grazers" in an effort to, "impress the cattlemen with the protective value of an

⁴⁹ Thompson, "Supervisors Annual Working Plan, Nevada National Forest, 1916," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁵⁰ The Southern Pacific Railroad purchased the Central Pacific Railroad in 1885 and in 1899 renamed the portion of the line from California to Utah the Central Pacific Railway. Richard Orsi details the attempts of the Southern Pacific to support federal regulations of livestock grazing in Nevada as an effort to bring order to the public domain where the railroad giant established livestock driveways leading to Halleck, Wells, Preble, Fenelon Station, Deeth, Elko, Metropolis, Montello, and Golconda Station by 1912. Richard Orsi, *Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930*, (Berkeley: University of California Press, 2007), pp. 395-400.

association which would include in its membership all the permittees on the National Forest and others grazing stock in the vicinity on the public domain.”⁵¹ Livestock associations often served the same purposes as “company unions.” In effect, they worked compliantly with Forest Service regulations in return for certain concessions and served as voices of public approval for the Forest Service grazing agenda. Yet some forest supervisors saw a threat in strong local stock organizations that dominated the advisory boards for the purposes of defending “an absolute monopoly” over grazing resources on the part of already established stock operators. In Nevada the powerful combination of livestock associations and advisory boards obtained a monopoly with the highest maximum limits allowed in District Four (Intermountain Region) with little tolerance for reductions to admit newcomers to the Forests.⁵²

Vernon Metcalf was an instrumental figure who brought the livestock industry in Nevada into full participation with the Forest Service. In 1915, Metcalf became Forest Supervisor of the Toiyabe National Forest. Metcalf acted as a mediator to create new associations, break apart the Central Nevada Stockman’s Association, and unseat its President, Patrick Walsh, who dominated for “his own interests.” The local graziers established new associations, such as the Toiyabe Dome Grazing Association whose members, as Metcalf asserted, “were wide awake and men whom no one can dominate.” After serving as mediator for the reorganization of livestock associations on the Toiyabe National Forest, he transferred to the Humboldt National Forest to organize the problematic Santa Rosa Range where graziers found disfavor with the Forest Supervisor

⁵¹ Fred Mott, Forest Supervisor’s Annual Working Plan, Nevada National Forest, 1917,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁵² Rowley, *U.S. Forest Service Grazing and Rangelands*, 81.

W. W. Blakeslee and increased pressure from sheep operations from the Owyhee Desert of Nevada and Idaho.⁵³

In the sparsely settled and remote outback of Nevada, forest rangers were the mediators serving to bring order to the range. The District Office's assistant forester kept a close watch over forest personnel to ensure the right person was in the right place. This meant a restrained approach that prioritized graziers as invested users at the local level, but also required supervisors to have a firm grasp of the regulations that could be used when a situation required authority. "Speak softly and carry a big stick" was a common range administration proverb where rangers and supervisors interacted with wily livestock operators. The situation required people management as well as resource management, and some forest officers were better diplomats than others.⁵⁴

Vernon Metcalf soothed relations between the Forest Service and local livestock operators during the transition of the Santa Rosa National Forest to the Humboldt National Forest. In addition, he worked for a time under Homer Fenn in the District Office (Region Four), who was specifically mentioned by Frank Lockwood as a one of

⁵³ Vernon Metcalf, "Supervisors Annual Working Plan, Toiyabe National Forest, 1915," NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances. Metcalf transferred to the Santa Rosa National Forest to help bring order to the range. The Santa Rosa National Forest consisted of a large mountain spine dominated by Granite Peak, a forested mountain block rising to 9731 feet. The southern end of the range is a typical Nevada narrow mountain spine where water flows into Quinn River Valley to the west and Paradise Valley to the east. The rest of the northern part of the national forest rangelands are a steep rise on the west side onto an elevated shelf that gradually descends to the east toward the Owyhee Desert creating a large expanse of summer grazing where springs and creeks flow into the Little Humboldt River. As with other Nevada national forests, the Santa Rosa Range was severely overgrazed by cattle and sheep when it entered the national forest system. The creation of new national forests throughout the West displaced itinerant bands of sheep. The Santa Rosa Range became especially overstocked after the creation of the Independence Forest Reserve (1906) and again with the Bruneau addition to the Humboldt National Forest (1909) in northeast Nevada. Many of the transient sheep operations simply headed west, crossed the Owyhee Desert, and used the Santa Rosa Range for summer forage. The operators already using the Santa Rosa Range, many from Paradise Valley, petitioned for a National Forest to control the great influx of sheep that began using the mountain range.

⁵⁴ Written by Teddy Roosevelt in a letter to Henry Sprague, January 26, 1900. "Speak softly and carry a big stick; you will go far." Also mentioned by Will C. Barnes in his *Reminiscences*.

Will C. Barnes' shock troops who won the West for forestry. Supervisor Metcalf's success as a mediator between livestock operators and the Forest Service brought him to the attention of the Nevada Livestock Association's President in Winnemucca, Jerry Sheehan.⁵⁵

After serving as supervisor for multiple forests in Nevada and Chief of the Division of Operations in District 4, the Forest Service granted Metcalf furlough from the Secretary of Agriculture and he went to work for the Nevada Livestock Association to secure the livestock industry in the state "every legitimate benefit to which it is entitled."⁵⁶ As the executive secretary for the association, Metcalf did not disappoint. Thomas Alexander referred to the Nevada Livestock Association, under its new executive secretary as conducting the most vigorous attempts in District Four to obtain "recognition of grazing on public lands as property rights based on 'priority and preference.'"⁵⁷

By the early 1920s, there were eleven livestock associations with advisory boards interacting with forestry officials on the Humboldt National Forest. Supervisor Favre reported, "The value of their cooperation is increasing continually. In fact, the cooperation we have received from the associations this summer has been far beyond our expectations." He made special note of the Paradise Association in the Santa Rosa Division and their full cooperation with regard to closed areas and their application to

⁵⁵ In 1884, a group of influential livestock operators from Nevada, Oregon, and Northern California met in Winnemucca. The Elko Free Press referred to the gathering as a "Cattle King's Council." This council of influential ranchers formed the Nevada Livestock Association. The Association's initial interests related to influencing freight rates and establishing an affective network of information related to brands and cattle rustlers. One of their first orders of business in 1884 was to create the first Nevada brand book for cattle. *Elko Free Press*, February 15, 1884; Edna B Patterson, *Nevada's Northeast Frontier*, 217-18.

⁵⁶ Vernon Metcalf, "Secretary's Memorandum," c. 1920, NARA, San Bruno, California, Regional Branch, RG 95, G-Cooperation.

⁵⁷ Alexander, *The Rise of Multiple-Use Management in the Intermountain West*, 85.

construct fences.⁵⁸ In the Toiyabe National Forest, there were two officially recognized livestock associations with almost full membership of forest users. In the Nevada National Forest, two livestock associations had also been formed, complete with advisory boards and nearly full membership of forest users. The only unrepresented group in the three forests were the sheep operators on the Nevada National Forest. While they retained membership in the Eastern Nevada Cattle and Sheep Growers Association, they had not formed a separate advisory board to represent their interests.⁵⁹

While working to organize representative boards for the local livestock associations, Secretary Metcalf also encouraged the creation of advisory boards as an interface with the District Office in Ogden, Utah. Metcalf ably instructed Nevada livestock operators on how to negotiate with the Forest Service. He organized meetings between individual ranchers and forest supervisors to hash out issues related to forest use. He also influenced policy at the District level, especially with regard to his “yardstick” for permittee preferences in an effort to increase maximum limits for established users. Historian William Robbins in his work on American forestry and state and private cooperation points out: “On some occasions, the district forester granted local associations responsibility for enforcing management on the ranges.” In addition, western livestock operators and Forest Service personnel openly cooperated in 1922 to rewrite the grazing manual. Throughout the West, the livestock industry and federal management of

⁵⁸ C. E. Favre, “Supervisor’s Annual Working Plan, Humboldt National Forest, 1919,” NARA II, College Park, Maryland, RG 95, Division of Range Management, Region 4, Grazing Allowances.

⁵⁹ Secretary Metcalf of the Nevada Livestock Association had already been working with Supervisor McQueen on the issue and quickly began correspondences with both the association and the new Supervisor (Charles Beam) who replaced McQueen after his transfer to the Humboldt National Forest.

grazing lands had become intricately intertwined—a relationship that Robbins refers to as “cooperation beyond the Congressional mandate.”⁶⁰

Metcalf used his Forest Service expertise to guide the dominant livestock interests in the state as they accommodated to the new order of mandated grazing regulations. He succeeded in striking a common understanding with Assistant District Forester C. N. Woods in prioritizing the “custom of the locality.” Using his “yardstick” to measure the custom of the locality, he persuaded the Forest Service that the “customs of the cattle man” offered the most stability for settlement and resource uses and hence the most economic benefit to the country. As a result, commensurate property came to be the primary basis for issuing new permits, which advisory boards used as their criteria for recommending permittees on the forests.

The Nevada forests in the Intermountain District 4 had higher maximum limits than any other forests including Utah, Wyoming, or Idaho. In addition, Assistant District Forester Woods knew of no other district in the West with maximum limits as high as Nevada. In other words, well established Nevada cattle ranchers benefitted from the most expansive acreage of forage privileges to monopolize access to resources as compared with the entire United States National Forest system.⁶¹

Metcalf justified the arrangement: “Nevada does not present much in the way of inducements for new settlers.” Therefore, according to Metcalf, new settlers in Nevada

⁶⁰ William G. Robbin, *American Forestry: A History of National, State, & Private Cooperation* (Lincoln: University of Nebraska Press, 1985), 107.

⁶¹ C. N. Woods to Vernon Metcalf, June 22, 1922, NARA, San Bruno, California, Regional Branch, RG 95, G-Cooperation, Nevada Land and Livestock Association. Correspondences between Secretary Metcalf, Assistant District Forester Woods, Supervisor McQueen (Humboldt N. F.), Supervisor Beam (Nevada N. F.), and Supervisor McGowan (Toiyabe N. F.), NARA, San Bruno, California, Regional Branch, RG 95, G-Cooperation

should no longer be a consideration for the Forest Service. Instead of making room for new participants in Nevada's grazing economy, the Forest Service should focus on "fostering" what was already there. New participants in the grazing industry would "unduly handicap" the existing balance on a "gamble that newcomers would make up for any loss sustained." The potential loss of forage resources, grazing privileges, and established protective and maximum limits was, for Metcalf, too great a gamble to include newcomers without commensurate property.

Nature, according to Metcalf, "has protected us [Nevada cattle men] to a material extent" and has preserved an "old time frontier." As a result, "the big danger," according to the former forestry officer was in "too much administration." The urgency, Metcalf asserted, was to solidify the preferences of the established graziers in the state and limit the speculation underway from lowland agricultural settlers keen on establishing livestock ventures. Metcalf referred to the "inrush of speculators" from the irrigation projects in the Snake River and the Carson-Truckee, both products of the 1902 Reclamation Act.⁶²

These speculators, particularly new sheep outfits, operated on "shoestring" budgets. Metcalf asserted his, "firm conviction that the sheep business in Nevada is no poor man's game under present conditions." For these reasons, the lack of settler opportunities, increased competition on the domain, and the high cost of Nevada ranching, Metcalf pleaded with the District Forester to make recommendations to his forest supervisors that a "homemade or shirtsleeve" administration could operate best,

⁶² Vernon Metcalf to District Forester, February 2, 1922, NARA, San Bruno, California, Regional Branch, RG 95, O Boundaries, Livestock Associations.

especially with the Forest Service freely coordinating with cooperative and organized livestock associations:

Let's have 'yardsticks' based on present customs and let changes in customs regulate changes in the yardstick. In Nevada, let's try for a while, a policy designed more directly to insure the welfare of the outfits we have than to keep them in suspense awaiting a newcomer who in most cases hasn't and can hardly come.⁶³

To ensure coordination between livestock associations and the Forest Service, it was standard practice for a ranger or supervisor to attend association meetings among the participants with advisory boards. Livestock associations also sent copies of their minutes to the forest supervisor. By 1922, the district forester began sending Metcalf both annual working plan reports and allowances pertaining to the Humboldt, Toiyabe, and Nevada National Forests. By the mid-1920s, the coordination between livestock associations and the Forest Service in Nevada was substantial and operated to the benefit of well-established settlers in the livestock industry.

Limits of Forest Management

While commensurate property became an instrument of management and exclusion administered by the coordinated efforts of livestock associations and the Forest Service, the public domain remained a problem. Transient sheep herders, according to the Forest Service and Nevada ranchers were ubiquitous across the public domain. Forest Supervisor of the Nevada National Forest, Charles Beam, pointed out that increased regulations in other states surrounding Nevada pushed transient sheep herders into the central portion of the Great Basin. Their herds prevailed on Nevada's domain lands,

⁶³ Vernon Metcalf to District Forester, February 2, 1922, NARA, San Bruno, California, Regional Branch, RG 95, O Boundaries, Livestock Associations.

which were larger than any other state and had the fewest settlers. Transient herds encroached on private property and National Forests at a time when propertied ranchers began to organize in coordination with the Forest Service to strengthen the security of their grazing privileges on all federal lands.

Forest supervisors consistently argued for the extension of regulations over the public domain lands in Nevada. Supervisor Charles Beam, writing to the District Forester in 1924 argued, “I am firmly convinced that the only way to perpetuate the livestock business in this country is to place enough of the now open public range lying adjacent to the established ranches under Government control to provide a year-long range for the stock locally owned.” In 1924, Beam inspected the forest range, ranches, and domain lands adjacent to the White Pine Range to build an argument to expand the Nevada National Forest, which would include lands fit for grazing purposes only.⁶⁴

To make his case, Beam related the struggles of a Forest permittee and owner of productive hay agriculture—commensurate property. In 1897, Bessie Rosevear and her husband settled along Green Springs in White Pine County on the western slope of the White Pine Range (South of Hamilton and bordering, after 1909, the Nevada National Forest). At the peak of their operations the Rosevears produced only 15 tons of hay per year and managed 700 head of cattle on property adjacent to both the border between National Forest and Public Domain. The ranch relied upon public range both in the Forest and public domain for its success.

Circa 1914, transient herders increased their use of the domain range in Railroad Valley as they were increasingly excluded from the National Forests. By 1924, Bessie

⁶⁴ Supervisor Beam to District Forester, March 10, 1924, NARA Regional Branch, San Bruno, California, L-Boundaries, Nevada National Forest, Proposed White Pine Addition.

Rosevear (her husband had since died) ran only 300 head of cattle because the public domain rangeland had deteriorated to such a degree that it was useless for her local operation. Her stock by the 1920s depended on 175 tons of hay-making from the home ranch for winter feed and Forest Service grazing in the summer. Bands of sheep moved along the bordering public domain lands of her ranch boundaries making the public domain rangelands useless to her stock. Supervisor Beam on a visit to the Rosevear Ranch saw evidence of damage:

While on this inspection trip I stopped over night at the Rosevear Ranch and Mrs. Rosevear told me that not less than twenty bands of sheep had passed her ranch during the fall and early winter going south down the valley and that as many bands had passed just recently returning to the north country and that in passing they came right up to her field fences and in several instances some of the sheep would pass through her fences and into the fields and it had been necessary for her to drive them from her privately owned lands. At the time that I was there the sheep tracks were still clearly visible which left no doubt in my mind as to the truthfulness of her statements.⁶⁵

Despite multiple proposals to expand Nevada national forests, the Forest Service resisted the expansion of boundaries for grazing purposes alone. According to the 1897 Forest Organic Act the primary purposes of the forests was to protect favorable conditions of water flows and the supply of timber. The expansion of forest boundaries into the lower grazing lands with no timber to protect snowpack could not be justified in a political environment that was becoming increasingly critical of Forest Service grazing regulations in many western states. In Congress, the 1926 Stanfield Grazing Bill from Oregon's Senator Robert Stanfield signaled problems for the Forest Service's efforts to limit grazing numbers prioritizing protection of the resource over stock production plus the ever-present criticism of grazing fees levied under the permit system. Clearly there

⁶⁵ Supervisor Beam to District Forester, March 10, 1924, NARA Regional Branch, San Bruno, California, L-Boundaries, Nevada National Forest, Proposed White Pine Addition.

was no enthusiasm in Congress for the expansion of Forest Service boundaries. In Nevada, established livestock operators using their livestock associations turned to the state legislature in an effort to establish some types of regulations on the public domain.

State of Nevada

In 1925, the Nevada Legislature passed the Stock Watering Act. In an effort to prevent transient sheep herds from encroaching onto cattle ranges, or more specifically ranchers with private property, water from springs and creeks could be appropriated (claimed and registered with the State Engineer's Office) and declared of beneficial use by adjacent property owners. The act mirrored Idaho's 1918 use of police powers to limit the encroachment of sheep herds onto federal lands where privileges had already been distributed to private home ranchers. The U.S. Supreme Court's, *Omaechevarria v. Idaho* (1918) approved the application of state police powers to the public domain. It kept the peace between cattle ranchers and sheepherders and protected against overgrazing. Police powers under the Tenth Amendment of the U.S. Constitution allowed states to establish and enforce laws protecting the welfare, safety, and health of the public.⁶⁶

The historian of western federal lands Leisl Carr Childers highlighted the importance of the Stock Watering Act, which essentially used the State Engineer's Office to, "convert prior usage into a water right and the grazing range into liminal property," which means it was unlawful to graze within a certain distance of a water source claim.

⁶⁶ "Message of Gov. F. B. Balzar," *Appendix to Journals of Senate and Assembly of the Thirty-Fifth Session of the Legislature of the State of Nevada*, Vol. I (Carson City, State Printing Office, 1931), p.20. *Omaechevarria v. Idaho*, 246, U.S. 343 (1918), prohibited sheep from grazing on federally owned lands previously used by cattle. The U. S. Supreme Court affirmed the ruling and established that state police powers extend over federal lands.

The former, or the conversion of prior use into a water right, was an established form of water law in the West known as prior-appropriation. State water laws prevailed by legislative acts and court decisions even on public domain lands. The acknowledgment of, “water rights as the anchor for an alternate form of land ownership...,” brought the livestock industry to the state legislature where it lobbied for water right appropriation and accompanying land-use claims surrounding the water sources.⁶⁷

Nevada’s Supreme Court upheld the Stock Watering Act in the Carville Decision (1929) arguing that state regulation of the federal public domain fell within its police powers. The ability to control the water sources based on the 1925 Act granted protection of water sources for a three-mile radius around a water source and effectively brought some restrictive use to the public domain rangelands.⁶⁸

In 1928 the American National Livestock Association argued in favor of leasing the public domain lands to bring federal regulatory controls to grazing industries. These controls would favor “resident land-owning stockmen” over the “migratory owners.” Public lands historian Paul Wallace Gates comments on the development of public land law during the mid-1920s:

In the absence of Federal regulation the states had been obliged to assume jurisdiction over the public lands and had enacted legislation providing a procedure for adjudicating such issues in the state courts. Individual priorities to ranges were recognized, exclusive right to public lands near developed stock water was acknowledged, and it was forbidden to graze sheep within 3 miles of a town or residence.”⁶⁹

⁶⁷ Leisl Carr Childers, *The Size of the Risk: Histories of Multiple Use in the Great Basin* (Norman: University of Oklahoma, 2015), 24.

⁶⁸ Childers, 20.

⁶⁹ Paul Wallace Gates, *History of Public Land Law Development*, first published 1968 (Florida: WM. W. Gaunt and Sons, Inc., 1987), 523.

Nevada's Stock Watering Act was part of the move to bring regulation to the western public domain. While the Forest Service stood ready to expand its regulatory authority onto the public domain, the 1897 Forest Organic Act did not provide a basis for such expansion. Increased tensions between the Forest Service and western stock operators over reductions and grazing fees, coupled with an increasingly demonized bureaucratic structure during the 1920s, exacerbated dwindling support for the Forest Service in Congress.

In 1929, the Nevada Legislature established the State Range Commission, which consisted of the Governor, the State Engineer, and a member of the State Tax Commission. Well-established Nevada ranchers mobilized their influence in the State Legislature resulting in the State Range Commission. The State Range Commission was, in part, a response to proposals stemming from the new Hoover Administration. Soon after President Herbert Hoover's inauguration, the new Secretary of the Interior, Ray Lyman Wilbur, suggested the possibility of transferring all surface rights of the federal public domain lands to the states.⁷⁰ The State Engineer, George W. Malone was also assigned by Governor Balzar of Nevada to represent the state on President Hoover's newly formed Committee on the Conservation and Administration of the Public Domain (Committee of the Public Domain).

The Committee on the Public Domain considered whether federal regulations or state control most benefitted the remaining unappropriated lands. Western states' representatives on the committee were asked to consult the stakeholders within their respective domain lands. In Nevada, this included a "Representative of the United States

⁷⁰ Merrill, *Public Lands and Political Meaning*, 105.

Interior and Agricultural Departments, the Nevada Mine Operators' Association, the Nevada Farm Bureau, the Agricultural Extension, the Nevada Livestock Association, the Southern Pacific Land Department, United States Forest Service and Chamber of Commerce." Malone brought three proposals home to Nevada: (1) "the States that so desire may take their public lands under certain conditions"; (2) "the States that do not desire to take their public lands but want them supervised by a Federal Bureau, such as the Forest Service or a National Range Division, may secure such supervision"; (3) "the States that do not desire either State ownership or Federal supervision may get Federal recognition of the State's method of range control, such as under the Stock Watering Act, and such further legislation may pass in regard to fixing range boundaries."⁷¹

In late December of 1930, the Nevada stakeholders discussed the three proposals. The first proposal had no support. Only the Chamber of Commerce supported the second proposal with reservations. The third proposal, spearheaded by the Nevada Livestock Association's lead man, Vernon Metcalf, received support from all representatives. Culminating from these discussions, the Nevada Legislature passed the Range Act of 1931 that extended the state police powers to the public domain.⁷² In other words, the state of Nevada sought federal recognition for state control of federally owned lands not already under management. The state did not want the burden of ownership of the land, but simply the ability to regulate land use (they had already developed precedent for through the Stock Watering Act) which came with the prospect of grazing rights on the public domain for resident land-owning stock operators.

⁷¹ Balzar, "Message of Gov. F. B. Balzar," 19-22.

⁷² Balzar, 19-22.

Taylor Grazing Act

Between the years of 1915 and 1925, the Forest Service adjusted its regulations to promote settlement, conservation, and order. The Forest Service promoted settlement by prioritizing the more powerful and well-entrenched users of forest forage yet attempting to keep the door open for new users by improving range conditions. They promoted conservation by keeping numbers and types of stock in check and managing the land according to the new discipline of rangeland science. Order was an important goal to assure users continued access through the permit system and requirements for commensurate property. After 1925, the order established in the mountains of Nevada, prioritized the customs of the cattle operators. These dispersed settlers situated at home ranches across the state developed livestock associations to work in conjunction with Forest Service rangers and supervisors and their regulatory decisions. Exposure to a system of range regulations and their preferred status as owners of commensurate property poised land-owning stock operators to exert their influence onto the public domain through state initiatives, such as the State Water Act, then through a new system of federal regulations with the passage of the 1934 Taylor Grazing Act.

Clarity came to the range. Less need for reductions to accommodate new forest users depended on priority given to ranchers with commensurate property who, as a result, monopolized land use. Propertied graziers were the most obvious beneficiaries of grazing privileges offered by the Forest Service. They were the most cooperative with the Forest Service and in its view the most likely to sustain themselves and prosper in the livestock business. While Forest Service managers desired to have increased regulations on the public domain, they could not create policies under the political conditions in

Congress to extend a system of regulations onto the unappropriated and unreserved lands. State initiatives in the Stock Watering Act (1925) and Rangeland Act (1931), indicated that some type of regulation over the free range of the public domain was highly desirable from the local point of view. The Hoover Administration helped to stir the pot by promoting the transfer of domain surface rights to the states, but it was not until the New Deal that large federal programs, designed to counteract the Depression of the 1930s, came to the remaining public domain. In 1934 the Taylor Grazing Act brought a degree of management to the public domain. An organized livestock industry in Nevada was well-prepared to take advantage of the new regulatory regime by virtue of its previous partnering with the Forest Service.

Chapter Five

See Nevada First on Roads to a National Monument

On January 24, 1922, President Warren G. Harding proclaimed Lehman Caves a national monument using the powers of the 1906 Antiquities Act. The Lehman Caves National Monument and its location within the Nevada National Forest complicated the management efforts of the Forest Service. Located in eastern Nevada's southern Snake Range on the 39th parallel, this portion of the state's remote outback became accessible during the automobile age of the 1920s. State and federal officials anticipated traffic into Nevada as autos toured on routes connecting Yellowstone, Yosemite, and Zion national parks. The designation of Lehman Caves as a national monument, set against the backdrop of Wheeler Peak, drew attention to the scenic wonders in Nevada's outback and the possibilities of tourism via improved roads and even a state park system.

The 1906 Antiquities Act grew out of efforts by the Society for the Preservation of Historical and Scenic Spots.¹ Compared with national parks, monuments could be created with relative ease. The creation of a national park required an act of Congress, whereas presidential proclamations reserved monuments at the President's discretion. On the large federal estate, there remained unappropriated lands with sites of significant historic and scientific value worthy of protection.²

¹ Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1880-1920* (Pittsburgh: University of Pittsburgh Press, 1999), 196. The Antiquities Act was similar to the 1891 Land Revision Act in its significance for the executive powers of the president to reserve lands for public benefit. The powers of proclamation ceased for national forests at the end of the President Theodore Roosevelt's term (1909). However, the Antiquities Act remained consequential for the nation's preserved spaces throughout the twentieth century and into the twenty-first.

² Hal Rothman, "Second-Class Sites: National Monuments and the Growth of the National Park System," *Environmental Review*, 10, 1 (Spring, 1986): 45; Hal Rothman, *America's National Monuments: The Politics of Preservation* (Lawrence: University of Kansas Press, 1994), xiii.

At the beginning of the twentieth century, practical issues complicated the creation of monuments. Unlike national forests, both parks and monuments suffered from a lack of a centralized management agency. Monuments, in particular, remained without supervision even after 1916, the year Congress created the National Park Service. National monuments typically fell under the supervision of three agencies: the War Department, Department of Agriculture, and Department of Interior. Between 1906 and 1916, Presidents Roosevelt, Taft, and Wilson created twenty national monuments and Congress continued to shift their boundaries. Different federal agencies dispersed management responsibilities for monuments with no centralized order or mission. Public historian Denise Meringolo points out that none of the bureaus affected with the management of monuments, “were particularly well suited to the task.”³

Prior to 1916, some saw the Forest Service as the obvious choice to manage parks and monuments. Historian Samuel Hays writes: “As early as 1904 Pinchot recommended that Congress transfer national parks to the Forest Service.” The visions of preservationists, however, clashed with the utilitarian approach to conservation that Pinchot represented. For example, Pinchot came to favor damming the Tuolumne River in Hetch Hetchy Valley within Yosemite National Park, an action that other more preservation-minded individuals and organizations vehemently opposed—John Muir being prominent among them.⁴ Pinchot also scoffed at proposals to create a separate

³ Denise D. Meringolo, *Museums, Monuments, and National Parks: Toward a New Genealogy of Public History* (Amherst: University of Massachusetts Press, 2012), 48-49. The Antiquities Act was an effective step toward protecting, “historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest.” Meringolo specifically mentions the Indian Office, the General Land Office, the Bureau of Mines, and the United States Geological Survey. In addition, the War Department is another executive department of note affected by national monuments.

⁴ Samuel Hays, *Conservation and the Gospel of Efficiency*, 192-195. Hays described the damming of Hetch Hetchy Valley as John Muir’s “most dispiriting setback.”

management agency, such as a bureau of parks which he thought was, “no more needed than two tails to a cat.”⁵ In 1910, Henry Graves, successor to Gifford Pinchot became Chief Forester during the battle over Hetch Hetchy and he acknowledged that the Forest Service’s commitment to the “full utilization” of reserved land “had caused many to fear that the natural beauty of the Sierra was threatened.” However, Graves was also bewildered by an “adverse public reaction to his proposal for logging under controlled conditions in national parks.”⁶

Pinchot’s brand of utilitarian conservation never sat well with preservation-minded conservation groups during the first three decades of the twentieth century. Despite the pragmatic appeal of utilitarian conservation and its application in the policies of Pinchot’s Forest Service, the policies faced opposition from organizations such as the Audubon Society (est. 1886) and the Sierra Club (est. 1892).⁷ With the departure of President Roosevelt from office in 1909 and Pinchot’s firing as Chief Forester in 1910, the voices of the Secretary of Interior Richard Ballinger (1909-1911) and Lobbyist J. Horace McFarland of the American Civic Association became more prominent in conservation circles.⁸ McFarland drew a contrast between forests and parks when he

⁵ Hays, 196. Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 2004), 114. Reference made to correspondence between Pinchot and Garfield, November 22, 1911.

⁶ Steen, *The U.S. Forest Service*, 115.

⁷ Denise Meringolo, *Museums, Monuments, and National Parks*, 50. While parks could be created for scenic significance, it should be noted that there was no scenic agenda in the Antiquities Act. Monuments, as a result, required prehistory, history, and scientific significance. Of course, places of scenic value could fall into any category and were as a result susceptible to changing values in history and science, but also for changing attitudes for what constitutes scenic value.

⁸ President Theodore Roosevelt, “The President on Public Lands, Irrigation and Forestry,” *Forestry and Irrigation*, XI, 12 (December, 1905): 546-547. Forestry and Irrigation transcribed a portion of President Roosevelt’s message to Congress he explained the usefulness of forests for irrigation and ended abruptly by stating, “The national parks within or adjacent to forest reserves should be transferred to the charge of the Forest Service also.”

argued that parks should be “the nation’s playground” and not treated as the “nation’s woodlots.”⁹

In 1915, the conservation-minded businessman Stephen Mather and his legal assistant, Horace Albright, toured America at the insistence of the Secretary of the Interior, Franklin K. Lane, to make a case for a “park bureau.”¹⁰ Support grew, and in 1916 Congress passed an Organic Act creating the National Park Service within the Department of Interior. President Woodrow Wilson signed it into law and Mather and Albright became its first director and assistant director respectively. National monuments, however, remained a loose appendage in the Park Service with no uniform oversight from the new division of the Department of the Interior.¹¹

American involvement in World War I proved a challenging start for the National Park Service. First of all, Director Mather almost immediately fell ill and would not recover until near the war’s end. Horace Albright and Franklin Lane administered park management in his absence at a time when the war complicated the Park Service mission. Ranchers and other industry-minded users of resources insisted on access to park resources. Livestock operators especially wanted to take advantage of grazing. The patriotic stance of the nation, evidenced by song and editorials, exclaimed, “The Battle Cry of Feed’ Em” and “Soldiers need to eat meat not wild flowers.” Secretary Lane, a man who was often “afflicted with compromise,” proposed to allow large numbers of

⁹ Meringolo, *Museums, Monuments and National Parks*, 51.

¹⁰ Meringolo, 52-53. Secretary of the Interior Franklin Lane was, of course, following in the footsteps of Fred Ballinger, his predecessor, and recognized the significant influence the department would gain from a park service. Henry Graves, Pinchot’s successor, advocated for the advantages of managing the parks as part of the Department of Agriculture.

¹¹ The 1906 Antiquities Act provided for “uniform rules and regulations,” which the Secretaries of Interior, Agriculture, and War adopted. The rules and regulations remained secondary to the different Departments’ primary missions.

cattle and sheep in the parks. Acting Director Albright did not concede and conjured up images of the “Hoofed Locust” of the Sierra in opposition to Lane’s proposal. Albright significantly downscaled the plan and allowed a small number of cattle into the parks.¹²

In the wake of these management struggles, the National Park Service was slow to pay attention to national monuments. Many monuments became “second class sites” managed by volunteers and special interest groups and assigned to a variety of different agencies.¹³ The Forest Service managed monuments that fell within the boundaries of the national forests. Forest Service personnel usually had little interest in history, archaeology, natural history, or methods of preservation. Created in 1922, Lehman Caves National Monument, part of the Nevada National Forest in the southern Snake Range, suffered from a lack of management as a second-class site where management priorities were overwhelmingly directed toward grazing.

As with other national monuments within the boundaries of national forests, for better or worse, the Forest Service initially took a hands-off approach in the management or non-management of many monument sites. Arthur Carhart, a Forest Service recreation engineer and an early architect of the wilderness concept known as “primitive areas” after 1932, commented that some foresters, “grumbled a little because tourists were flooding into the back country in the 1920s. Foresters were trained to grow trees, not ride herd on dudes.” According to Carhart, foresters already “had to deal reluctantly with aggressive graziers entrenched on the forests. With all these troubles, forest-visiting tourists became

¹² Horace M. Albright and Marion Albright Schenk, *Creating the National Park Service: The Missing Years* (Norman: University of Oklahoma Press, 1999), 214, 271-272; Meringolo, *Museums, Monuments, and National Parks*, 53.

¹³ Rothman, “Second-Class Sites,” 45; Rothman, *America’s National Monuments*, 89.

a new aggravation to the dedicated tree-growers.”¹⁴ Protecting resources for recreation and tourism presented an entirely new set of administrative concerns for the Service. Through the 1920s, loggers and graziers were the traditional and preferred clientele.

In the 1920s and especially the early 1930s, the National Park Service and the U.S. Forest Service entered into “turf wars” over national monuments. The Park Service recognized its mission as part of a preservation ethos against which the Forest Service “jealously guarded its monuments.” Now with effective leadership from Stephen Mather and Horace Albright, the National Park Service gained favor in Congress and more appropriations. Historian Hal Rothman remarks that the “potential for interagency conflict was immense.”¹⁵

The early years of Lehman Caves National Monument witnessed such conflict. Forest Service personnel saw a threat from preservation-based management in the National Park Service. Foresters who had established relations with local graziers and worked to stabilize the forest forage cautiously approached the idea of national monuments and state parks near the Nevada National Forest. In Nevada, the Forest Service did not jealously guard Lehman Caves National Monument against management

¹⁴ Arthur H. Carhart, *The National Forests* (New York: Alfred A. Knopf, 1959), 21. Primitive areas, as defined by Forest Service regulation L-20, designated remote locations where an absence of use and development represented the primitive character of the forest region. “Correspondence concerning recreation planning and recreation policies on the national forests,” Memorandum for Branch Chiefs, April 25, 1932. Forest History Society, www.foresthistory.org.

¹⁵ Rothman, *America’s National Monuments*, 140, 143, 142. For many national monuments across the United States and even the West, Rothman overstates the case of turf wars. He builds an argument for interagency conflict with a case study on the Bandelier National Monument where the Forest Service and the Park Service tangled over who best could manage the monument. Rothman compared the ensuing struggle: “the bureaucratic equivalent of the nineteenth-century gunfight, the men drew their maps, and the process of orchestrating an acceptable agreement began.” *America’s National Monuments*, 150. Regardless, the struggle over management occurred and while leaders in both agencies claimed their management priorities most suited to land and people, the “potential for immense conflicts” remained and disagreements over who had the best arguments for land management practices proliferated. Each case on national forests had different circumstances to address.

by the National Park Service, but instead jealously guarded a difficult to establish, and maintain, relationship with graziers. The creation of a national monument in eastern Nevada placed the Forest Service's hard won working relationship with the local livestock industries on uncertain ground.

The creation of a national monument deep in the Nevada outback represented a new vision of conservation on the mountain rangelands. During the first decades of the twentieth century, conservation came to Nevada with Pinchot's vision of utilitarianism. By the 1920s, game refuges, parks, and places of prehistoric, historic, and scientific significance brought diverse ideas about nature and history to the high desert outback. Particularly important in opening these resources to the general public was a "diversified" Good Roads Movement during the interwar years.¹⁶

Historian Paul Sutter identified three developments during the interwar years that made the period transformative for outdoor recreation. The first was the "rapid proliferation of the automobile." The second major change was the government's "willingness to sponsor both road building and recreational development." The third major development stemmed from the "maturing consumer culture" that valued recreation and nature as part of an American identity for sale, emulation, and conspicuous consumption in life's leisurely experiences.¹⁷

In Nevada, road building and the rise of automobile ownership kept pace.

However, a purgatory where the monotony of a way through the Nevada landscape made

¹⁶ Marguerite S. Shaffer, *See America First: Tourism and National Identity, 1880-1940* (Washington: Smithsonian Institution Press, 2001), 138-141.

¹⁷ Paul S. Sutter, *Driven Wild: How the Fight Against Automobiles Launched the Modern Wilderness Movement* (Seattle: University of Washington Press, 2002), 23-27; Thorstein Veblen, *The Theory of the Leisure Class*, Oxford World's Classics (Oxford: Oxford University Press, 2007), 53.

the consumption of nature and recreation in its desolate places challenging. At Lake Tahoe, an urban elite saw the waterscape and rebounding forests as an inviting natural landscape to escape from the asphalt and concrete construction of modern life. Meanwhile, the rest of the state remained without destinations of scenic, historic, and scientific interest. In 1922, the creation of Lehman Caves National Monument promised otherwise for tourists and their automobiles. Governor James Scrugham and legislator Cada Costolas Boak saw the potential of linking tourism, the automobile, and the natural order in Nevada.¹⁸

Sutter makes the point that, between 1880 and 1920, the groundwork had been laid for nature “as a space for leisure.”¹⁹ Prior to WWI, utilitarian conservation and the aesthetic and recreational values of nature were both a reaction to urban-industrial changes. Recreation in the natural world, be it a rustic camping trip or arduous mountaineering, reflected society’s cravings for the “real life” and often transformed into a “cult of experience” where nature offered “relaxation, therapeutic recreation, and moral regeneration.”²⁰ The sentiment for a return to nature during the interwar period initiated a new symbolic and material experience. In this new experience, national parks and monuments provided a space for the technological and cultural reproduction of nature designed for a new consumer public. Parks and monuments became “hybrid technologies” in landscapes suited to auto-tours through America’s new and accessible

¹⁸ Thomas Cox, “Before the Casino: James G. Scrugham, State Parks, and Nevada’s Quest for Tourism,” *Western Historical Quarterly*, Vol. 24, No. 3 (Aug., 1993), 340-41.

¹⁹ Paul S. Sutter, *Driven Wild*, 23.

²⁰ Paul S. Sutter, *Driven Wild*, 21.

nature places.²¹ As American ideas about nature and the past changed, so too did the value of Lehman Caves in Nevada's basin and range stock raising outback.

Absalom Lehman and a Cave of National Significance

In 1885, a farmer, rancher, and miner by the name of Absalom (Ab) S. Lehman uncovered a limestone cave in the remote region of eastern Nevada. Ab first moved west from Ohio to join the Gold Rush to California. Unsuccessful in American mining ventures, he traveled to Australia and "developed a gold mine and established several wool stores." He married Mary Gardner, an English woman living in Victoria. After Mary's death in 1861, Absalom returned to the United States to live with his brother Jacob in Idaho. By the late 1860s, he traveled through Nevada's timber belt exploiting the opportunities afforded by its mines. He dabbled in multiple ventures hauling foodstuffs to the mines and staking a few claims of his own.²²

During the 1870s, the 39th parallel in eastern Nevada was as remote as anywhere in the contiguous United States. Successful mining towns, such as Pioche, Hamilton, and Osceola had lured Euro-American settlers to the region and an agricultural, ranching, and supply infrastructure developed across the timber belt. Often, successful settlers engaged in multiple endeavors. For example, Ab Lehman staked a mining claim in Osceola on the northwestern side of the southern Snake Range in 1872, soon after gold was discovered. By 1875, he partnered with his brother Ben, who arrived in Snake Valley in 1873, at the present town of Baker. Ab and Ben established a farm with approximately 30 cows and a

²¹ Richard Grusin, *Culture, Technology, and the Creation of America's National Parks* (Cambridge: Cambridge University Press, 2004), 3-5, 9.

²² Harlan Unrau, *Basin and Range: A History of Great Basin National Park, Nevada* (U. S. Department of the Interior: National Park Service, 1990), 179-80.

productive dairy, a large garden, and an orchard which they cultivated to supply the various mining towns in the region. By 1877, Ab's farm was substantial enough to hire two laborers. While carving out his claim to the land in Snake Valley as a miner and farmer, he discovered a cave of significant proportions. He renamed the settlement "Cave Ranche [sic]" and soon after began leading tours.²³

The date of the cave's discovery is uncertain. On April 25, 1885, the *White Pine Daily News* and the *Ward Reflex* reported that Ab Lehman, "struck a cave of wondrous beauty on his ranch near Jeff Davis Peak." Ab and another man explored into the cave to where, "the points of the Stalactites and Stalagmites were so close together to offer a bar to their further progress." The article continued, "They will again explore the cave armed with sledgehammers and break their way into what appears to be another chamber."²⁴ By September 1885, many visitors toured the cave with Ab Lehman as guide. A reporter with the *Genoa Weekly Courier* commented: "I have heard people who have visited the Mammoth Cave in Kentucky, say that this one is as large and excels in beauty [of] that noted cave."²⁵ Ab Lehman's life sets forth an example of the diverse economic possibilities in the region: mining, agriculture, and tourism. Mining and agriculture were common endeavors for the early colonizers along Nevada's transport and communication routes through the timber belt. By the 1920s, tourism on the eastern side of Nevada's timber belt offered new opportunities for visitors and the local economy.

²³ Unrau, *Basin and Range*, 178-81; Keith Trexler, "Absalom S. Lehman," 1965, 1-3; Vertical Files, Great Basin National Park; Laura Lehman Mellenbruch, *The Genealogy of the Lehman Family* (Wilcox, Arizona: Ruth Mellenbruch, 1943), 9-13; *Ward Reflex*, June 10, 1877.

²⁴ Unrau, *Basin and Range*, 180; *White Pine Daily News*, April 25, 1885. Note that there is today a Jeff Davis Peak immediately east of Wheeler Peak. Although Wheeler Peak has gone by different names such as Biap, Jeff Davis, and Wheeler, the mountain typically referred to as Jeff Davis or Wheeler is Wheeler Peak.

²⁵ Unrau, *Basin and Range*, 180; *Genoa Weekly Courier*, September 4, 1885.

A cave as Nevada's first national monument is relevant to the state's history. Mines are industrial and drab when compared to caves formed by the processes of nature over long periods of time. These places were not sudden creations carved from a search for wealth, but formed slowly as different phenomena sculpted unique variations of rock over millennia. In essence, marvels of geological uniformitarianism crept into places where humans could contemplate time outside their usual experiences. Caving provided the opportunity for people to experience natural wonders underground where not only rock formations created unusual shapes, but also unique ecosystems and species in the cavern environments. Caves not only formed unusual rock shapes, but prompted new questions about human and earth histories.²⁶ According to Australian literature professors, Ralph Crane and Lisa Fletcher, caves have "long been fundamental to human history. They are simultaneously places of shelter and places of deep, dark danger. They are places of birth and of burial, dwelling places and sanctuaries against persecution. They are human habitat and home of mythical monsters."²⁷

The Antiquities Act provided a means to define, make accessible, and interpret the geological and historical significance of America's caves for tourists. Within two decades after the Antiquities Act, presidents Roosevelt, Taft, Harding, and Coolidge designated seven caves as national monuments: South Dakota's Jewel Caves (1908), Montana's Lewis and Clark Cavern (1908), Oregon Caves (1909), Wyoming's Shoshone Cavern (1909), Nevada's Lehman Caves (1922), Utah's Timpanogos Caves (1922), and New Mexico's Carlsbad Cave (1923). These monuments exposed tourists to underground

²⁶ Ralph Crane and Lisa Fletcher, *Cave: Nature and Culture* (London: Reaktion Books, 2015), 36-37; David Gillieson, *Caves: Processes, Development, Management* (Oxford: Oxford University Press, 1996), 5.
²⁷ Crane and Fletcher, *Cave*, 36-37.

places of scientific and prehistoric significance. The caverns and their distinct underground environments had been an interest for spelunking societies, tourists, and scientists long before the Antiquities Act, but the new designations under the Act provided a way to identify and publicize these sites of underground curiosity.

By the time President Harding proclaimed Lehman Caves a national monument in 1922, spelunkers, speleologists, and tourists shared an enthusiasm for caving. First in Europe and later in America, according to Crane and Fletcher, “Formal, coordinated networks of scientists and explorers who shared a passion for caves began to emerge in the 1880s with the establishment of cave-exploring societies....”²⁸ Denise Meringolo argues that the rise of public history, or a history relevant to public interests, developed in part from collectors of natural history who were often earth scientists of the nineteenth century.²⁹ These collectors set the stage for a public interest in caves, many of which became part of America’s national monument system soon after the Antiquities Act. Lehman Caves, by virtue of the Antiquities Act, provided Nevada a place of designated national significance in its remote outback on the 39th parallel.

Roads to a National Monument

Prior to the 1920s, Lehman Caves primarily drew local interest. With the building of better roads, remote parks, monuments, and other significant places became more accessible. National monuments became “waystations” in the “See America First” auto-

²⁸ Crane and Fletcher, 32.

²⁹ Meringolo, *Museums, Monuments, and National Parks*, 5-6.

tours between Yosemite, Yellowstone, Zion and other national parks and monuments.³⁰

Yet, creating access to Nevada's outback and luring visitors to scenic points was a greater challenge than most champions of Nevada tourism expected.

One such advocate was Cada Costolas Boak, a little known figure in Nevada history. Born in 1870 in Iowa, Boak became a mining engineer who joined Nevada's second mining boom in the first decade of the twentieth century. He moved to Tonopah in 1904 to work as a mining broker and engineer. He later became involved in highway associations to promote western roads. Between 1926 and 1952, he served in the legislature as an assemblyman from Nye County.³¹ In the legislature and elsewhere, he was an early proponent of Nevada's remote and scenic locales as potential destinations for tourism.

With the decline of mining in Tonopah and Goldfield, Boak recognized that Nevada could benefit from tourism. A national monument, in Boak's view, increased the possibilities for outsider interest in the Silver State that broadened the divorce industry already putting Reno on the national map.³² The state engineer, James Scrugham, agreed with Boak and argued that the new highway system provided reason to "exploit the caves" in a campaign Scrugham later described as "See Nevada First."³³ After the

³⁰ Thomas Cox, "Before the Casino," 340-41; Rothman, "Second-Class Sites," 45; Shaffer, *See America First*, 26. Shaffer points to the first "See American First Conference" in 1906 as a transformative point when boosters began arguing for the American public to see America's history and scenic wonders prior to touring Europe.

³¹ A republican for Nye County, Nevada, Boak served from 1926-1930; 1934-1938; 1940-1952. In his final term he was the oldest male assembly member at the time. He died in 1954.

³² The singer, William Thomas "Billy" Murray's song "I'm on My Way to Reno" (1910) helped to popularize Reno as a destination for divorce seekers.

³³ "See Nevada First" was Governor Scrugham's attempt to bring tourists into Nevada with new road systems to see the state's scenic wonders. "See Nevada First" was adopted from the "See America First" campaigns to encourage Americans to tour the U.S. instead of Europe, especially the West. Cox, "Before the Casino," 339, 340; Nevada Department of Highways, *Biennial Report, 1921-1922* (Carson City, 1923),

Lincoln Highway Association identified the transcontinental auto-route across Nevada in 1913, a flurry of new proposals sprouted to attract tourists and other travelers.

The construction of the Lincoln Highway was a major step in the promotion of Nevada tourism. On September 12, 1912, an entrepreneur named Carl Fisher hosted a dinner party for the leaders of the new and promising automobile industry in America. He proposed a coast-to-coast graveled auto route financed by the industry's leaders, which he estimated would cost ten million dollars. Henry Joy, president of Packard Motor Car Company in Detroit, recognized the potential opportunities of the project for the automobile industry. Joy led a "sophisticated public relations campaign to promote the highway." He argued that "it was the patriotic thing to do."³⁴ On September 14, 1913, the first official route was publically proposed in the Lincoln Highway Association's "Appeal to Patriots" that spread throughout newspapers in the country "as an expression of the national desire to bind the country from east to west."³⁵

Two problems emerged immediately. One, the project would cost one hundred times the initial proposal of 10 million dollars. Road-building costs presented particular problems in states west of the Rocky Mountains because of sparse settlement and

p. 104; Nevada Department of Highways, *Biennial Report, 1923-1924* (Carson City, 1925), 8, 9; Nevada Department of Highways, *Biennial Report, 1925-1926* (Carson City, 1927), 8; *Ely Daily Times*, April 25, 29, May 4, June 24, 1921; F. A. Lehenbauer to Scrugham, Box 5/2, Fish and Game Refuges File (1925), Scrugham Executive Records, Nevada State Archives, Carson City, Nevada. Marguerite S Shaffer, *See America First*, 26-39; Anne Farrar Hyde, *An American Vision: Far Western Landscape and National Culture, 1820-1920* (New York: New York University Press, 1990). Anne Hyde lays the foundations for Shaffer's work. Hyde details how American tourists first imagined the American West as an American Europe that would later begin to develop its own national identity. "See America First" was born out of this transition.

³⁴ Gregory M. Franzwa and Jesse G. Petersen, *The Lincoln Highway: Nevada* (Tucson: The Patrice Press, 2004), ix, x.

³⁵ Drake Hokanson, *The Lincoln Highway: Main Street across America* (Iowa City: University of Iowa Press, 1988), 15, xvi.

insufficient tax bases to help fund projects throughout the empty regions.³⁶ A second problem had to do with the route. From coast to coast, the Lincoln Highway was a patchwork of existing roads—some better than others. One of the most difficult decisions for the routing of the highway was the section through western Utah and Nevada.

Historian Pete Davies referred to the Utah and Nevada section as “the thorniest problem.”³⁷ The Lincoln Highway Commission confronted three options. One, the route could go through Ogden, north of Salt Lake City and follow the Humboldt River. Two, the route could go through Salt Lake City, then head across seventy miles of the most arid environment in North America and reconnect to the Humboldt River. Options one and two cut off a reasonable connection to Los Angeles. Three, the route could go through Salt Lake City and veer southwest along the old Pony Express Trail and then turn south to Ely, Nevada. This route offered a connection to San Francisco and Los Angeles, but numerous mountain passes would have to be engineered where wagon roads still dominated travel along the central transect of the state.³⁸ The route through Ely, Nevada became the official Lincoln Highway, but building the road required extensive funding.

During and after World War I, the future of Nevada’s economy was precarious. The early twentieth century mining boom had run its course and the population of the state fell to 77,407—down from its 1910 high of 81,875, despite wartime markets for agriculture, wool, mutton, and beef production. In 1918, Professor Romanzo Adams of the University of Nevada, argued that the tax problem in the state was a product of its settlement patterns. Nevada remained a state with “a very small and unstable population”

³⁶ Franzwa, *The Lincoln Highway: Nevada*, x.

³⁷ Pete Davies, *American Road: The Story of an Epic Transcontinental Journey at the Dawn of the Motor Age* (New York: Henry Holt and Company, 2002), 154.

³⁸ Davies, 154-55

dependent on “industrial development that lacks diversification,” which was in turn supported by limited “agricultural lands...in large holdings.”³⁹ With regard to Nevada’s mining industry, Adams showed that taxes levied on “net” mining proceeds allowed mining magnates to hide substantial profits behind exaggerated operating costs. He also pointed to the unequal distribution of property in the state where the ranching industry secured monopolies on the open range through the control of valuable water sources. The monopolization of water sources—and by extension grazing lands—stymied population growth and the expansion of crop agriculture. Adams considered mining taxes and the monopolization of rangelands and property as the fundamental taxation “misfits” crippling Nevada’s ability to raise revenue and attract a settler population.⁴⁰

An additional factor arising from an inadequate tax base and poorly distributed property, according to Adams, was a migratory workforce that did not invest in local economies. Adams’ work in school and tax reform as well as his critique of the larger ranching structure of Nevada’s stock raising industry made him a key figure among Nevada progressives in the first two decades of the twentieth century. Another key figure in Nevada progressivism was Renoite Anne Martin who led the state’s battle for women’s suffrage—achieved in 1914. Later, she was a candidate for the U.S. Senate in 1916 and 1920.⁴¹ In 1922, Martin turned her attention to some of Nevada’s perennial problems in *The Nation Magazine* with an article titled “Nevada: Beautiful Desert of Buried Hopes.” She lamented Nevada settlement patterns, “...in no other State is there such concentration of land ownership in a few families, or are there so few farmers. In no

³⁹ Romanzo Adams, *Taxation in Nevada: A History* (Carson City: State Printing Office, 1918), 18.

⁴⁰ Adams, x.

⁴¹ Anne Bail Howard, *The Long Campaign: A Biography of Anne Martin* (Reno: University of Nevada Press, 1985).

other State is the average size of farms, and the average number of cattle or sheep on each farm, so large. And in no other State are there so many migratory farm workers in proportion to the number of farms.”⁴² The lack of an adequate tax base and a migratory work force, according to social progressives, stunted the growth of Nevada.

While Progressives were adept at pointing out the problems of settling and developing Nevada, a solution was more problematic. For social progressives, Nevada’s politics were suspect because they had been fashioned by decades of mining and ranching oligarchies.⁴³ At the beginning of the 1920s, the figure of George Wingfield loomed as the chief arbiter of Nevada and the king-pin in its power structure. Historian, C. Elizabeth Raymond pointed out that “some people claimed he owned his adopted state” and “perhaps ran *both* of its political parties to suit his own purposes.”⁴⁴ Wingfield was heavily invested in ranching and mining, controlled Nevada’s banks, and influenced

⁴² Anne Martin, “Nevada: Beautiful Desert of Buried Hopes” *The Nation*, 115, 2977 (July 26, 1922), 91; Anne Martin specifically referred to an earlier publication of Romanzo Adams, “Public Range Lands—A New Policy Needed” *American Journal of Sociology*, 22, 3 (November, 1916), 324-351.

⁴³ Jeanne Wier, a founder of the Nevada Historical Society, was critical of mining’s influence on settlement. The slowness of settlement in Nevada, Wier asserted, attracted speculators in a desert where mining preceded agriculture, which stunted its political wherewithal. According to Wier, Nevada was caught in its nascent political system constructed out of mining interests. She expressed this condition soon after the Nevada Historical Society formed: “Unfortunate has it been for Nevada that its youth was spent, not under the open skies in closest contact with even the desert soil, but in the deeps of the darksome mines.” Jeanne Wier, “The Mission of the State Historical Society,” *State of Nevada: First Biennial Report of the Nevada Historical Society 1907-1908* (Carson City: State Printer, 1909), 62; James T. Stensvaag, “The Life of My Child: Jeanne Elizabeth Wier, The Nevada Historical Society, and the Great Quarters Struggle of the 1920s,” *Nevada Historical Society Quarterly*, 23, 1 (Spring 1980), 17. Jeanne Wier became part of Nevada’s social progressives who were “*Upbuilders*” in the Silver State. While the mining booms doubled Nevada’s population by 1910 and provided some prosperity, social progressives, such as Sam Doten of the university’s agricultural extension, cautioned that the participants in the mining industry “were not settlers.” Doten continued: “They did not intend to stay. They meant to make a fortune and get out.”⁴³ To combat these uncertainties of settlement during the first decades of the twentieth century, Nevada’s social progressives pointed to an endemic problem where colonizers cared little for settlement. The mining industry, they pointed out colonized without concern for sustaining their instant towns in precarious locations. Samuel Bradford Doten, *An Illustrated History of the University of Nevada* (Reno: The University of Nevada, 1924), 74; William D. Rowley, “People of Good Hope in the Land of Nod,” *Nevada Historical Society Quarterly*, 42, 1 (Spring 1999), 7.

⁴⁴ C. Elizabeth Raymond, *George Wingfield: Owner and Operator of Nevada* (Reno: University of Nevada Press, 1992), 1.

politics. Regardless of the apparent failure of reform in Nevada as seen in the growing power of Wingfield over state government and economic legislation, the federal government became a source of funding for Nevada roads and hence tourism.

The federal government compensated Nevada for its extensive public domain and national forest lands as sparsely settled counties struggled to create revenue for basic services. For example, the Federal Aid Road Act of 1916 allowed for a dollar-matching plan in states with an operating highway department. Prior to the act, the state of Nevada had only once invested in a road system. Governor Tasker L. Oddie proposed a good highways movement in 1911 using revenue from tourist travel and labor from convicts. The experiment was largely unsuccessful and after 1913 the legislature no longer allocated funding for the project.⁴⁵

The 1916 Federal Aid Road Act stipulated that states have a highway department to manage their road systems. In 1917, these requirements motivated Governor Boyle and Senator Tasker Oddie to organize the Nevada Department of Highways. Matching funds and a highway department provided the foundations for road building, but it was not until the 1921 Federal Aid Highway Act that Nevada engaged in serious efforts to expand its highway system. The new law, “included a matching formula which gave an advantage to states where unappropriated and unreserved public domain exceeded 5 percent of the total area.” Nevada had no problem meeting the requirements and paid only 16.32 cents to the federal dollar spent on roads in the Silver State.⁴⁶

⁴⁵ Russell R. Elliott, *History of Nevada* (Lincoln: University of Nebraska Press, 1987), 263. Pete Davies, *American Road*, 179.

⁴⁶ Elliott, *History of Nevada*, 264.

The 1916 act followed the persistent trend of allocating federal monies critical to bring remote western spaces into closer contact with the rest of the nation. This time, as opposed to train travel, the new technology was the automobile which offered not only greater liberty for the individual but also new market possibilities. Distance was a long-standing obstacle to the integration of rural spaces and market economies, especially in the West. With nearly ninety percent of the land federally owned in Nevada, the state eagerly accepted and advocated for any type of funds to be applied to highways.⁴⁷

In 1919, road systems across the nation were deplorable, especially in western states. In this year, the U. S. Army commissioned the first convoy across the country from Washington D.C. to San Francisco. The convoy, consisting of more than 80 vehicles, 24 officers, and 258 enlisted men, traveled along the established route of the Lincoln Highway. It was a spectacularly difficult journey where the under-developed roads were equaled only by mechanical failures and logistical problems. A young Lieutenant Colonel named Dwight D. Eisenhower, who volunteered for the assignment, described the first half of the trip as “easily overcome”; but after Nebraska the trip proved otherwise. “From Orr’s Ranch, Utah, to Carson City, Nevada, the road was one

⁴⁷ In addition to federal road building acts, the U.S. Government established the Payments in Lieu of Taxes Program to offset taxes lost to local and county governments for federal land holdings. The Forests Service began this program after passage of the Agricultural Appropriation Act on June 30, 1906 and began returning a portion of revenue gained from grazing fees and timber sales. The first year of its enactment few National Forests had been created in Nevada and even fewer were still not collecting grazing fees. Nevada received only 24 dollars the first year, but benefitted the following years. “Profits from Forest Reserves to be Shared by Counties,” *Forestry and Irrigation*, XII, 7 (July 1906), 341-342. In 1908, the program extended to counties for tax revenues lost because of the public domain. Stanford, Spatial History Project (CESTA), Follow the Money, <http://followthemoney.stanford.edu/pages/PILT.html>. In addition, the state of Nevada raised funds with a poll tax after 1914, license fees, and revenue taxes from para mutual racing.

succession of dust, ruts, pits, and holes,” complained Eisenhower.⁴⁸ The initial impetus for building a cross-country road foundered on difficulties unforeseen by Carl Fisher when, in 1913, he imagined a well-constructed road connecting the nation for the 1915 Panama Pacific World Fair in San Francisco. By the time Lehman Caves became a national monument in 1922, sections of the road system envisioned by Carl Fisher still had not been improved.

In the 1920s, the automobile and new road systems started to open previously isolated parts of Nevada to visitors. In 1923, when James Scrugham became governor, he quickly set to taking advantage of federal funds to build a road system in the state. During the governor’s four-year term, he directed funds to create, “nearly one thousand miles of highway.”⁴⁹ Highways and auto-touring allowed tourists to directly experience “the people, the places, and the history that made America unique,” according to Margaritte Shaffer in her book, *See America First*. Tourism and a new emphasis on national identity in America suggested that the automobile liberated the tourist from what had been a prescribed and commercialized experience. She writes: “Transcontinental automobile touring allowed tourists to move beyond the passive act of viewing the landscape to actually experience both history and nature. This allowed for the complete reconceptualization of the tourist experience.”⁵⁰ Specifically, a national road system, with spur routes off state highways, offered the tourist more flexibility to discover an America

⁴⁸ Sarah Laskow, “Eisenhower and History’s Worst Cross-Country Road Trip” (Atlas Obscura, Aug. 24, 2015); Also see Pete Davies, *American Road*.

⁴⁹ Cox, “Before the Casino,” 340.

⁵⁰ Shaffer, *See America First*, 153, 132.

previously inaccessible on prescribed routes dominated by train, stage, or even the national park concessioner.⁵¹

Cada Boak was an avid participant in the new auto age. In 1921, Boak “heard vague rumors of caves” in the southern Snake Range. The caretakers of the caves, Clarence and Beatrice Rhodes, who owned Cave Ranch since 1920, led tours through the caverns and assisted Boak when he arrived to photograph its limestone formations. In the process, he recognized a site worthy of monument status.⁵² Impressed by his visit, Boak promptly brought the caves to the attention of the Park Service Director, Stephen Mather. He then informed his friend Nevada Senator Tasker Oddie, who also wrote to Mather vouching for Boak’s, “highest character, ability, and integrity.” Park service officials reviewed the proposal and “reacted favorably,” but pointed out that the caves were within a national forest and under the jurisdiction of the Forest Service.⁵³

As circumstances would have it, the Secretary of Agriculture, Henry C. Wallace was a long-time friend of the Boak family in Iowa and he responded to Boak’s interest in Lehman Caves. Secretary Wallace requested forest supervisor Alexander McQueen to confirm the significance of the caves.⁵⁴ These events instigated a flurry of communications between politicians and foresters to establish a national monument in the Snake Range of Nevada’s remote outback. Leon Kneipp, Acting Forester, wrote to the

⁵¹ Mark Daniel Barringer, *Selling Yellowstone: Capitalism and the Construction of Nature* (Lawrence: University Press of Kansas, 2002), 6.

⁵² Unrau, *Basin and Range*, 324-325. Boak took with him “several Five [sic] hundred candle power gasoline lanterns” and made “frequent quite lengthy illuminations with magnesium.” The caves, Boak concluded, “as a whole far surpass my expectations...and I believe when fully explored and a little more work done so as to make additional chambers and caverns easy of access, that they will rank with any of the better known caves in the United States.” Boak to Davis, November 24, 1923, Cada C. Boak Collection, Nevada Historical Society, Reno.

⁵³ Unrau, *Basin and Range*, 328.

⁵⁴ Darwin Lambert, *Great Basin Drama*, 75-77.

Secretary of Agriculture on January 18, 1922, describing large caves, “of considerable interest both from a scenic and scientific standpoint.” Kneipp recommended that the caves be “adequately protected” under the Antiquities Act and that the “proposed national monument shall cover an area of approximately 593 acres....”⁵⁵ Secretary Wallace recommended the “scenic and scientific” importance of the caves to President Warren G. Harding on January 21, 1922.⁵⁶ Two days later, President Harding proclaimed the Lehman Caves National Monument.

Boak wasted little time promoting Lehman Caves as a site to visit for travelers on the complex of underdeveloped roads along or near Nevada’s timber belt. These roads included the Roosevelt Midland Trail (Highway 6), Grand Central Highway (Highway 50 from Ely to Delta, Utah), and Lincoln Highway, which roughly followed today’s Highway 50 from Reno to Ely, then turned northeast along the old Pony Express Route toward Salt Lake City. To boost interest in the monument, Boak, in consultation with W. G. Scott, Chairman of the Division of National Parks in the National Highways Association, entertained the idea of changing the name from Lehman Caves to Roosevelt Caverns or Roosevelt Grottos to ensure tourist interest and firmly establish the caves as a worthy destination for travelers through Nevada.⁵⁷

Forest Supervisor Alexander McQueen quickly contravened the suggestion, stating that the “locals” understood the connection to Roosevelt, but preferred to honor “Mr. Lehman, who spent considerable time and means in opening up the cave and

⁵⁵ Leon Kneipp to Secretary of Agriculture, January 18, 1922, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁵⁶ Henry C. Wallace to President Harding, January 21, 1922, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁵⁷ W. G. Scott to C. C. Boak, June, 27, 1922, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

making it possible for the public to view it.” There was also the fact “that it has been known as Lehman Cave for the past forty odd years.”⁵⁸ Soon after, preparations for the dedication on August 6, 1922 began. The Forest Service invited Boak to help organize and advertise the ceremony. He sent letters to the President, the secretaries of Agriculture and Interior, the Director of the National Park Service, the state’s governor, senators, congressmen, and more. Boak must have felt some anxiety about the dedication ceremony in such a remote place. In early August of 1922, he polished his “new Franklin ‘til it shone” in preparation for the 260-mile journey from Tonopah to the caves.⁵⁹

On August 4, Boak and his wife, Grace, “bedecked” themselves “in the niftiest of auto traveling apparel.” They departed Tonopah and headed along the Roosevelt Midland Trail (present-day Highway 6 at the southern end of the timber belt in Nye County). They did not get far when a “wanderer” appeared in the desert. The stranger explained to Boak, “we are stuck in a mud-hole...won’t you please run down and pull us out?” Boak agreed and found the stranger’s “flivver” stuck in the mud. He helped the travelers pull their cheap and flimsy vehicle (flivver) from the mud hole and boasted to Grace: “We were wise on the roads” and there would be “no mud holes for us.” After thirty miles of “trackless road” they came to a “dry lake covered in water.” Boak, despite his earlier warning, proceeded and was promptly stuck. He claimed to know the road, but admitted, “I did not know where it was—and I forgot to bring our diving suits.... We plunged in, but the poor car could not swim.”⁶⁰

⁵⁸ Alexander McQueen to C. C. Boak, July 17, 1922, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁵⁹ Cada Boak, “Dedication of Lehman Caves National Monument: Ascent and Perilous Descent of Mount Wheeler, August 1922,” *Nevada Historical Society Quarterly*, XVI, 2 (Summer 1973), 102.

⁶⁰ Boak, 103.

Stuck in the saturated playa, Cada left Grace with the car and walked to a ranch in the next basin, but as is common in Nevada he forgot about an additional basin remained between him and his destination. The distance was too great and he returned to the automobile. On his return, he found next to the Lincoln another “ever-present flivver.” Boak exclaimed that the vehicle was “stuck stucker than we were.” Late in the afternoon, a touring car from Washington D. C. drove up and pulled both vehicles out of the mud. The two travelers, muddy, wet, and exhausted, decided to camp for the night on the basin floor. The next day they arrived at Ely where the Lincoln and Grand Central Highways intersected. They pressed on to Baker along the Grand Central Highway where the festivities for the opening ceremonies were set to begin.⁶¹

Forestry officers Supervisor McQueen and Ranger Graham S. Quate, received the Boaks upon their arrival to Baker. They promptly made plans for the dedication ceremonies. The evening was attended by a significant affair as “hundreds” of people descended into the small town of Baker for an evening dance. Boak remembered “senators, congressmen, and officials and near officials—for it was just before the primaries—mingled with cowboys and cowgirls in chaps and riding apparel—they all danced.” The next day “eighty-six fine, large autos, carrying 428 persons had arrived at the little park of cedars and pinions near the caves.” Forest Supervisor McQueen presided and State Engineer, James Scrugham delivered the dedication speech. After the dedication, Cada and Grace joined Supervisor McQueen and three others on a two-day horseback excursion to the top of Wheeler Peak. The trip proved an adventure and an end

⁶¹ Boak, 104.

to Boak's "thrilling journey" to the new monument.⁶²

Managing the National Monument

While national monuments could be created with relative ease by Presidential proclamation, new monuments often came with complications. The original boundaries of Lehman Caves National Monument covered 593.03 acres. Within the monument boundaries was the homestead of Clarence and Beatrice Rhodes. The Rhodes' land holdings amounted to 46.97 acres and included the original opening of the cave entrance. At the request of Governor James Scrugham in 1924, they deeded 0.688 of an acre at the entrance of the caves to the state of Nevada. The monument, Rhodes' property, and entrance to the caves were within the boundaries of the Nevada National Forest. The Forest Service, as a result, was in charge of managing the monument.⁶³

Long before the neon lights came to Reno or Las Vegas, James Scrugham looked to tourism as an economic boost for Nevada. Elected in November 1922, he had been born in 1880 in Lexington, Kentucky and educated at the University of Kentucky as a mechanical engineer. Scrugham made a career in academics. From 1903 to 1914, he was a professor of mechanical engineering at the University of Nevada, Reno and then dean of the mining and engineering school. Between 1917 and 1923, he served as state engineer. He then served one term as Governor and in 1926 lost reelection. Following his loss, for the next six years, he worked as the editor of the *Nevada State Journal* and as an advisor to the Secretary of Interior on Colorado River water projects. He returned to

⁶² Boak, 105-106.

⁶³ Unrau, *Basin and Range*, 329, 332. The Rhodes donated the property on October 20, 1924. They continued to manage the cave, charge an entry fee, and make improvements. Their homestead had an alfalfa field, orchard, thirty cows, and accommodations for tourists.

politics from 1933 to 1942 to serve as a Democrat in the House of Representatives for Nevada. Between 1942 and 1945 he represented the Silver State as a U.S. Senator. His legacy remains a diverse collage of interests and occupations. One of his earliest interests was to connect Nevada to the “See America First” campaign that swept across the nation when roads brought the auto-tourist into the Nevada outback.⁶⁴

Scrugham was part of a limited, but widespread movement to create state parks. Historian, Thomas Cox writes, “Scrugham and his contemporaries who pushed for state parks represented not only a regional echo of the national movement for state parks..., but also were harbingers of regional conservationists yet to come.” Cox added that Scrugham set the stage for conflicts over land use that occurred over and over in the intermountain region west. Although Scrugham supported ranching and mining, he understood, and also supported, preservation ideas that carried the possibility of conflict with mining and ranching interests.⁶⁵

Scrugham’s focus on the possibility of Nevada tourism began while he was state engineer, if not earlier. He promoted state parks as early as 1919, when Park Service Director Stephen Mather began lobbying for a highway system connecting the West in a giant loop for automobile touring. Scrugham recognized Nevada’s potential role in this loop and identified possible national park locations such as the southern Snake Range and Lamoille Canyon in the Ruby Mountains. In 1921, former forest supervisor and secretary for the Nevada Livestock Association Vernon Metcalf immediately found Scrugham’s interests in national and state parks suspect.⁶⁶

⁶⁴ Cox, “Before the Casinos,” 340-41.

⁶⁵ Cox, 333-34.

⁶⁶ Cox, 336-37

Metcalf, who defended the customs of the cattlemen in the state, warned Scrugham of the dangers of “withdrawing land for ‘sentimental’ rather than utilitarian purposes.” Thomas Cox explains the disagreement, “Metcalf objected especially to the withdrawal of mountain areas, noting Nevada’s shortage of summer as compared to winter range.” According to Metcalf, recreation areas in Nevada were “a joke.” He believed public campgrounds were not an experience into nature, but a well-traveled annoyance. He added that Nevadans, “have the whole outside world to recreate in and most of us, I am sure, prefer to do our vacationing back in the less traveled regions, rather far from public campgrounds.”⁶⁷ For Metcalf, the combined efforts of the Forest Service, grazing, and timber industries already offered a place to recreate without crowds funneled into one location disrupting the balance of shared forest users.⁶⁸

Scrugham was not swayed by Metcalf’s arguments. In September of 1922, Scrugham sent a letter to Mather requesting funds to manage, or at least curate, the new national monument. He stipulated: “If no one is left to guard the caves it is possible that vandals may do almost irreparable damage therein.”⁶⁹ The Department of Interior referred his letter to the Department of Agriculture. Leon Kneipp, Assistant Chief Forester, responded: “Congress has made no appropriations for the special care of these caves and, therefore, the Forest Service is not in a position to do much in the way of improving them.”⁷⁰ Although Kneipp supported the creation of the national monument, it

⁶⁷ Cox, 337.

⁶⁸ Metcalf’s argument has subtle hints for what would later become the Wilderness Act of 1964, which brought environmentalists and utilitarian forest grazing together in Nevada.

⁶⁹ J. G. Scrugham to Stephen Mather, September 21, 1922, L-Boundaries, Nevada, Lehman Caves, RG 95, National Archives and Records Administration, San Bruno, California.

⁷⁰ L. F. Kneipp to J. G. Scrugham, September 27, 1922, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

was clear that the caves would not be a priority for forestry personnel to manage. The dismissal of the caves, and his request for that matter, concerned Scrugham.

In 1923, the *Reno Evening Gazette* reported that, James Scrugham, now Governor, signed Nevada Assembly Bill 104, which authorized him, “to create game refuges by proclamation.”⁷¹ Historian of state parks Ney Landrum points to an “enlightened leadership” in Nevada that took hold under the direction of Governor Scrugham. This leadership according to Landrum, “recognized that modern improvements in transportation and other facilities would increase tourism and create a demand for access to the state’s scenic areas.” Within two years in office, Governor Scrugham proclaimed fifteen “state recreational grounds and game refuges.”⁷² After the passage of Assembly Bill 104, Scrugham focused on Lehman Caves and on July 20, 1923 he established the Lehman State Recreation Ground and Game Refuge. According to National Park Historian Harlan Unrau, the refuge “was a cooperative venture between the Forest Service and state wildlife officials” to prohibit hunting “in an effort to encourage the growth of the mule deer population.”⁷³ Due to Governor’s Scrugham’s interest in tourism, he was clearly interested in developing the recreation and game refuge for more than a mule deer breeding ground.

In June of 1924, Senator Key Pittman with support and encouragement from Scrugham and Boak, proposed a national park in the southern Snake Range above

⁷¹ “Scrugham Signs Many New Laws,” *Reno Evening Gazette*, March 6, 1923.

⁷² Ney C. Landrum, *The State Park Movement in America: A Critical Review* (Columbia: University of Missouri Press, 2004), 103. All fifteen proclaimed recreation and refuge sites included the game refuge designation, except for Cathedral Gorge.

⁷³ Unrau, *Basin and Range*, 266. The recreation and game refuge grounds did not necessarily conflict with federal land management agencies. For example, many forest rangers were already deputized game wardens for the state of Nevada and the Forest Service had already been protecting the wildlife as deputy wardens for several years.

Lehman Caves National Monument that included Wheeler Peak. The proposal was met with strong opposition from local graziers and the Nevada Livestock Association. Vernon Metcalf, representing the Nevada Livestock Association, pointed out that “grazing permits are not issued for national parks, which in this instance would work a hardship on local stockmen...requiring them to seek new grazing grounds for their herds, which cannot be found in eastern Nevada.” Pittman consented to the interests of the stockmen and the bill failed.⁷⁴

Scrugham turned his attention to improving and developing the state recreation ground, proclaimed a year earlier. He returned to the monument in early July of 1924 and “secured horses and worked his way back into the far reaches of Mount Wheeler.” The *Ely Record* reported that Governor Scrugham believed the recreation area in the Nevada National Forest to be “equal, if not superior, to the Yellowstone park.” Despite Scrugham’s enthusiasm for recreational grounds in the Snake Range of eastern Nevada, the *Ely Record* went on to suggest:

The facts are that the beauty of the caves and the grandeur of the scenery around Mount Wheeler, which is the highest peak in the state, and containing the only glacier in Nevada, are not appreciated even by the local people, hundreds of whom have not even visited the caves. If the scenic features were located in California, they would long ago have been advertised world-wide, because the people of California make a specialty of capitalizing all such attractions, and they have found that such publicity brings splendid results in attracting tourists.

Scrugham returned in August to the caves along with Peter Frandsen and B. F.

Schappelle, biologist and linguist from the University of Nevada, to investigate the

⁷⁴ *Ely Record*, June 13, 1924; Unrau, *Basin and Range*, 368.

additional caves surrounding the area and uncover artifacts, burial grounds, and other evidence of prehistoric peoples.⁷⁵

If the Forest Service was not going to improve Nevada's only national monument, Scrugham clearly had plans for the state to invest in the caves as part of a larger statewide effort to create recreation areas and game refuges. In August, 1924, Governor Scrugham opened discussions about recreation throughout Nevada on Forest Service lands where the mountains offered the most scenic and diverse opportunities for tourists. He wrote to Colonel W. B. Greeley, Chief of the Forest Service, declaring: "The State of Nevada desires to develop a system of State Recreation Grounds, acting in conjunction with the U. S. Forest Service." Scrugham went on to explain: "One of the most favorable areas in Nevada is the Lehman Caves district in White Pine County." He also pointed out that within a mile of the Monument additional other caves had "writings" and "relics" left by a "prehistoric race."⁷⁶

With the help of Governor Scrugham, the state of Nevada paid for excavation and experts to examine the writings and artifacts in the newly discovered caves (Baker Caves) near the National Monument. The excavation team uncovered a stone mortar, deer skin mask, pottery, and a burial cave. These findings piqued the interest of Forest Supervisor Charles Beam (successor to Alexander McQueen who had transferred to the Humboldt National Forest headquartered in Elko). Supervisor Beam wrote to the District Forester in Ogden, Utah that the state of Nevada supplied money for developing the area including \$200 for excavation at the new caves and \$1200 for a "bath house" (restroom and water

⁷⁵ *Ely Record*, July 4, 1924; Unrau, *Basin and Range*, 369-370.

⁷⁶ J. G. Scrugham to Col. W. B. Greeley, Aug. 14, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

storage facility) near the Lehman Caves entrance. Although pleased with these improvements, Supervisor Beam soon found Scrugham's continued support for tourism in Nevada's scenic places a nuisance.⁷⁷

Governor Scrugham made at least three trips to the southern Snake Range in July and August of 1924. On his third trip he brought the state geologist, J. C. Jones, civil engineer, C. McQuiddy, and Alan LeBaron, an archaeologist for the *San Francisco Examiner* and arranged for the findings to appear in the Sunday edition of the California based Hearst-owned newspapers. He consulted with "Hotel men" to build modern accommodations for tourists and arranged for the Nevada Fish and Game to stock the streams and lakes with an "abundance of fish."⁷⁸ After October 20, 1924, these arrangements were within Scrugham's grasp, especially after arranging for the State to acquire a 0.688 acre section of the original entrance of Lehman Caves at Cave Rancho where Clarence and Beatrice Rhodes owned approximately 46 acres within the boundaries of the National Monument. In his enthusiasm, Scrugham over-extended his reach when he approached the Forest Service to build a road from the National Monument to the upper lakes of the Snake Range near Wheeler Peak.

The following September, Supervisor Beam, who began to express concern over Scrugham's interest in building a road into the National Forest, wrote to the district supervisor in Ogden that nothing additional had been found in the shallow cave (west of Lehman Caves). He asserted that there was little more to offer than "ancient writings

⁷⁷ Charles A. Beam to District Supervisor, Sept. 18, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California. Governor Scrugham made at least three trips to the southern Snake Range in July and August of 1924.

⁷⁸ Charles A. Beam to District Supervisor, Sept. 18, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

which to the average person means but very little, since they are not understandable.” He admitted that Lehman Caves had increased in popularity from 200 visitors in 1920 to 1500 by September in 1924, which “really was the greatest attraction in the area” and serviced by a “perfectly adequate road.” Beam’s observation that the writings were not “understandable” illustrated the utilitarian mind-set of Forest Service personnel with little understanding of cultural resources.⁷⁹

Beam’s annoyance grew when Governor Scrugham suggested that a road be built to the upper lakes of Lehman Creek for the enjoyment of tourists. When it came to further road building into the Wheeler Peak area behind the caves, Beam began to balk at the governor’s interest in tourism. A road project threatened critical summer grazing allotments. Supervisor Beam recommended an expansion of the National Monument boundaries, but continued to challenge Scrugham’s assertion that the southern Snake Range offered more than Lehman Caves for the tourist to visit. Despite Scrugham’s efforts to promote Nevada’s scenic and recreational opportunities, the Forest Service maintained control of the prime summer grazing offered by the southern Snake Range and circumvented any additional investments by the state of Nevada into the National Forest.⁸⁰

In October of 1924, Governor Scrugham, tired of the Forest Service’s lack of enthusiasm for his proposals for a park and recreation facilities in the Southern Snake Range, sent letters to both William Spry, Commissioner of the General Land Office and Colonel W. B. Greeley, Chief of the Forest Service, declaring that he wanted to set aside

⁷⁹ Charles A. Beam to District Supervisor, Sept. 18, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁸⁰ Charles A. Beam to District Supervisor, Aug. 22, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

a number of areas on federal land to preserve “from damage and as a tourist attraction.” According to Scrugham, and in consultation with lawyers, he had constitutional basis to set “aside a number of these areas as state reservations so that we [State of Nevada] may exercise police authority thereon.”⁸¹ Similar to the Stock Watering Act of 1925, the police powers of the state became a centerpiece for Governor Scrugham’s efforts to wrest from federal control portions of the public domain lands and national forests. Under the Tenth Amendment to the U.S. Constitution, the police powers of the state provided the governor the ability to protect the health, well-being, safety, and morality of its citizens when deemed appropriate.⁸² The governor saw a cultural resource in danger and recreational opportunities denied to the citizens of Nevada. Clearly, the governor used these powers for the protection of aesthetic and cultural resources as well and did not believe their application to conflict significantly with the interests of the state’s livestock operators.

In a place that had recently undergone transitions where federal land managers favored livestock grazing regulations, Scrugham faced an uphill battle to create a recreation site that threatened stock operators in Forest Service grazing lands. In the 1920s, graziers resisted tourism in eastern Nevada and the Forest Service supported grazing interests. In this way, the Forest Service jealously guarded its established relationship with the ranching community.

Beam’s course of action, to deny further developments for tourists, suggests his concern for the alliance with ranchers in the Nevada National Forest—a tenuous

⁸¹ J. G. Scrugham to William Spry and Col. W. B. Greeley, October 2, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁸² Tenth Amendment to the U.S. Constitution.

relationship, difficult to establish, and maintain. For example, he favorably commented about Wheeler Peak's recreational attractions, but he maintained that the area had little to offer tourists beyond the National Monument. He wrote, "I cannot help but feel that Governor Scrugham is somewhat over enthusiastic in regards to the Lehman Creek Road and Lehman Caves." Beam referred to the roads that Governor Scrugham thought necessary to bring tourists to the upper reaches of Wheeler Peak—the centerpiece of the proposed national park. Beam continued, "I am certain that this area can never compare favorably with Yellowstone or Yosemite Parks as was stated by the Governor in his letter of recent date addressed the County Commissioners of White Pine County."⁸³

Supervisor Beam recommended that the national monument boundaries be extended, but emphasized that the Forest Service remain managers of the monument to ensure grazing rights continue for the local economy. Beam asserted that the local land users agreed with the Forest Service. They were, after all, the people who would lose out on a change in land designation, or more specifically, a transfer of the land to a different authority—a state park or the National Park Service. By the 1920s, the Forest Service had developed a delicate relationship with resource users on lands under its administration. Clearly the local Forest Service officers did not want to "rock the boat" by entertaining new users for these lands that might threaten their grazing clientele.

Supervisor Beam explained that the Governor of Nevada intended to create state parks in the area of Lehman Caves, "which would, of course place the park under the control of the state, which, in my [Forest Service] judgement, would materially interfere

⁸³ Charles A. Beam to District Supervisor, Sept. 18, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

with the proper administration of the National Forest.”⁸⁴ In Beam’s opinion, the forest rangers had enough to contend with on the Nevada National Forest with managing graziers and optimizing the forage output, without having to “ride herd on dudes” interested in the oddities and scenic virtues of nature in a place already short of resources.⁸⁵

Between 1924 and 1925, Governor Scrugham had brief support from Nevada’s U.S. Senator Key Pittman for a national park at Wheeler Peak. Support for the park faded quickly. While Scrugham’s recreation area and game refuge remained, it did little to change Forest Service management. Despite these setbacks, Scrugham’s greatest preservation success came in 1923 when he arranged for the excavation of the Lost City in southern Nevada amidst much talk of a future dam on the lower Colorado River that would flood and destroy this cultural resource. The site proved immensely informative about ancient Puebloan cultures and their far western prehistoric settlements. These efforts by Scrugham, which also included recreation areas, such as the Chloride Cliffs near Beatty, the Valley of Fire, and Cathedral Gorge, led the Secretary of Commerce, Herbert Hoover, to describe the Governor as an “outstanding executive in the western states.”⁸⁶

A Lost Opportunity

⁸⁴ Charles A. Beam to District Forester, December 6, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁸⁵ Charles A. Beam to District Forester, December 6, 1924, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California; Arthur Carhart, *The National Forests*, 21.

⁸⁶ Cox, “Before the Casinos,” 345; Russell Elliott, *History of Nevada* (Lincoln University of Nebraska Press, 1973/1987), 268; Lambert, *Great Basin Drama*, 79-80. In addition, Otto Meeks, who purchased Guy Saval’s Baker Ranch holdings in 1922 came into financial difficulty. Meeks intended to build a dude ranch near the park, but fell into financial trouble by 1924.

Despite the national recognition, when Scrugham came up for reelection in 1926, he lost to Republican Fred Balzar who championed the traditional economic mainstays of the state: railroads, ranching, and mining. Journalist and park advocate Darwin Lambert contends: “In the Nevada election of 1926 Governor Scrugham lost his attempt at reelection, because his opponent kept interpreting interest in scenery, archaeology, highways, and outdoor recreation as neglect of mining and ranching.”⁸⁷ Stockmen in particular were suspicious of the Governor’s attempts to reclassify the lands as multiple-use sites of scenic, cultural, or scientific interest. With the backing of the Nevada power broker, George Wingfield, Balzar became governor and ignored the nascent state park system initiated by Governor Scrugham. With an effective slogan, Balzar declared: “Live cities instead of dead ones.”⁸⁸ Balzar replaced Scrugham and emphasized another type of tourism in the state, based on divorces and gambling after 1931. The new Balzar-Wingfield tourism was urban based and significantly distanced from the scenic and recreational tourism Scrugham envisioned. Balzar promised live cities and ushered in a new form of tourism, specifically gambling, in Reno that provided the basis for a new economic engine in a fledgling railroad town named Las Vegas where a federal dam and later urban-tourism would enter the state in gigantic proportions.

The new roads, most of which were not significantly improved until the late 1920s and 1930s, brought in tourists of a new breed. Nevada’s scenic value continued to lag behind the other economic mainstays that included gamblers and would-be divorcees. Scrugham’s efforts to secure Wheeler Peak as a scenic preserve failed to displace the Forest Service from its management regime. Conversely, his efforts did find some

⁸⁷ Lambert, *Great Basin Drama*, 83.

⁸⁸ Cox, “Before the Casinos,” 346

success, such as the excavation and preservation of the Lost City site and increased attention to Nevada's only national monument, which remained loosely connected to the "See America First" auto tourists. Although connected to both East and West on spur roads stemming from the Lincoln Highway, Lehman Caves National Monument did not draw significant traffic from other national parks and monuments. Other routes assumed greater importance after improvements to Utah's Arrowhead Highway connecting Salt Lake City to Los Angeles and Nevada's Victory Highway, which routed traffic to San Francisco along the Humboldt River route into the Sierra via Truckee Canyon west of Reno. The Lincoln Highway, as a result, lost its influence as a main interconnector through Nevada before it was finished despite a route from Ely to Los Angeles along present day Highway 6 (inspired by the Automobile Club of Southern California).

After Governor Scrugham left office in 1927, White Pine County began to make arrangements to purchase the Rhodes' property at the caves and donate it to the Forest Service for its continued management. After visiting the caves, Major Robert Y. Stuart, fourth Chief of the Forest Service (1928-1933), recognized the value of the caves and he suggested that the Forest Service needed to own the cave entrance. On January 26, 1930, former forest supervisor Charles Beam, now Secretary for the White Pine County Chamber of Mines and Commerce, wrote to the district forester: "The Chamber of Mines and Commerce have the assurance from the County Commissioners of White Pine County that the \$15,000 can be provided by White Pine County for the payment for this property."⁸⁹ White Pine County recognized that the Forest Service had the local interests in mind. In an effort to secure those interests, the county initiated the proposal to

⁸⁹ C. A. Beam to Regional Forester, Jan. 26, 1930, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

purchase the Rhodes property, including the cave entrance, in an effort to maintain the status quo of ranching and mining in the region.

The purchase of the cave entrance set in motion improvements to bring in power lighting, water sources, new facilities, and etc. This news led the paleontologist and conservationist in Berkeley, John C. Merriam, to write Chief Stuart exclaiming that he had been aware of the “cave for many years,” and believed it to be “a feature of considerable interest.” In time, continued Merriam, the cave will be of much interest to “visitors and to scientific men.” He closed his letter stating, “I believe thoroughly in the policy of a former Governor of Nevada [James Scrugham] who felt that in the long run the natural features of interest in Nevada would represent one of its most important assets.”⁹⁰ Merriam applauded the former Governor’s efforts at Lehman Caves and hoped the Forest Service would take his efforts seriously. Scrugham at least placed pressure on the Forest Service to increase efforts to preserve the site and improve access to the National Monument—a tricky and often contradictory balance between utilitarian conservation and the prospects of recreational use.

To purchase the property at the entrance of the caves, the White Pine Chamber of Mines and Commerce secured an option to purchase the Rhodes’ Ranch (formerly Cave Ranche) for \$15,000. The Forest Service would in turn “improve the cave and its approaches and surroundings” and an appropriation might also be “secured to reimburse the purchasers for the expense of securing the privately owned property.”⁹¹ After passing

⁹⁰ John C. Merriam to Major R. Y. Stuart, July 28, 1930, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁹¹ T. S. Shuttleworth (secretary-manager, White Pine Chamber of Mines and Commerce) to Senator Taskar L. Oddie, February 9, 1931, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

the inquiry to Acting Forester Leon Kneipp, Beam informed Nevada U.S. Senator Tasker Oddie that the purchasers (White Pine County) might expect reimbursement, but it was not the “practice of the Federal Government to reimburse purchasers of lands which have been donated to the United States for National Park [Service] purposes.”⁹²

Purchase of the caves did not guarantee the Forest Service’s good faith to fund additional improvements for tourists. As late as 1933, acting Forest Supervisor Ernest Hill (successor to Charles Beam), expressed uncertainty at the White Pine County Chamber of Commerce meeting when he admitted to the District Forester, “I could promise them nothing, but that I was reasonably sure, basing conclusions on past experience, that the Forest Service would put forth its best efforts to develop the Cave and the roads.”⁹³ By July 5, 1933, the acting Forest Supervisor had been “officially and unofficially informed” that the negotiations were complete and that the property had been purchased by the county.⁹⁴ Hill quickly set about preparing plans to improve the caves including the use of the Civilian Conservation Corps to build new facilities, especially a hydro-electric plant and improved roads.⁹⁵ In addition, he traveled to Timpanagos Caves (established in 1922) outside of Salt Lake City to inspect improvements at that national monument. These efforts to improve tourist access to Lehman Caves resulted from increased competition for who could best management the monument, but were part of a

⁹² Leon Kneipp to Hon. Tasker L. Oddie, March 17, 1931, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁹³ Ernest R. Hill to Regional Forester, June 28, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁹⁴ Memorandum for files by Ernest R. Hill, July 5, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

⁹⁵ Memorandum for files by Ernest R. Hill, July 11, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California. A Forest Service CCC camp was located at Berry Creek on the western slope of the Schell Creek Range approximately seventy miles from Lehman Caves.

national land-use planning initiative by the Forest Service, known as the Copeland Report, which emerged as part of the New Deal and emphasized the principle of multiple-use.⁹⁶

By the end of July 1933, the Forest Service moved forward on its plans to build a hydroelectric plant, improve roads into the National Monument, and develop the water supply at the entrance to the caves. Swift action after five years of deliberations were likely in response to two important events: one, a change in executive administration under President Franklin Roosevelt; two, Executive Order 6166, June 10, 1933, which reorganized federal land management agencies. The Executive Order identified fifteen national monuments on Forest Service lands to be reorganized under the umbrella of the National Park Service within the Department of Interior. Lehman Caves National Monument was one of the sites selected for new management.⁹⁷

The National Park Service

The Great Depression and the New Deal brought the mission of the National Park Service to center stage. The Park Service increased its focus on the neglected national monuments, many of which were on Forest Service lands. When Franklin Delano Roosevelt assumed the presidency on March 4, 1933, the nation was in the depths of the Great Depression. He immediately announced a New Deal that included relief, recovery, and reform programs that focused on economic initiatives to revive both industry and agriculture. The New Deal addressed a host of programs, but most noticeably demonstrated a willingness to spend money to revive the economy. The federal

⁹⁶ Rowley, *U. S. Forest Service Grazing and Rangelands*, 149; Steen, *The U.S. Forest Service*, 199-204.

⁹⁷ Unrau, *Basin and Range*, 347.

government became a source of funds through various programs designed to boost the faltering American economy. Federal lands and the agencies that administered the eagerly vied for relief and recovery funds came swiftly to Nevada where the vast federal estate within its borders obtained support for agriculture, water projects, historic preservation, recreation, and funds for the support of road building. Federal lands in Nevada offered a platform to support agriculture, ranching, historic preservation, and tourism. In this way, marginal lands of Nevada became public lands where federal agencies competed and cooperated to manage resource development and use.

The new Secretary of Interior in the Roosevelt Administration, Harold Ickes, was a staunch conservationist and a former Bull Moose Republican who championed the land use policies put forth by Theodore Roosevelt and Gifford Pinchot. His leanings toward utilitarian conservation seemingly made him an ally of the United States Forest Service in any turf struggle with the more preservationist policies of the Park Service. To the welcomed surprise of the Park Service, however, Secretary Ickes developed a positive relationship with the now Director of the Park Service, Horace Albright.⁹⁸

After reorganizing the federal land agencies in 1933 under Executive Order 6166, the Park Service began to intensify its management over the much neglected national monuments. These transitions brought Lehman Caves, along with fourteen other National Monuments on Forest Service lands, to the attention of the Park Service. According to the National Park Service, the Forest Service was not properly trained to manage places preserved for their scenic and historic significance.⁹⁹ The U.S. Forest Service

⁹⁸ Rothman, *America's National Monuments*, 164-65. Horace Albright succeeded Stephen Mather as director of the NPS on January 12, 1929.

⁹⁹ Rothman, 142. Rothman referred to arguments put forth by Frank Pinkley from Horace Albright.

immediately recognized their managerial authority may be in jeopardy. In response, Forest Service management attempted to employ better practices to ensure an infrastructure designed for National Monument visitors.

The Executive Order did not revoke the monuments from Forest Service lands, but nonetheless placed them in an “Executive Department other than those specifically charged by law with national-forest administration.”¹⁰⁰ In an effort to challenge these changes to administration, Assistant Chief Forester Leon Kneipp telephoned Guy F. Allen in the Bureau of the Budget to make the Forest Service’s case from an economic point of view. Kneipp argued that the national monument sites were “not so heavily used by the public” and the U.S. Forest Service personnel could adequately manage them under the stated guidelines to prevent private appropriation and vandalism. When needed, during periods of heavy use, additional personnel could be appointed at the appropriate times and places. As a final note, Kneipp questioned whether the National Park Service would be able to deal with fire, tree diseases, and insect pests or whether they would be able to address issues related to trespasses and rights-of-way. The Forest Service, argued Kneipp, has dealt with these issues “continually without difficulty or friction.”¹⁰¹

Acting Director Demaray of the Park Service responded by arguing that national monuments that were caves, “can hardly be classified as facilities in the work of the Forest Service.” Kneipp had to concede that caves as places of recreation caused little disruption to the Forest Service conservation agenda—they were in fact underground.

The caves Demaray identified were Jewel Cave in South Dakota; Lehman Caves in

¹⁰⁰ Leon Kneipp to Guy F. Allen, transcript, July 25, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

¹⁰¹ Leon Kneipp to Guy F. Allen, July 25, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

Nevada; Oregon Caves in Oregon; Timpanogos Cave in Utah.¹⁰² In September of 1933, Chief Forester Stuart sent a telegraph to the Forest Service Regional Headquarters in Ogden, Utah (Region 4), stating that the “Park Service plans to assume administration [of] Lehman Caves National Monument October First.”¹⁰³ The NPS did not assume charge of the Monument until December 2, but it was clear by the end of September that Kneipp’s arguments against NPS management of sites on National Forests could not thwart the rising power of the Department of the Interior and the interests of preservationists with the National Park Service.

The National Park Service took control of Lehman Caves National Monument in 1933. Otto T. W. Nielson, the caretaker of the caves, became a park service ranger the following year and began a campaign to advertise the caves. In a Department of Interior publication Nielson waxed that “Splendid highways reach in all directions and modern transportation makes it possible to reach the once remote regions.” As a result, travelers to national parks and monuments could easily access Lehman Caves:

A trip through the Caves is an experience most stimulating. There is variety enough to gratify all, regardless of their walks of life. The dreamer can be stimulated to realms of joy; the technically trained will be awed by the symmetry and exactness; the philosopher will have ample opportunity to deduct; the artist will have reason to see beauty and form; the musician might perhaps see it as a complete symphony; and to all a journey through it will leave a most pleasant memory. The chambers contain representations of the many famous and glorified. There are depicted objects pertaining to music, art, drama, and nature, as well as statues in likeness, pillar of renown, obelisks, minarets, spires, gargoyles, pipe organs, and many of the things in life—formed in unbelievable verisimilitude. The Caves abound in crystalline splendor but the formations are preponderantly incrustated with lime. However, there are exposed surfaces of

¹⁰² A. E. Demaray Memorandum to Mr. Bailey, Bureau of the Budget, August 4, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

¹⁰³ Stuart to Forest Service, Ogden, Utah, September 26, 1933, L-Boundaries, Nevada, Lehman Caves, Record Group 95, National Archives and Records Administration, San Bruno, California.

vari-tinted crystallizations—opaque, translucent, and pellucid. Layers of onyx resting on marble make the caves more interesting. Here you see nature’s work—ages in the making skillfully wrought. It is interesting to scrutinize and spectacular to gaze upon.¹⁰⁴

Lehman Caves National Monument continued to inspire advocates of a national park in Nevada’s Great Basin for the better part of the twentieth century. Darwin Lambert details the political drama surrounding a national park that surfaced again in the 1950s and into the 1980s. In 1986, under the guidance of Nevada’s U.S. Senator Harry Reid, Congress established the Great Basin National Park. The park’s central physical feature is Wheeler Peak. The park represents not a flat desert basin, but a mountainous region of internal drainage. The creation of the Great Basin National Park provided a well-manicured experience for the tourist in Nevada’s outback to explore a remote and hidden scenic landscape that represents the mountainous Great Basin.

After 1934, Nevada’s federal lands became sites of improvement work under the New Deal’s most popular programs—the Civilian Conservation Corp which joined with the U.S. Grazing Service, Bureau of Reclamation, Fish and Wildlife Service, National Park Service, Forest Service, and Soil Conservation Service to improve Nevada’s rural economies while putting the nation’s young men, and sometimes women, to work.¹⁰⁵ Although long administered for graziers, the land also offered opportunities for recreation, hunting, and tourism. These activities took advantage of Nevada’s most important assets as they related to its mountainous environment. Will C. Barnes, the

¹⁰⁴ Otto T. W. Nielson, “Lehman Caves,” *Zion and Bryce Nature Notes*, Department of the Interior: National Park Service, 6, 4 (July-August, 1934), 41-43.

¹⁰⁵ Renée Corona Kolvet and Victoria Ford, *The Civilian Conservation Corp in Nevada: From Boys to Men* (Reno: University of Nevada Press, 2006), 18. The closest CCC stag camp to the Nevada National Monument was at Berry Creek in the Schell Creek Range approximately 30 miles to the Northwest of Lehman Caves (as the crow flies). They were called on multiple times to work on the infrastructure surrounding the monument.

grazing expert for the Forest Service ended his career with a final message for land users of the West. In Barnes' 1941, *Apaches and Longhorns*, he wrote:

I can see how, at this very day, certain matters are coming to the front which, if not met by the stockmen in a wise and constructive spirit, may possibly imperil their continued use of the ranges. They cannot afford to forget that these lands are public property, owned by the whole of the American people, and their use must be along popular lines, and not exclusively for the financial gain of the stock interests. These public lines are—game, watershed protection and recreation. Of these wide and popular aspects of Forest utilization, the game question stands easily at the head. Unless the stock interests handle all these matters mightily carefully, they will be the losers in the end.¹⁰⁶

Barnes, the long-time cattle man from Arizona during the nineteenth century became, in 1907, a popular personality in the Forest Service's connection with the western ranch community. An astute stockman and leader of the Forest Service's grazing "shock troops," Barnes somehow kept his finger on the pulse of western rangelands throughout his life. His final warnings to the stockman that national forests were designated to serve diverse purposes, such as "game, watershed protection, and recreation" remain as relevant today as they were throughout much of the twentieth century.

¹⁰⁶ Barnes, *Apaches and Longhorns*, 206-207.

Chapter Six

Monitoring Mountain Snow

Nevada's highest mountains often accumulate over thirty inches of precipitation per year, most of which falls during the winter months to form a substantial snowpack. As national forests were established in Nevada's high mountain ranges, so too did the protective measures of the Forest Service increase over the flora and terrain in order to conserve snowpack. However sparsely forested from a commercial standpoint, the mountains supported tree canopies and undergrowth that slowed spring and summer snowmelt, limited erosion, and reserved water sources for runoff into the lowlands during summer's dry season. This conservation of snow provided the principal rationale for the creation of Nevada's national forests, under the Forest Organic Act of 1897, to protect "favorable conditions of water flows."¹

The connection between mountain snow and lowland water supplies pervaded the literature of late nineteenth-century arid land irrigation and hydrological studies. Healthy forest environments in the highlands guarded watersheds and water supplies. An early forester and head of the Division of Forestry, Bernard E. Fernow titled a chapter in his noted 1893 study, *Forest Influences*, "The Relation of Forests to Water Supply." The concept of "forest influences" asserted that forests were not just forests, but they were pivotal in shaping the physical environment of the high mountains' local climate phenomena, vegetation, stability of soils, health of streams, control of freshets and floods, and finally favorable flows of water to the low land agriculture.² While John Wesley Powell's Irrigation Survey for the U.S. Geological Survey in 1888-1893 paid little

¹ Sundry Civil Appropriations Act, June 4, 1897.

² Bernard Fernow, *Forest Influences* (Washington: Department of Agriculture, 1893).

attention to high mountain water sources, it did begin systematic measurement of precipitation and surface water flows and called for a general withdrawal of land entries from vast parts of the West until completion of the survey. This suggestion caused the demise of the survey when western congressmen scoffed at the cessation of land entries and sales while surveyors and scientists gathered data about water supplies, possible reservoir sites, and the amount of western lands that could be brought under irrigation or reclaimed from the desert.³

One foreign observer from the dry continent of Australia saw the crucial role of water stored in the snow pack of western mountain ranges for the irrigation of America's arid lands. In the early 1880s the future prime minister of Australia, Alfred Deakin, traveled through the western United States on an irrigation study tour from his home colony of Victoria. In his 1885 report he noted that "the prime source" of western America's water supply occurs in "natural mountain storage moisture, in the shape of snow, released by the heat of the sun in the season when it is most needed upon the plains." His study also concluded that in the arid American West, "all value may be said to inhere in the water." The protection of water supplies in the high mountains of Nevada, where the U.S. Forest Service presided, underlined the importance of its charge and mission. That purpose confirmed its *raison d'être* in Nevada, and called forth the authority of the federal government to implement conservation policies centered on the

³ Thomas G. Alexander, *A Clash of Interests: Interior Department and Mountain West, 1863-1896* (Provo, Utah: Brigham Young University Press, 1977), 150-157 ; Wallace Stegner, *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West*, first published 1954 (New York: Penguin Books, 1992), 300-304; Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920*, first published 1959 (Pittsburgh: University of Pittsburgh Press, 1999), 6; Donald J. Pisani, *To Reclaim a Divided West: Water, Law, and Public Policy, 1848-1902* (Albuquerque: University of New Mexico Press, 1992), 146-147.

protection of watersheds in the highlands. Water protection under various labels enabled federal authority to fan out from the forests making its imprint on property ownership patterns and the nature of livestock holdings outside of the forests and intertwining Forest Service regulations with local economic life.⁴ And while the outback of Nevada was remote in distance, its everyday life and stock raising economy suddenly, after 1905, became directly and instantly connected to policy and administrative decisions made in the Congress and the offices of the Federal Government in Washington.

By the end of the nineteenth century water sources for arid land agriculture became crucial. Even the popular press had long recognized forest reservations as essentially “water reserves.” It was almost inevitable that proponents of forest protection and the irrigation of arid lands joined forces. In 1902 the American Forestry Association and the National Irrigation Association began sponsorship of the journal *Forestry and Irrigation*. Its central theme was government management of forests to protect mountain watersheds for lowland water supplies. In 1903, Edward Bowers, Secretary of the American Forestry Association and former Assistant Commissioner of the General Land Office, argued that forest reserves were natural reservoirs that conserved water. As such the reserves were at the foundation of a Conservation Movement, which placed emphasis on the efficient use of resources as a victory over waste. Bowers believed, “The forest reservations were destined to be the cause of irrigation.” Conserved water supplies were “destined” to turn wasted lands into productive reclaimed lands. Certainly this reflected

⁴ Alfred Deakin, *Irrigation in Western America, so far as it has relation to the circumstances in Victoria, and Irrigation in* (Victoria: Royal Commission on Water Supply, 1885), 23, 61; J. A. La Nauze, *Alfred Deakin: A Biography*, vol. I (Melbourne, Australia: Melbourne University, 1965), 84-85.

historian Samuel Hays's thesis that the central message or "gospel" of the Conservation Movement was "efficiency" and an abhorrence of waste.⁵

The Reclamation Act of June 17, 1902 confirmed an ongoing relationship between mountain forests and irrigation. In 1904, *Forestry and Irrigation* described it:

The people of the United States, as a whole, have little idea of the enormous magnitude of the interest affected by the Government's forest reserve policy. Timber supply as important as this is, is a relatively small part of the whole purpose. The reclamation of millions of acres of arid land, a sustained or heightened fertility for other millions of acres of farm lands, and, finally the safeguarding for the future of pasturage for millions of head of sheep and cattle are already certain results of that policy.... Roundly stated, the purpose is to give these forest reserves their highest utility to all who use them now or will use them in the future.⁶

in 1904, the head of the U.S. Bureau of Forestry Gifford Pinchot, emphasized the importance of forest reserves in relation to irrigation when he addressed the Twelfth National Irrigation Congress: "Water is the measure of the value of land, and it is water that the West needs.... The forest is the first and most important factor in the water supply of the West, except the water itself."⁷ If the forest was the most important factor in the western effort to develop and sustain resource use, then the power to govern and protect it depended on its influences especially "favorable conditions of water flows." The measure of the land in effect became a measure of water supply.

⁵ Nation Magazine; Edward A. Bowers "The Future of Federal Forest Reservations," *Forestry and Irrigation*, 10, 3 (March, 1904): 132; Hays, *Conservation and the Gospel of Efficiency*, 2-3.

⁶ No Author, "The National Forest Reserves: The Purpose of Their Establishment—How They Have Grown, and the Important Ends They will Conserve," *Forestry and Irrigation*, 10, 11 (November, 1904): 520.

⁷ Gifford Pinchot, "Relation of Forests to Irrigation," *Forestry and Irrigation*, 10, 12 (December, 1904): 551.

In 1904 William B. Greeley, a promising graduate of the Yale School of Forestry and Chief Forester of the U.S. Forest Service between 1920 and 1928, began working for the Bureau of Forestry. In 1905, he pointed to the complicated relationship between forests and water supply. Precipitation, topography, rock type, and flora all affected surface water flow and Greeley warned that forest cover was only one influence on potential stream flow.⁸ Given the irregularities of mountain environments there appeared to be little possibility to make correlations between mountain forests and water supply. Water historian Donald Pisani makes the argument that forestry and reclamation often clashed in their efforts to coordinate scientific studies to bring mountain forests and irrigation together in a concerted effort during the Progressive Era Conservation Movement (early decades of the twentieth century).⁹ Underlying the disagreements at the time between forestry managers and reclamation developers was the difficulty of making reliable connections, especially measurements, between snowpack and water supply. After 1906, James Edward Church at the University of Nevada began to tackle that challenge with an extensive and complex effort to measure the relationship between mountain snowpack and stream flow. His efforts provided the foundations for what is now the snow telemetry system used by the National Resource and Conservation Service to forecast water supply and floods. Measuring snowpack and improved winter transportation designed to assist humans into the mountains during the winter helped to provide a predictive measurement between forests and irrigation.

⁸ W.B. Greeley, "The Effects of Forest Cover on Stream Flow," *Forestry and Irrigation*, XI, 6 (June, 1905): 163-168. Greeley would later become the third Chief of the U.S. Forest Service (1920-1928).

⁹ Donald J. Pisani, "Forests and Reclamation, 1891-1911," *Forest & Conservation History*, 37, 2 (April, 1993): 68 (68-79).

Water Supply, Stream Flow, and Settlement

In the late nineteenth century, scientists and surveyors disagreed over how to maximize water supply. The foundation for an environmental history of water in the West typically extends back to John Wesley Powell's 1878, *Report on the Lands of the Arid Region of the United States*. Powell, second director of the United States Geological Survey (1881-1894), was the surveyor who articulated a problematic relationship between water and settlement. In his 1878 report, he warned that the monopolization of water could have detrimental effects on settlement in the West. Powell differentiated between timber, pasture, and irrigable lands in an effort to explain diverse land types and users. Timber and range lands greatly exceeded irrigable lands and Powell observed, "In general the lands greatly exceed the capacities of the streams...the lands have no value without water." His report illustrated the problem of land settlement based on practices developed in wet regions, particularly a frontier ideology that stemmed from the humid east and created settlement opportunities woefully inadequate in land size based on available water supplies.¹⁰

Powell warned, "If the water rights fall into the hands of irrigating companies and the land into the hands of individual farmers, the farmers then will be dependent upon stock companies, and eventually the monopoly of water rights will be an intolerable burden to the people."¹¹ Powell referred to waters from the mountains (timbered lands)

¹⁰ John Wesley Powell, "Physical Characteristics of the Arid Region" *The Arid Lands*, Wallace Stegner, editor (Lincoln: University of Nebraska Press, 2004), 29-36.

¹¹ Powell, *The Arid Lands*, 53.

and their dispersal through pasture lands as a problem for agricultural settlement because water rights would be diverted and claimed prior to reaching the irrigable valleys. Powell recognized that mining magnates, irrigation companies, and stock companies ruled the arid West as owners of water before the resource reached the lower elevations where irrigable lands provided the prospective farmer a place to cultivate. To counter the unregulated settlement patterns that concerned Powell, he and his colleagues in part used Mormon methods of water distribution along the Wasatch Front as an example for sustainable settlement on the semi-arid desert.¹²

Early Mormon settlements used a cooperative model, tapping into the mountain snowmelt with irrigation ditches that led to irrigated fields within the “watershed.” For Powell, this form of water use emphasized cooperation between water users who shared the valuable resource along what he envisioned as long-lot surveys amounting to 2,560 acre plots along streams and rivers. In addition, farmers developed their own infrastructure and bound their reliance to one another through self-interest by collectively constructing catchments, head-gates, canals, and then returning unused water back into the watershed. Powell spent the better part of the 1880s as Director of the United States Geological Survey combatting what he observed as unsustainable settlement.¹³

Grove Karl Gilbert contributed to Powell’s *Report* with an article titled, “Water Supply.” Gilbert concluded that human settlement along the Wasatch Front increased surface water flow. Gilbert’s essay can be read as a response to the misguided idea that civilization increased rainfall or that “rain followed the plow.” According to Gilbert, the

¹² John Wesley Powell and colleagues, Grove Karl Gilbert, Clarence Dutton, Ammon H. Thompson, and Willis Drummond Jr., contributed to the report concerning settlement on the arid lands of Utah.

¹³ Paul Starrs, *Let the Cowboy Ride: Cattle Ranching in the American West* (Baltimore: Johns Hopkins University Press, 1998), 56-57.

nineteenth century notion that cultivating the soil increased rainfall was “erroneous.” He argued that logging, ranching, and agriculture increased stream flow and not rainfall. Based on twenty years of observations by settlers, he concluded that the Great Salt Lake water levels had increased since the time Euro-Americans settled the Great Basin.¹⁴

According to Gilbert, three conditions modified drainage for a positive increase of surface flow: first, agriculture increased flow by draining areas that suffered from bog conditions that promoted evaporation during peak seasonal runoff; second, livestock increased flow by decreasing the vegetation that entangled surface water and by trampling the soil to make it impervious to water loss hence limiting groundwater infiltration; third, timber cutting decreased evaporation from the thirsty timber and foliage (evapotranspiration). Gilbert argued, as a result, that “white man” increased the inflow of water to the Great Salt Lake.¹⁵ In essence, Gilbert correlated increased streamflow and Euro-American settlement with rising water levels at the Great Salt Lake.

In 1874, Robert Fulton, a land agent for the Southern Pacific Railroad with some scientific training, moved to Reno, Nevada. Like Gilbert, Fulton argued that settlement increased surface water flow. While Fulton agreed that settlement increased water flow, he was not arguing exclusively for agricultural settlements as articulated by Powell and Gilbert. He understood that settlers and their respective settlements appropriated water. In turn, water would flow positively for the benefit of industry, urban, and irrigation

¹⁴ Grove Karl Gilbert, “Water Supply,” in John Wesley Powell, *Report on the Lands of the Arid Region of the United States*, ed. Wallace Stegner, 3rd edition (Lincoln: University of Nebraska Press, 2004), 69; Stephen J. Pyne, *Grove Karl Gilbert: A Great Engine of Research* (Austin: University of Texas Press, 1980), 160. In addition to Euro-American settlement patterns, one should note that Mexican water use also prioritized communal models similar to the cooperative model in New Mexico, Arizona, and California prior to the Treaty of Guadalupe Hidalgo (1848).

¹⁵ Gilbert, “Water Supply,” 87-89.

purposes. With numerous scientific publications, including an 1896 article in *Science* titled, “How Nature Regulates the Rains,” Fulton suggested that the balance between forests and water flow favored “the open country.” In consultation with loggers and municipal water owners, such as J. B. Overton of Virginia City, Fulton argued that forests created obstacles to important wind-formed snow accumulations, consumed water, and consequently evaporated much of the resource into the air. Accordingly, forests depleted the water supply and consumed the resource as it infiltrated the ground. For Fulton, water needed to be collected and controlled as soon as possible for the maximum flow into human-made storage and diversion facilities.¹⁶

Bernard Fernow, head of the Division of Forestry until 1898, responded to Fulton with an article also in *Science* titled “Pseudo-Science in Meteorology.” According to Fernow, the conclusions of “practical men” lacked “quantifiable” evidence. There were neither “instruments nor methods” to measure “meteorological phenomena” with accuracy. Fernow contested the conclusion that forests decreased water supply. He recognized the importance of “subterranean” flows that delayed the effects of the dry season and even multi-year droughts. Rapid run-off was a short-term solution to increased water supply whereas forests provided a stable and slow dispersion of water that encouraged the subterranean flows to hydrate the watershed and provide useful water sources into the future. Essentially, he was describing favorable conditions of water flows that were influenced and protected by the forests.¹⁷

¹⁶ Robert L. Fulton, “How Nature Regulates the Rains,” *Science*, New Series, 3, 67 (April 10, 1896): 547-549; William D. Rowley, “Forests and Water Supply: Robert L. Fulton, Science, and U.S. Forest Policies,” *Nevada Historical Society Quarterly*, 37, 3 (Fall, 1994): 216.

¹⁷ Bernard E. Fernow, “Pseudo-Science in Meteorology,” *Science*, New Series, 3, 71 (May 8, 1896): 706-707; Rowley, “Forests and Water Supply,” 219.

Fernow agreed with Powell, Gilbert, and Fulton that settlement increased run-off, but in the long run deforestation posed problems for lower elevation water users. Trees and foliage slowed the dispersal of mountain waters well into the fall. The wording in the 1897 Forest Organic Act, “favorable conditions of water flows” came to prioritize the conservation of snowpack in nature’s mountainous inverted reservoirs throughout the arid Nevada outback. The favorable conditions of water flows proved to be more complicated than just surface and subterranean water flows. The fundamental question was how humans could best manipulate water supplies for settlement in the West.¹⁸

In much of the Nevada outback the importance of water meant providing resources for stock watering, commensurate property, and agriculture on private property. It also meant the conservation of timber for canopies and forage to help anchor the soils and slow spring run-off. C. J. Blanchard, a statistician with the Reclamation Service, observed in 1906 that reclamation engineers and hydrographers were in agreement that the “greatest present need in many sections [for lowland irrigation] is forest preservation

¹⁸ The language of the Forest Organic Act of June 4, 1897 provided the basis for discussions for the importance of water and forests in journals such as *Forestry and Irrigation*. Whether the argument focused on economics, homemaking, stock raising, industry, scenic attractions, or game refuges, the forest reserves served the purposes of the American people. Notable articles: Prof. William H. Brewer, “Relation of Forestry to the Public Health,” *Forestry and Irrigation*, IX, 1 (January, 1903): 12-15; Edward A. Bowers, “The Future of Federal Forest Reservations,” *Forestry and Irrigation*, X, 3 (March, 1904): 131-135; President Roosevelt, “Wilderness Reserves: Part One,” *Forestry and Irrigation*, X, 3 (March, 1904): 250-259; Unknown, “Private Rights in Forest Reserves,” *Forestry and Irrigation*, X, 12 (December, 1904): 563-564. Major F. A. Fenn “The Relation of Forest Reserves to the Mining Industry,” *Forestry and Irrigation*, X, 12 (December, 1904): 574-580; John D. Leland, “Creation of Forest Reserves a Benefit to Miners,” *Forestry and Irrigation*, XI, 3 (March, 1905): 119-120; W.B. Greeley, “The Effects of Forest Cover on Stream Flow,” *Forestry and Irrigation*, XI, 6 (June, 1905): 163-168; G. Frederick Schwartz, “A Suggestion Regarding the National Forest Reserves” *Forestry and Irrigation*, XI, 6 (June, 1905): 287-289; George W. Woodruff, “Agricultural Settlement in Forest Reserves,” *Forestry and Irrigation*, XII, 6 (June, 1906): 267-271. “Recreation and the Forests” *Forestry and Irrigation*, XII, 9 (September, 1906): 461-462; Unknown, “All Industries Furthered by National Forests,” *Forestry and Irrigation*, XII, 12 (December, 1906): 552-556; Gifford Pinchot, “What the Forest Service Stands For,” *Forestry and Irrigation*, XIII, 1 (January, 1907): 26-29; T. J. Mott, “Our National Parks,” *Forestry and Irrigation*, XIII, 8 (August, 1907): 415-424.

and restoration...we of the Reclamation Service feel a deep and kindly interest in the growth of the Forest Service.”¹⁹

The prospect of developing a predictive relationship between snowpack and surface water flow began after the formation of the Reclamation Service in 1902 (created as the U.S. Reclamation Service and later renamed the Bureau of Reclamation in 1923). One of five initial federal reclamation projects in the United States was a diversion on the Truckee River east of Reno to direct water to a reclamation project surrounding Fallon, Nevada. Government involvement to bring water to the desert offered the possibility of making the desert bloom for rich and poor alike. For western settlement, federal reclamation offered a panacea to the water problem in the arid and semi-arid west. Guy Elliott Mitchell, Secretary for the National Irrigation Association, referred to the Truckee-Carson Project as the “Re-Conquest of Nevada” by restoring its inland waters that once formed ancient Lake Lahontan. He believed Nevada’s population would double almost immediately after completion of the diversion dam.²⁰ Despite the hopes of many, reclamation was not a cure-all for western settlement in arid and semi-arid regions. Nevada’s population doubled between 1900 and 1910 from 42,335 to 81,875, but because of mining in Tonopah, Goldfield, and Ely, not agriculture. When the gold and silver mines played-out in Tonopah and Goldfield, Nevada’s population once again declined from 81,875 in 1910 to 77,407 in 1920. Mining brought both increased population and

¹⁹ C. J. Blanchard, “Mutual Relations of the Forest Service and the Reclamation Service,” *Forestry and Irrigation*, XII, 1 (January, 1906): 42-43; Morris Bein, “Influence of the Work of the Reclamation Service on the Forestry Movement,” *Forestry and Irrigation*, XII, 1 (January, 1906): 46-48.

²⁰ Guy Elliott Mitchell, “Re-Conquest of Nevada,” *Forestry and Irrigation*, XI, 5 (May, 1905): 220-223; William E. Smythe, “The Homemaker or the Speculator?,” *Forestry and Irrigation*, IX, 9 (September, 1903): 442-446; Unknown, “The Up-Building of Nevada,” *Forestry and Irrigation*, XI, 6 (June, 1905): 270-274; Unknown, “Homes in Nevada,” *Forestry and Irrigation*, XIII, 3 (March, 1907): 144-147. In reality, Nevada’s population fell between 1910 and 1920.

wealth, but proved unsustainable on both accounts. To diversify out of precious metals mining, the measure of potential water supply entered into the question of how to maintain agriculture in the state.

Water Supply Forecasting

With “Water on His Wheel,” Senator Francis Newlands of Nevada argued that technology and science were fundamental to the future of irrigation in the arid West.²¹ While the construction of Derby Dam (1903-1905) on the Truckee River ushered in a new era of dam building, it also indirectly and slowly, brought attention to Nevada’s most productive reservoir system: snowpack on the elevated portions of Nevada. More snow equaled more water, but accurate measurements proved difficult. Scientific knowledge and its adherents demanded the usual prerequisite in the equation: prediction. If, for example, the Reclamation Service and power companies desired data to predict lake levels and stream flow, then snowpack amount and its relation to the hydrology of the watershed required measurement, correlation, and prediction. As the Reclamation Act and hydro-power companies set lofty goals to deliver a known quantity of water for settlement of the western states, “The demand for water for irrigation and electric power led directly to snow surveys,” according to Bernard Mergen, author of *Snow in America*.²²

²¹ Rowley, *Reclaiming the Arid West*, 99; William D. Rowley, *The Bureau of Reclamation: Origins and Growth to 1945*, Vol. 1 (Denver: U.S Department of the Interior, 2006), 83; John M. Townley, *Turn this Water Into Gold: The Story of the Newlands Project* (Reno: Nevada Historical Society, 1977), 27; John M. Townley, *Reclamation in Nevada, 1850-1904*, doctoral dissertation (Reno: University of Nevada, 1976), 278-79.

²² Bernard Mergen, *Snow in America* (Washington: Smithsonian Institution Press, 1997), 125.

Snow surveys were not new to the early twentieth century. Mergan points to the Swiss-born scientist Arnold Guyot and his work at the Smithsonian Institution in the United States as the first concerted effort to attribute and correlate snow to water supply. Guyot's contributions to snow surveys stemmed from measuring the amount of water in snow. He simplified a general measurement for a ratio of 10:1, which indicated that 10 inches of snow depth equaled one inch of water. The need for real-time and place measurements complicated this general ratio by taking into account differing annual and regional weather patterns and snowpack densities. Specific regions became laboratories where individual assessments of snow water equivalents (SWE) established the basis for annual predictions.²³ For example, general measurements applied to different regions did not take into account the actual amount of water in snow at any given time. To solve the problem of predicting the amount of water in snow and differing snowfall amounts, snow surveyors used samplers to measure SWE, weather stations to record precipitation, and flow gauges to correlate run-off with the previous winter's snowpack. In the early 1900s, scientists and engineers developed an extensive system of studies to coordinate snow surveys across the West. The implementation of this new science of snow began in Nevada on Mount Rose, between Reno and Lake Tahoe.

At the turn to the twentieth century, snowpack was an understudied reservoir system in the Great Basin (and around the world). A relationship between snowpack and water supply was a given, but could the mountain snowpack offer a predictive component for the oncoming dry season? And, if so, how might it be measured? James Edward Church, a professor of classics at the University of Nevada and winter recreation

²³ Mergan, 123.

enthusiast took up the challenge of measuring the relationship of snowpack to water supply. In 1892, Church arrived at the University of Nevada to teach the classics and German. To the dismay of some, he enjoyed excursions into the mountains during winter. Church unwittingly embarked on a career as a snow scientist after “some colleagues in the university’s School of Agriculture asked him to investigate the relationship between forests and the depth of snow.” As a result, “Church the surveyor was born.” He recalled: “I had gone to the hills for pictures and pleasure, but to the public I was merely a great fool. So the humanist decided to become a scientist and ‘hero,’ yet still take his pictures on the side.”²⁴ Church can be understood as a nineteenth century gentleman scientist trained in the classics with a desire to explore natural history. As a scientist in the twentieth century he was also part of creating a specialized discipline that brought forestry and irrigation together through measurement and prediction.

Church developed standardized technologies and methods to measure snow. Winter, Church professed, hides an “abundance of knowledge that nature will pour into your lap if you will come within her reach.” He went to nature’s wintry abode and, at times, regretted being a “hero” who brought knowledge and civilization to the white covered mountains of the West.²⁵ As a result of his appreciation for the wintry mountains, Church and his scientific colleagues formed a basis for modern water supply forecasting.²⁶ His contributions to snow surveys assisted land users and land managers to

²⁴ James E. Church, “The Human Side of Snow: The Saga of the Mount Rose Observatory,” *Scientific Monthly*, 44 (February 1937): 141; Mergen, “Seeking Snow,” 79-80.

²⁵ James Edward Church, “The Human Side of Snow: The Saga of Mount Rose Observatory,” *The Scientific Monthly*, 44, 2 (Feb., 1937): 139, 143, 141.

²⁶ Douglas Helms, *The History of Snow Survey and Water Supply Forecasting*, 3-4; Bernard Mergen, “Seeking Snow: James E. Church and the Beginnings of Snow Science” *Nevada Historical Society Quarterly*, 35, 2 (Summer 1992): 80; Fred A. Strauss, “Forecasting Water Supply Through Snow Surveys,” *American Water Works Association*, 46, 9 (September 1954): 853-54. While there was controversy as to

predict potential water supplies. He also helped to establish a structure of knowledge that classified the properties of snow. Many of these efforts stemmed from the desire of power companies and federal and state governments to better allocate and order water by predicting stream-flow, frosts, and floods.

In 1906, Church constructed the first weather observatory on Mount Rose overlooking Lake Tahoe to the west and Washoe Lake and Truckee Meadows to the east. In 1909, he tested a snow sampler on treks onto Mount Rose in Nevada's Carson Range of the Sierra. The "Mount Rose Snow Sampler" was the third of its kind, but became part of a much larger endeavor to predict water supplies by measuring SWE and calculating the amount of water reserves in a given watershed system.²⁷ While snow surveys and the technologies for measuring water in snow were not original efforts, the potential to know the relationship between snow and water supply generated a positive response from federal land managers. Church recognized that diverse organizations, private and public, could come together on the critical resource of water supply, especially if the available water could be a known quantity before it reached the valley floors.

The Derby diversion dam on the Truckee River brought attention to the idea of measuring snowpack as a way to predict water supply. The Tahoe Basin, Washoe Valley, and Truckee Meadows were sources for water flowing into the Truckee River. The river terminated at Pyramid Lake. As a result, the watershed's primary source, the mountains surrounding the Tahoe Basin watershed, served as a measurement area to predict the

whose snow sampler would bring together snow surveys, by 1909, the Mount Rose Sampler by James E. Church found much traction especially due to his concerted efforts to standardize snow surveys during the Progressive Era.

²⁷ James E. Church, "Snow Surveying: Its Principles and Possibilities," *Geographical Review*, 23, 4 (October, 1933): 529-30.

potential hydraulic input into the system. Though Church's initial efforts did not accurately predict the rise of Lake Tahoe, he soon "developed the snow survey-runoff relationship so well...that he could and did accurately forecast the spring rise of the lake."²⁸

Federal funding for scientific work trickled into Church's investigations after 1906 by way of the University of Nevada's Agricultural Experiment Station. Research at the station initially focused on forecasting frosts but turned to water data for the Truckee River to predict floods, measure sustainable flow rates to the agricultural community of Fallon, and hopefully maintain the Northern Paiute fishing grounds at the mouth of Pyramid Lake.²⁹ As a result, methods to measure snowpack began as an attempt to warn of spring and fall frosts, predicting water supplies for irrigation, and even hydro-electricity generation. The conservation of snow—which the Forest Service had already been concerned with—as part of knowledge about water supply became an important source of information critical for federal reclamation projects, power companies, and lowland water users.

While the Truckee-Carson Reclamation project did not irrigate the vast numbers of acres predicted, Fallon did survive as an agricultural community, especially when coupled with the arrival of a military training base in WWII.³⁰ Initial estimates by the

²⁸ George Hardman, "Dr. James Edward Church—Specialist in Snow," *James Edward Church: Bibliography of a Snow Scientist*, Bibliographical Series No. 4 (Reno: University of Nevada Press, 1964), 7.

²⁹ Mergen, "Seeking Snow," 80.

³⁰ Donald J. Pisani, "Federal Reclamation and Water Rights in Nevada," 554; Donald J. Pisani, "Irrigation, Water Rights, and the Betrayal of Indian Allotment," *Environmental Review*, 10, 3 (Autumn, 1986), 161. As might be expected, the Paiute fishing grounds did not fare so well. In 1859, the General Land Office set aside Pyramid Lake as a Paiute reservation. After the Derby Dam began diverting water in 1905, half of the flow that once poured into Pyramid Lake no longer arrived. As a result, "...federal reclamation greatly accelerated the natural process of evaporation and from 1910 to 1970 the lake dropped over eighty feet."

first Director of the Reclamation Service, Frederick H. Newell, projected the reclamation project would reclaim 400,000 acres from the sagebrush desert (greasewood desert might be more appropriate). He based the estimate on an exaggerated water supply from Lake Tahoe that was not forthcoming because California and Tahoe property owners refused to permit the use of the lake as an inexhaustible reservoir to meet the needs of Nevada. He also did not foresee that drainage presented a host of additional problems. Ultimately, cultivation did not exceed 50,000 to 60,000 acres.³¹

A major reason the Reclamation Service failed to understand the drainage problem on the Truckee Carson Project was its lack of input from the U.S. Department of Agriculture and a need for local-based agricultural research. Since the creation of the Division of Agricultural Soils in 1894 the USDA undertook, “the beginning of a national commitment to soil science and soil survey activities.”³² The Hatch Experiment Station Act of 1887 established agricultural experiment stations at land grant universities across the nation that helped distribute scientific knowledge to the states. The Hatch Act, according to historian Milton Conover, initiated an official role for the government in soil

During that time-span, the Lahontan Cutthroat Trout nearly died off as the fish could no longer reach their spawning grounds. The Paiutes on the other side of the diversion dam near the Carson Sink encountered even greater difficulties. Under the Dawes General Allotment Act of 1887, the United States Government attempted to *settle* Native Americans on plots of land. The intent was for them to enter the United States economy as farmers that could eventually apply for title of their land if they *improved* the plot. Pisani identified 196 Northern Paiutes granted approximately 30,000 acres. Just after the completion of Derby Dam, “the secretary of the interior cancelled those allotments in exchange for ten-acre irrigated plots. In all, the Indians gave up 26,720 acres.” Great Basin Indians and the environments they had come to rely on carried the brunt of reclamation failures throughout the twentieth century.

³¹ Donald J. Pisani, “Federal Reclamation and Water Rights in Nevada” *Agricultural History*, 51, 3 (July, 1977): 543. For a history of reclamation in Nevada and its struggles to provide settlement, adhere to water rights, and California-Nevada conflicts over waters stemming from Lake Tahoe see John Townley, *Turn This Water to Gold: The Story of the Newlands Project* (Reno: Nevada Historical Society, 1977); John Townley, *Reclamation in Nevada, 1850-1904*, doctoral dissertation (Reno: University of Nevada).

³² Douglas Helms, Anne B. W. Effland, and Steven E. Phillips, “Founding the USDA’s Division of Agricultural Soils: Charles Dabney, Milton Whitney, and the State Experiment Stations” *Profiles in the History of the U.S. Soil Survey*. Helms, Effland, and Patricia J. Durana, eds. (Ames: Iowa State Press, 2002), 1.

science research within the U.S. Department of Agriculture.³³ The federal Office of Experiment Stations centralized state efforts to coordinate the Department of Agriculture's agenda to optimize soil productivity at local levels. Yet, the USDA's work and knowledge was often not utilized in the development of reclamation projects.

The Office of Experiment Stations concentrated its efforts on plant pathology, animal husbandry, agronomy, agricultural engineering, horticulture, and forestry. Later research expanded to include home and agricultural economics and rural sociology.³⁴ The Adams Act (1906) and Purnell Act (1925) broadened the focus of the Hatch Act during the period that snow science came to assist federal land management.

University of Nevada President Joseph Edward Stubbs had doubts as to whether the potential observatory atop Mount Rose could acquire initial funding under either the Hatch Act or the Adams Act. He wrote to Professor Church in 1905 to relay a message from E. W. Allen, Acting Director of the Office of Experiment Stations explaining, "The meteorological work I am still in doubt about..." But, after a visit from W. H. Beale and consultations with Alfred True, of the Office of Experiment Stations, they were "well pleased" and Mr. Beale was "very sympathetic" to Church's work and he acquired funding under the Adams Act.³⁵

The Adams Act of 1906 provided the first federal funds for Church to construct a weather observatory on Mount Rose. The observatory's primary purpose was to predict

³³ Milton Conover, *The Office of Experiment Stations: Its History, Activities, and Organization* (Baltimore: The Johns Hopkins University Press, 1924), 1, 42-43. Conover pointed out that the initial attempts to organize a relationship between colleges and the government began with Samuel L. Mitchel, Professor at Columbia College, beginning 1792 and later with the Morrill Land Grant College Act of 1862.

³⁴ NARA Archives, <http://www.archives.gov/records-mgmt/rcs/schedules/departments/departments-of-agriculture/rg-0164/n1-164-86-001_sf115.pdf>

³⁵ J. E. Stubbs to J. E. Church, July 23, 1906, Special Collections NC96, University of Nevada, Reno.

oncoming frosts for the agricultural areas east of the Sierra Nevada. The Adams Act allocated 500 dollars to install the weather observatory and, “Church’s work formally became the Department of Meteorology and Climatology of the Experiment Station.”³⁶ The Weather Bureau took charge of lower elevation data collection east of the Sierra after 1905 and left high altitude weather stations and snow surveys under the charge of Nevada’s Agricultural Experiment Station.

James Church recalled in a 1937 article, “The Human Side of Snow” that the floods of 1910 and 1911 brought the attention of the Sierra Pacific and Power Company “who begged” to use his data “to determine how much moisture was latent in the watershed.” Not only did snowpack offer an indicator for water supply, it could also provide information related to flooding. These circumstances that elicited federal, state, and private interests in snowpack, led Church and his colleagues to establish the “forecasting of streamflow.”³⁷ As a result, scientific studies of snowpack offered both knowledge about water supply and an indicator of potential flooding.

Church was not alone in his efforts. Samuel B. Doten, Director of the University of Nevada’s Agricultural Experiment Station, became a major source of support for Church’s snow surveys. Horace P. Boardman also became an asset to Church. Boardman, a professor of civil engineering at the University of Nevada, helped to convert snow measurements, especially SWE, into stream runoff.³⁸ In addition, many young outdoor enthusiasts accompanied Church on his weather observations and snow surveys to assist with supplies and data collection.

³⁶ Helms, *The History of Snow Survey and Water Supply Forecasting*, 5.

³⁷ James Edward Church, “The Human Side of Snow: The Saga of Mount Rose Observatory,” 148.

³⁸ Church, 7-8.

The Mount Rose Snow Sampler, weather observatories, and coordinated snow surveys provided necessary information relevant to spring runoff that informed land managers about prospective water supply at the Derby diversion dam and hydro-power facilities. Mergen wrote:

Legitimizing his [James Church] contribution to snow surveying by placing it in the international scientific tradition as well as the more immediate political milieu of the Progressive conservation and reclamation movement gave Church the final victory over his rivals.”³⁹

Through the 1910s and 1920s, Church established water supply forecasting methods that became increasingly integrated into federal and state efforts to estimate snow packs. After the first three decades of the twentieth century, snow science at the Agricultural Experiment Station in Nevada became an established discipline with funding and collaborative opportunities from the USDA and the Department of Interior and their various divisions.

As early as the 1920s, Church had his sights on developing snow surveys in the mountains that supplied spring run-off into the Humboldt River of northern Nevada. In 1923, Church informed the State Engineer, Robert E. Allen, of his interest in securing funding for the Humboldt project. As meteorologist for the Experiment Station this was an obvious research project for Church and the most significant watershed entirely contained in northern Nevada. In the early 1930s, Church along with Arthur J. Shaver, engineer with the Pacific Power Company and A. V. Tallman, Supervisor of Water Distribution of the Humboldt Basin, established numerous snow survey sites to record snowpack and its relation to flow rates of the Humboldt River. They located the survey

³⁹ Mergen, “Seeking Snow,” 81-86.

sites, but practical support came from Alexander McQueen, Supervisor of the Humboldt National Forest, headquartered in Elko, Nevada (former supervisor for the Nevada National Forest).

Supervisor McQueen offered the support of his rangers to conduct the snow surveys. Supportive of Church's efforts to determine flow into the Humboldt River watershed, McQueen expressed enthusiasm when Church wrote in 1933, "You will be greatly interested in knowing that the Experiment Station has been permitted to set aside a fund of approximately \$2500 annually for investigation of snow and runoff problems in the Humboldt Basin."⁴⁰ McQueen and Church quickly arranged to acquire topographic maps for new elevation readings and additional snow courses (survey sites). Church also established a pay system for the forest rangers through the Agricultural Experiment Station and provided funding for an infrastructure to support the safety of the rangers and their assistants on winter research excursions. Survey work into the mountains provided real-time and place measurements necessary to predict the amount of available water latent within the watershed at a given time.

Church relied heavily on Carl Elges for snow surveys in the Nevada outback. As assistant meteorologist, Elges graduated from the University of Nevada with a M.S. in Civil Engineering. His Thesis, "Developing a Method for Forecasting the Runoff of the Humboldt River, Nevada," provided him with the necessary education to assist Church throughout the 1930s and into the 1940s. Church regarded Elges as "the best trained man in forecasting streamflow ever developed here at the University and the only person to whom I would care to intrust [sic] the further study of the complex problems in the

⁴⁰ J. E. Church to Alexander McQueen, Sept. 13, 1933, Church Papers, NC96, University of Nevada, Reno, Special Collections.

Humboldt Basin in case I were to relinquish the work.”⁴¹ Assistant Meteorologist Elges worked closely with Church and oversaw the operations of the Humboldt River Snow Surveys while Church traveled to conferences and engaged in international snow survey efforts.

According to Elges, in 1934, the Humboldt River remained “the last frontier in stream forecasting from snow-surveys.” While the Truckee River on the western side of the timber belt was one of the first watersheds to become part of stream forecasting based on snow surveys, the rest of Nevada lagged behind these efforts. The Humboldt River, which provided the bulk of agricultural potential across the state had few stream gauging stations above water diversions. In an effort to gage streams above diversions and measure snowpack, Forest Service rangers became part of the Agricultural Extension efforts in Nevada to predict water supply into the dry season. Elges explained in 1934, “During the past few years, the United States Forest Service has developed a group of rangers in the Humboldt Basin who are unsurpassed in reliability as snow-surveyors and can be expected to bring back the desired data taken in a dependable manner.” Elges hoped that “with good men and the best of equipment, all measurements received by the forecaster can be considered reliable.”⁴²

Church insisted upon providing bonuses to the rangers managing the survey sites, especially because of the hazardous nature of snow survey work. Supervisor McQueen and Church sent an inquiry about the bonuses for the rangers to Milo Perkins, Assistant to the Secretary of Agriculture. The letter was deferred to E. W. Loveridge, Assistant Chief

⁴¹ May 26, 1934, J. E. Church to W. R. Gregg, Chief of the Weather Bureau, Church Papers, NC96, University of Nevada Reno, Special Collections.

⁴² Carl Elges, “Improvements in Forecasting the Flow of the Humboldt River, Nevada,” *Transactions, American Geophysical Union* (Reports and Papers, Hydrology, 1934), 630-631.

of the Forest Service. Loveridge responded that a multiple agency payment for the forest rangers was inconsistent with both federal employment regulations and a mission to manage resources without outside influences on public lands.⁴³

Church, unable to pay the forest rangers, made arrangements to provide them with additional equipment and to pay assistants from local communities for work done on the snow surveys. He avoided paying the rangers directly and instead allocated that money into the most up-to-date backcountry equipment, building permanent shelters, and compensation for non-Forest Service personnel. He employed young local men to do the work of the rangers and when able persuaded forest rangers “seeking adventure and experience” to participate.⁴⁴

Church argued that the Nevada State Cooperative of snow surveys within the Agricultural Experiment Station deserved the same kind of support that was now being offered to the Bureau of Agricultural Engineering under the Department of Agriculture, which had already begun its own efforts to develop snow surveys across the West’s snow-belt. He did not want state support of snow surveys to forever fall behind federal initiatives. Church pointed out that, “As the Western pioneer in snow surveying, I am naturally deeply interested in seeing the Federal foundations laid broadly and permanently. Hence my deep interest in securing the happiest service possible.”⁴⁵ For Church, this “service” meant cooperation between all stakeholders in Nevada’s water supply.

⁴³ E. W. Loveridge to J. E. Church, Nov. 20, 1935, Church Papers, NC96, University of Nevada, Reno, Special Collections.

⁴⁴ J. E. Church to E. W. Loveridge, Dec. 18, 1935, Church Papers, NC96, University of Nevada, Reno, Special Collections.

⁴⁵ J. E. Church to E. W. Loveridge, Dec. 18, 1935, Church Papers, NC96, University of Nevada, Reno, Special Collections.

The most dangerous part of snow surveys was arguably the use of forest rangers to manage survey sites and conduct snow course measurements. In Nevada, Church relied on rangers mainly in the Humboldt National Forest, and to a lesser extent in the Nevada National Forest and the Toiyabe National Forest. To do so, Church acquired funds to build shelters with wood stoves and cots, and equipped the rangers with sleeping bags and skis. Most rangers were inexperienced and some were too old to do the rigorous work of winter snow surveying—a concern expressed by both Forest Service management and Church.

With his extensive experience of winter travel, Church took care to provide the safest conditions possible. Not only did he build shelters and provide winter gear, he also established safe access routes for the rangers. Despite these efforts, in 1941, Ranger Wilkinson while working on the Humboldt Survey lost his life in an avalanche. Wilkinson, convinced that the snow was sturdier than the previous three years, chose not to follow the safe routes established by Church and others. After assessing Wilkinson's death, Church determined that a sustained warm period caused the snow to become heavy on top. Wilkinson, not aware of the unstable snow layers, triggered an avalanche that killed him and buried his assistant in a tree-well where he lay unconscious for over an hour.⁴⁶ Church later described Wilkenson's death as an "unintentional suicide" because of his failure to follow the established route.⁴⁷

⁴⁶ J. E. Church to S. B. Show, Regional Forester, May 19, 1941, Church Papers, NC96, University of Nevada, Reno, Special Collections.

⁴⁷ J. E. Church to Alexander McQueen, September 5, 1941, Church Papers, NC96, University of Nevada, Reno, Special Collections. Unfortunately, in 1939, Ranger Mayfield in Utah also died in an avalanche after he skied below a point where trees served as anchors. The snow let go and he suffocated while buried under snow.

In 1935, Elges accompanied Church on a trip of more than “13,000 miles through the Western watersheds” financed by W. W. McLaughlin, Division of Irrigation and S. B. Doten, Director of Nevada’s Agricultural Experiment Station. Church and Elges sought to become familiar with the “the problems of snow surveying and stream flow forecasting through the different regions.”⁴⁸ The tour was an attempt by Church and Elges to acquire support from the Soil Conservation Service and increase funding that had been limited to 15,000 dollars since 1935, when the Bureau of Agricultural Engineering (U.S. Department of Agriculture) oversaw the snow survey operations within its Division of Irrigation.

Understanding snow became a necessary component to optimizing water supply in the Great Basin. Water was considered something to control and steward into productivity. Bernard Mergen even suggests that Church “saw the study of snow playing a part in bringing about world peace.”⁴⁹ Horace Boardman, friend and colleague of Church commented that his international travels and training in the classics contributed to shaping a man intent on developing global relationships through a “deep friendship in snow.”⁵⁰ For Church, the science of snow began as an experience with nature, but he sought to contribute to control and order. As Church commented, “The playful charge was made that we were trying to annex the world. Such is the penalty of a lure.” He admitted that snow surveying became a “football field of opposing forces” between necessity and an impossible endeavor. As his successes mounted, Church lamented,

⁴⁸ J. E. Church to H. H. Bennett, May 22, 1940, Chief of the U. S. Soil Conservation Service, Church Papers, NC96, University of Nevada, Reno, Special Collections.

⁴⁹ Mergen, *Snow in America*, 126.

⁵⁰ Horace P. Boardman, “Friendships in Snow” *James Edward Church: Bibliography of a Snow Scientist*, Bibliographical Series, No. 4 (Reno: University of Nevada, 1964), 9-10.

“Adventure is being taken out of snow surveying.” Regardless of inner romanticizing, he continued to argue that boundaries of shared resources could bring people and nations together.⁵¹

In 1942, Church commented “Then *I* was a ‘damnfool’; now *all* are.” What was once an uncommon activity, settlement, science, and technology created a new experience in the West. By the 1930s, in the western states alone, “two million visitors” entered the region during winter by auto travel for both transport and recreation. Scientists also found access to engage in snow surveys that numbered to “750 snow courses” and “14,000 snow samplings.” Winter exploration and ramblings in the quiet of the Sierra Nevada between Mount Rose, Lake Tahoe, and the western snow-belt were forever altered by a technological West and the irrepressible human desire to control and order the natural world. Knowledge of snow was fundamental to this transition where a cadre of “fools” now found a convenient place to travel and recreate on the highland boundaries of shared resources.⁵²

Church’s second installment to “The Human Side of Snow” focused on sport and transport. He commented, “Snow removal has now become a highway function in 36 snow belt states. In [the winter of] 1939-1940, 232,615 miles of roads were cleared at a cost of \$20,969,988.” Snow survey methods, he pointed out, determined the necessary technologies to open up the west for winter travel. For Church, the west during winter became a technological landscape open to people who would probably never know the experience of hypothermia, frostbite, or the discomfort afforded by a nature not yet

⁵¹ Church, “The Human Side of Snow: The Saga of Mount Rose Observatory,” 148.

⁵² James Edward Church, “The Human Side of Snow: Sport and Transport,” *The Scientific Monthly*, 54, 3 (March, 1942): 211.

altered by modern civilization's grasp. The time had passed, as Church asserted in 1937, when "'Fools rush in where angels fear to tread' and are generally successful."⁵³

To open the West and Nevada's outback, specialized snow plows cleared roads, calcium chloride, salt, and sand controlled ice, sheds and fences altered snow accumulation, and new technologies assisted back-country winter travel on land, sea, and air. Different snow required different modes of removal and transport. Plows were designed to push or blow snow off roads. In the backcountry, the Tucker spiral-drive snow sled operated well in soft snow, whereas the Eliason motor toboggan could travel over hard snow pack at up to forty-miles an hour. New waxes provided skiers a reasonable mode of transport for their "snowshoe sticks." In addition, ice breakers began to open up the winter seas and de-icing techniques were developed for air travel.⁵⁴ In other words, these technologies developed to know the cold in an effort to control "The Snow Bogy" that once limited travel during the winter.⁵⁵

After the mid-1930s, Nevada and especially Nevada's portion of the Sierra became a place where access and tourism ushered in a modern tourist state. Snow no longer created an impenetrable obstacle. In 1942, Church commented that, "Snow and Ice are no longer insuperable obstacles to man and their once sinister aspect has become a source of appeal. Whether we move over the surface or fly far above the snow-clad peaks, the last and farthest regions of the earth are now within our reach."⁵⁶ These developments in access brought access to the Nevada outback year-round where the

⁵³ Church, "The Human Side of Snow: The Saga of Mount Rose Observatory," 145.

⁵⁴ Church, "The Human Side of Snow: Sport and Transport," 211-218.

⁵⁵ Mergan, "Snow in America," 62. Mergan makes use of a promotional booklet published by the Caterpillar Tractor Company in 1927 which demonized snow that was "defeated by science."

⁵⁶ Church, "The Human Side of Snow: Sport and Transport," 229.

highest mountains could be studied during the winter and developed for winter excursions.

In March of 1935, the Nevada State Legislature formally established the Nevada State Park System. A year later, the Nevada State Highway Department published its first volume of *Nevada Highways and Parks*. Their mission focused on “disseminating facts and news about Nevada’s highways and parks, its abundant natural scenic places, and perhaps promote a wider knowledge of its mountains, deserts, and the real western friendly spirit of its people...”⁵⁷ “Perhaps” remained the operational word that suggested hope for a park system still unsure of itself in the mid to late 1930s. Regardless, tourism in Nevada increased substantially and *Nevada Highways and Parks* focused on disseminating information about an accessible high-desert state through all four seasons of the year.

The Lincoln Highway developed slowly from the time that Captain James Simpson traversed the Egan Trail where the Pony Express mail route soon followed. Completion of the highway remains a matter of definition. If, for example, one uses the standard of an oiled surface, the highway was not completed across Nevada until after 1936.⁵⁸ The Victory Highway, or Highway 40, along the Humboldt River (today’s Interstate 80) was the first completely oiled highway and the most traveled route across the state in the mid-1930s. By the late 1930s, if the destination was Nevada, then travellers probably headed to Reno where the Biggest Little City offered gambling and amenities. Conversely, the Nevada outback, continued to linger behind the rest of the

⁵⁷ “Modern Highways Unify Nevadans” *Nevada Highways and Parks*, 1, 1 (January, 1936): 1.

⁵⁸ “Nevada Makes Scenic Desert Safe” *Nevada Highways and Parks*, 1, 1 (January, 1936): 3.

state as a secluded place, little touched by the changing tides of tourists at Yosemite, Yellowstone, Zion, and Lake Tahoe.

In 1937, *Nevada Highways and Parks* published “Snow Surveying: A New Science.” The article focused on Professor James Edward Church’s influence on the world, nation, and Nevada. In Nevada, a “Great dependence is placed upon its [snow surveys] determinations and predictions.” The article continued, “In fact, the snow survey findings which are made each year are eagerly awaited by farmers, power people, and others who will be directly affected.”⁵⁹ The wide dissemination of Church’s survey methods, and his ability to articulate the science of snow in multiple languages made him a well-known figure of his day.

By the 1940s, Nevada’s scenic and scientific interests remained secondary to ranching and mining. Replaced by gambling and divorce, James Scrugham’s vision of scenic and scientific parks lingered behind Nevada’s new tourism of gambling. A traveler could conveniently drive across the state in awe of the challenging environment of outback Nevada on the way to Reno or Las Vegas though all four seasons of the year.

In 1938, the Director of the Intermountain Forest and Range Experiment Station, Reed Bailey, traveled to Yellowstone National Park for the Western Regional Farm Bureau Conference. At Old Faithful Inn, Bailey warned water users of the West: “We must look beyond the headgate, the lateral, and the reservoir and become conscious of the source of our water.”⁶⁰ Bailey sent his presentation that emphasized the importance of snowpack to Church, who was at the time Vice Chairman in the Section of Hydrology for

⁵⁹ “Snow Surveying: A New Science” *Nevada Highways and Parks*, II, 1 (January, 1937): 1.

⁶⁰ Reed W. Bailey, “Mountain Waters,” Presented at the Western Regional Farm Bureau Conference, 1938, Special Collections, NC 96, University of Nevada, Reno.

the American Geophysical Union. Impressed with Bailey's conviction, "Both for attractiveness and inspiration," Church replied, "I have always believed in humanizing science. You have done so."⁶¹ The two men referred to the importance of snowpack and its relation to sustainable uses of water supply that, when understood, could transcend the limits of boundaries on the land. During the first four decades of the twentieth century, scientists and land managers untangled a positive relationship between mountain snowpack and water supply in the arid and semi-arid West. In Nevada, this meant the relationship between forests and irrigation on the ranges and basins in support of a settler society in a challenging outback environment. The conservation of snow, measurement, and distribution imposed an order on the lowlands that few could have imagined when resources beckoned for all to use. The measure of snow integrated Nevada's land use regimes, but the vastness of the high desert remains a difficult place to manage or predict.

⁶¹ James Edward Church to Reed W. Bailey, July 19, 1938, Special Collections, NC 96, University of Nevada, Reno.

In Summation

Euro-American settlers struggled to impose a settler society on Nevada's mountainous and arid outback where mountain waters disappeared into internal basins and stream waters often failed to flow during the midst of summer. During the nineteenth century, settlers developed unsustainable uses of renewable resources in the Nevada outback. Driven by relentless demand for precious metals that demanded timber, forage, and water resources for ore processing and mine stoping, forests vanished, stock numbers increased spectacularly, and scarce water sources fell to monopolization either by prior appropriation or riparian landownership. Even with the fast-paced change and exhaustion of rangeland resources, homesteading claims were modest at best, leaving much of the Nevada outback in federal ownership. In the early twentieth century that ownership opened the door to a national conservation movement that used political authority and range science in its infancy to regulate use of renewable forage resources by graziers in the high mountain ranges. National Forests under the newly established U.S. Forest Service in the Department of Agriculture became the immediate face of new rules and a new order to govern grazing practices on selected portions of the public domain designated as forest reserves.

Geographer Nathan Sayre in his 2017 book, *The Politics of Scale: A History of Rangeland Science*, argues that rangelands were much misunderstood. In part, that derives from the vastness and scale of the landscape dominated by marginal lands. Despite their marginality, these lands invited economic development or capitalist exploitation, yet became sites for incipient government control measures and the efforts

of scientists to understand the challenges of arid upland resource use.⁶² In the case of Nevada and other marginal rangelands, private land tenure systems never succeeded government ownership. By the late nineteenth century in Nevada, an expansive and varied commons, or public domain, opened to private grazing and other resource development, namely mining. The common grazing lands and the scarcity of water sources turned competition for resources into what would later be called “the tragedy of the commons.”⁶³ Both the failure of private range organizations and state government to address problems of the Nevada range spoke to the difficulties of governing marginal rangelands. The difficulties challenged the national or federal state to exert authority and order. It did so under the banner of the conservation movement, the system of U.S. national forests, and a systematizing of B.L.M. and U.S. Forest Service grazing permits that gave the national state a legible presence in the marginal lands of Nevada’s outback.⁶⁴

The Conservation Movement of the early twentieth century provided a way forward for politics, science, and knowledge to coalesce on a hinterland far removed from the economic centers of industry and development. Science became a pathway for the federal state to legitimate its authority over marginal and remote lands. Already-established livestock operators often saw opportunity and advantages in land management. The entrance of federal land management into outback Nevada marked the beginning of boundary formations based on land management schemes that have

⁶² Nathan F. Sayre, *The Politics of Scale: A History of Rangeland Science* (Chicago: University of Chicago Press, 2017), 1-3.

⁶³ Garrett Hardin, “The Tragedy of the Commons,” *Science*, 392, 3869 (December 1968): 1243-1248.

⁶⁴ James Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1998), 2, 6-7.

increased over time. The increased demarcation of Nevada, a place with increased boundaries based on federal land management schemes composed of vast stretches and sparse populations, continues to offer a platform for government, science, and capital to control and order the land based on public administration and private claims to an expansive landscape. Historically, the various stakeholders — often with differing visions for the proper human relationship with nature — presented a contentious stage for the implementation of the Conservation Movement.⁶⁵

Science, particularly plant or range ecology, bolstered a conservation movement's influence on the range. To reinforce federal authority to regulate stock numbers for resource protection and stamp the efforts with legitimacy, an emerging Forest Service embraced range science. The science, based largely on the work of University of Nebraska ecologist Frederic Clements' study of seral stages, with plant succession, sub-climaxes, and climaxes in plant communities, sought to set range carrying capacities in order to stabilize stock numbers and protect the forage and vegetation resource. His was a vision that placed early range management in thrall to a Great Plains ecological history.

This dissertation began with exploration and settlement that came together in outback Nevada during the 1850s with the eastward movement of the California mining and ranch frontier. Nevada and its mountainous landscape presented problems for settlers in search of land and opportunity. Especially problematic was the route to California. Surveyors arriving in Nevada struggled to make sense of the land and its potential uses. They searched for throughways to connect California with other urban centers in the Midwest and East recognizing that Nevada was simply a place to cross through. Other

⁶⁵ Nancy Langston, *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995), 5.

explorers and surveyors contemplated the possibility of sanctuaries in the high desert, mining opportunities, and sustainable livelihoods in the vast high desert lands. The initial mining operations of the nineteenth century brought many settlement opportunities across Nevada's marginal environments and precarious locations.

After 1860, miners moved east along the 39th Parallel from Virginia City and the Comstock, accelerating migration from California. Lake Tahoe became a place where resource extraction, especially logging and lumbering, clear-cut the landscape but also made it accessible. Later residents and investors at Lake Tahoe, itself a bit of an anomaly in the Great Basin, restructured their economic base and took advantage of Tahoe's now-accessible scenery. The roots for this transition were well-entrenched as the tourists never tired of the place during the nineteenth century—even during extensive logging and lumbering operations. At Lake Tahoe, with demands from the Comstock, intensive resource extraction and use came to Nevada. Later, forest reserves and national forests followed at Lake Tahoe by the twentieth century in a belated effort to protect the timber, water, and forage resources in a setting of striking scenic beauty. Soon after, National Forests appeared in some of Nevada's mountainous ranges to protect the state's high mountain water reservoirs. This is to say, the elevated mountainous lands accumulated winter snow whose spring run-off watered the lowlands.

Nevada's hinterland geography and aridity defined its isolation and marginality. Yet, distance and marginality did not bar the arrival of the Conservation Movement in Nevada with forestry experts designating forest reserves and their extensive boundaries. Their presence foreshadowed an ordered grazing agenda resting on political and scientific authority that cast a management rationale over the landscape based on the tenets of

sustained resource use. Sustainable resource-use came to mean the conservation of water in the form of snowpack, and at times, the protection of timber from mining industries that briefly flourished, yet in most instances swiftly disappeared.

The purposes of sustainable use translated to the conservation of livestock grazing and croplands, usually in riparian hayfields. The settlers affected by a new land use agenda varied, but cattle ranchers with deeded property became prioritized land users when, after 1905, the Forest Service began to confer special privileges to preferred users — landowners. This condition set the stage for priority-based users who settled along surface water sources and owned property where they would raise grass hay or other fodder to feed stock during the winter months.

With the encouragement of the Forest Service and its emphasis upon livestock advisory boards, local livestock associations developed in Nevada after the 1920s. Generally, livestock associations worked to receive favor from the Forest Service and influence Forest Service grazing decisions. These patterns of relationship developed before the creation of the United States Grazing Service and the Bureau of Land Management. None of these agencies, beginning with the Forest Service, granted grazing rights. Grazing occurred under a leasing or permit system based on preference and privilege of use.

With the arrival of the automobile, interests in Nevada's remote mountains increased, especially inside forest boundaries where Native American artifacts might be found alongside scenic and unusual natural settings. In the Snake Range on the eastern side of Nevada's portion of the Great Basin, the automobile made outback Nevada accessible to a new generation of travelers, spurred by completion of the Lincoln

Highway, which would later become U.S. Highway 50 and the arrival of automobile clubs. In the early part of the 1920s, the creation of Nevada's first National Monument connected it to the See America First campaign. The effort sparked renewed interest in diversifying Nevada's economy. The success at Lake Tahoe as a tourist destination was an example of the possibilities for similar developments in more remote lands. Still nothing elsewhere in Nevada could match the aesthetic appeal of the scenery perceived by the public in the Lake Tahoe setting.

A significant, if often overlooked, part of federal land management in Nevada rested upon the significance of mountain range snowpack. The creation of National Forests in Nevada both by presidential proclamation and Acts of Congress protected watershed and less so merchantable timber supplies. James Edward Church looked to the mountains (he considered them inverted reservoirs) as a way to measure, order, and predict the spring run-off of mountain snowpack. To know and order this resource became a lifelong obsession for the Nevada Classics professor turned physical scientist who recognized the possibilities and promises of mountain snows. In Nevada, he developed technologies to measure mountain snowpack and predict lowland surface water flows that continue to influence land use. The 1897 Forest Organic Act provided the basis for sustained conservation into the twentieth century with its emphasis upon the need to promote favorable conditions of water flows through forest protection or the creation of forest reserves. Church's contribution to snow measurement in the mountain heights was supported by federal land management agencies that established their authority, presence, and rationale during an early conservation movement.

The misunderstandings and mysteries of the Nevada environment are legendary.⁶⁶ Government, science, and capital all sought to order the land. At the same time, ranchers living on the land pursued their interests in the context of the influences of government, science, and capital, all seeking to order resource use. They saw advantages to cooperating with government-implemented science by consenting to stock limitations; in return, they saw the benefits of limiting the access of competitors to forest grazing resources as they worked through their livestock associations to achieve these ends.

By the time that the United State Grazing Service came into existence in 1936, a well-formed system of interaction between livestock graziers, government, science, and capital had already developed to secure a preferred settler grazing society. While cultural and scenic attributes of the land for these early non-Native users of the land, new interest groups have since succeeded in promoting the Great Basin's historical and physical attractions with a national park, new national monuments, state parks, wildlife refuges, wilderness areas and an appreciation for both settler and indigenous cultures. Clearly, Nevada's livestock graziers received priority throughout much of the first half of the twentieth century, but over time an increase of public land users complicated federal land management.

For a Nevada outback, federal land management was, and is, a major force in a state whose lands are largely controlled by the federal government (86 percent is a figure generally cited). The Forest Service's early mandate to protect favorable conditions of water flows extended to the conservation of timber and other vegetation to protect

⁶⁶ An early poem by Francis Fuller Victor appearing in the *Overland Monthly* ponders the mystery and enigma of the Nevada environment. See Francis Fuller Victor, "Nevada," *Overland Monthly* 3 (December 1869): 423-424.

snowpack. The preferred land users, who were ranchers dependent on access to high mountain grazing, received advantage in the new political and scientific order initiated by the Forest Service. Their preferred status, guaranteed by the issuance of grazing permits or privileges, excluded competitors unable to obtain the privilege. The long-term permits were an economic collateral that added to the value of the home ranch when bankers often considered the permits in the granting of loans and the appraisal of property values.

The 39th parallel in Nevada has a story to tell that is so much more than the romanticizing of surveyors, geologists, Pony Express riders, mining bonanzas and borascas, or ranching cultures. The inclusion of the federal government and its attempts to secure a stable settler society has largely been left out of Nevada's early twentieth century history. Forest Service personnel attempted to create an equilibrium, or a carrying capacity, between resources and resource users that has often faltered because of an unpredictable environment and changes in how humans create, understand, and interact with the landscape. Their efforts, however, used the incipient discipline of ecology to attempt a sustainable land use agenda. While ecology brought legitimacy to the federal land use agenda, it brought exogenous influences in politics and economics and became, at times, a handmaiden to the interests of government and capital—and of course politics.⁶⁷

Forest rangers and supervisors who were on the front lines prioritized local interests and succeeded in circumventing rules and regulations unfit for high mountain grazing in outback Nevada. Regardless, by the end of the 1920s and the rise of livestock associations at both local and national levels, ranchers secured their voice in politics and

⁶⁷ Sayre, *The Politics of Scale*, 209-210.

confronted the Forest Service on a wide range of issues. In outback Nevada, the landscape appears empty and dominated by an untouched natural order. Yet, the appearances disguise a place wrapped in historically complex land management schemes where high forested mountains collect snows and emit water through spring and summer months that sustain a variety of land uses.

Images

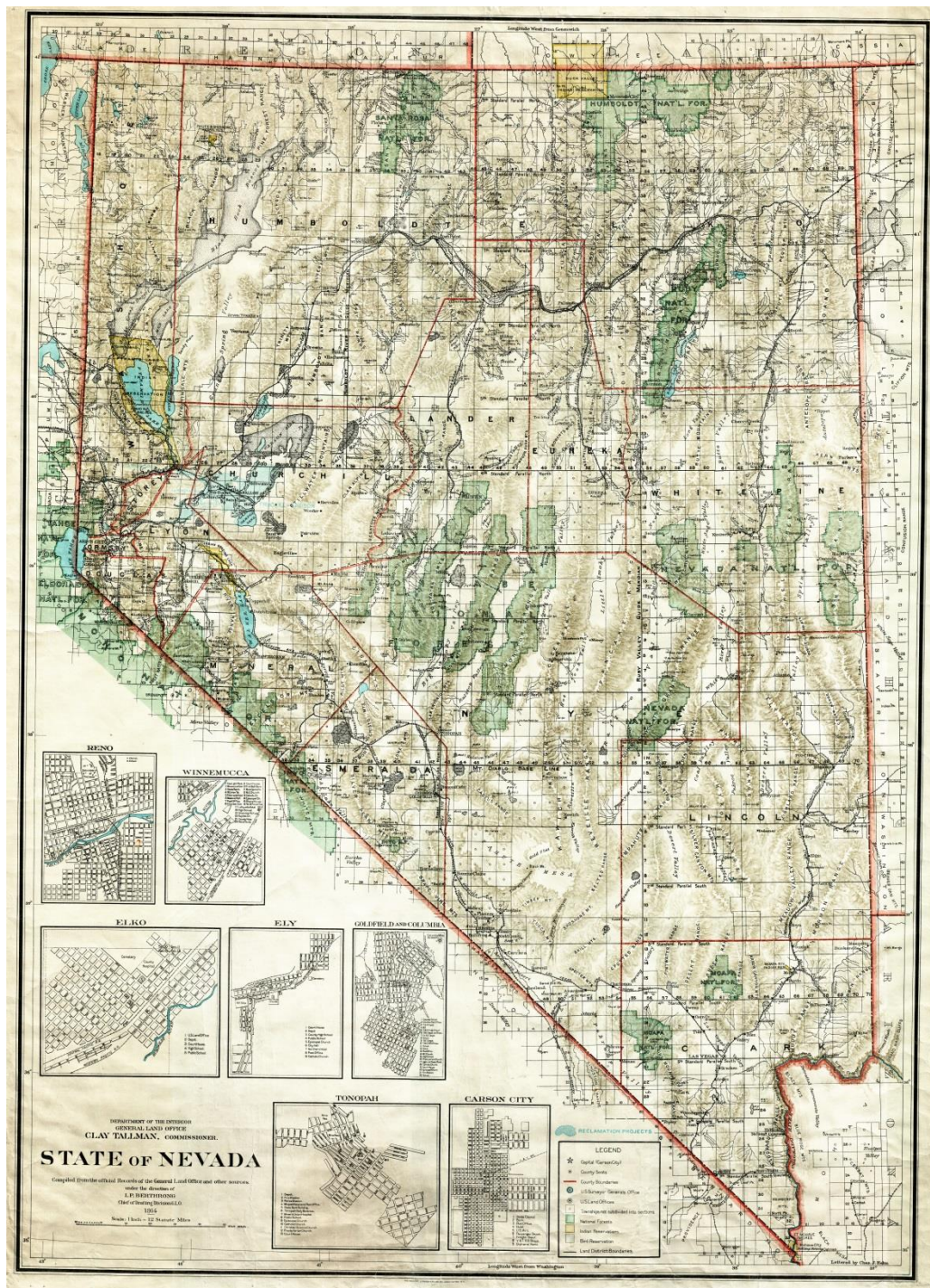


Image 4: National Forest Map of Nevada, 1914. (Courtesy of University of Nevada, Reno, Special Collections)

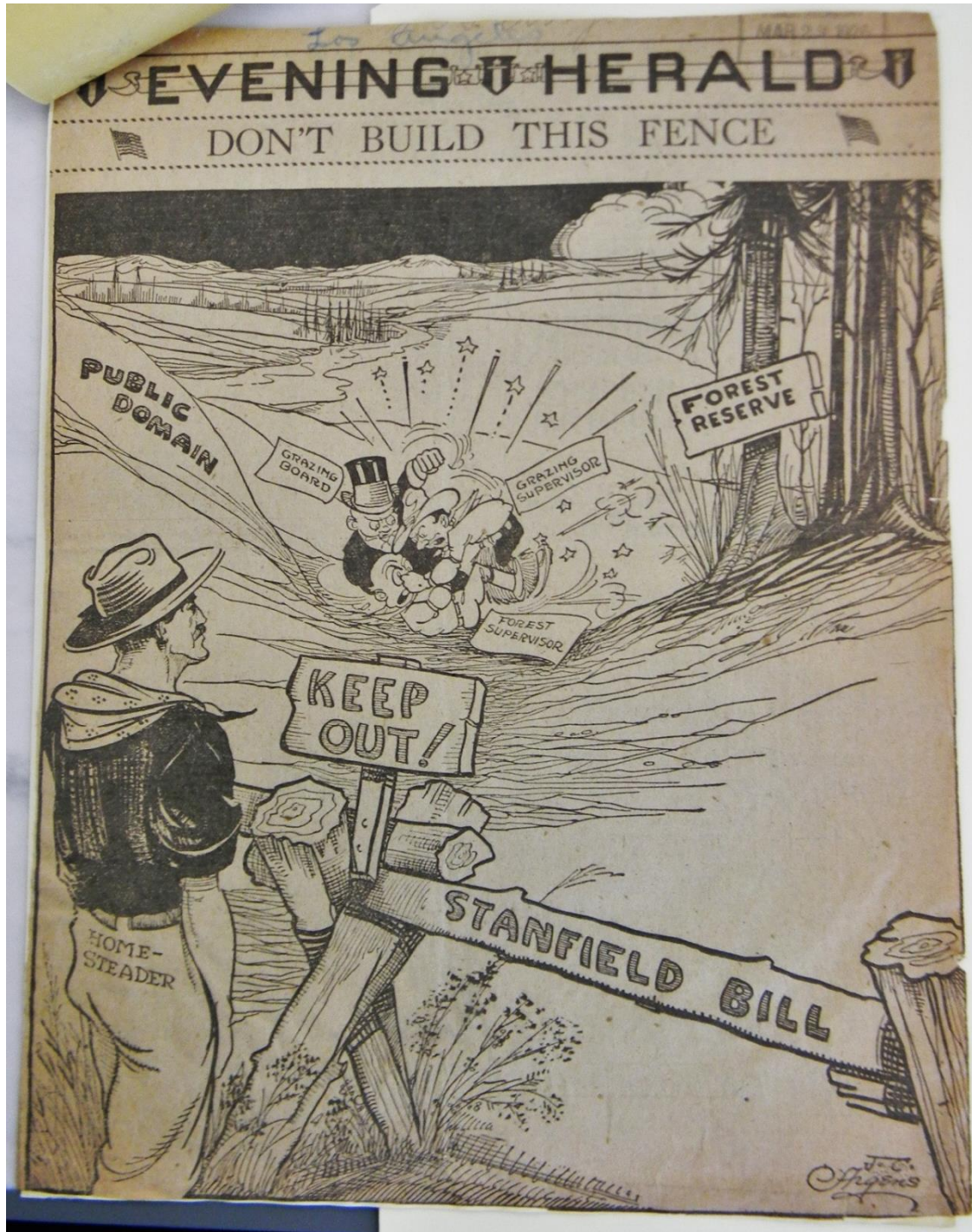


Image 5: Stanfield Bill (Senate Bill No. 2584): Designed to give the livestock industry vested rights on the forest. (Courtesy of National Archives and Records Administration II, College Park, MD)



Image 6: Santa Rosa Range Floods at Rebel Creek Ranger Station, 1918. (Courtesy of National Archives and Records Administration II, College Park, MD)



Image 7: Santa Rosa Range Floods Illustrating Erosion Around Quadrat, 1918. (Courtesy of National Archives and Records Administration II, College Park, MD)

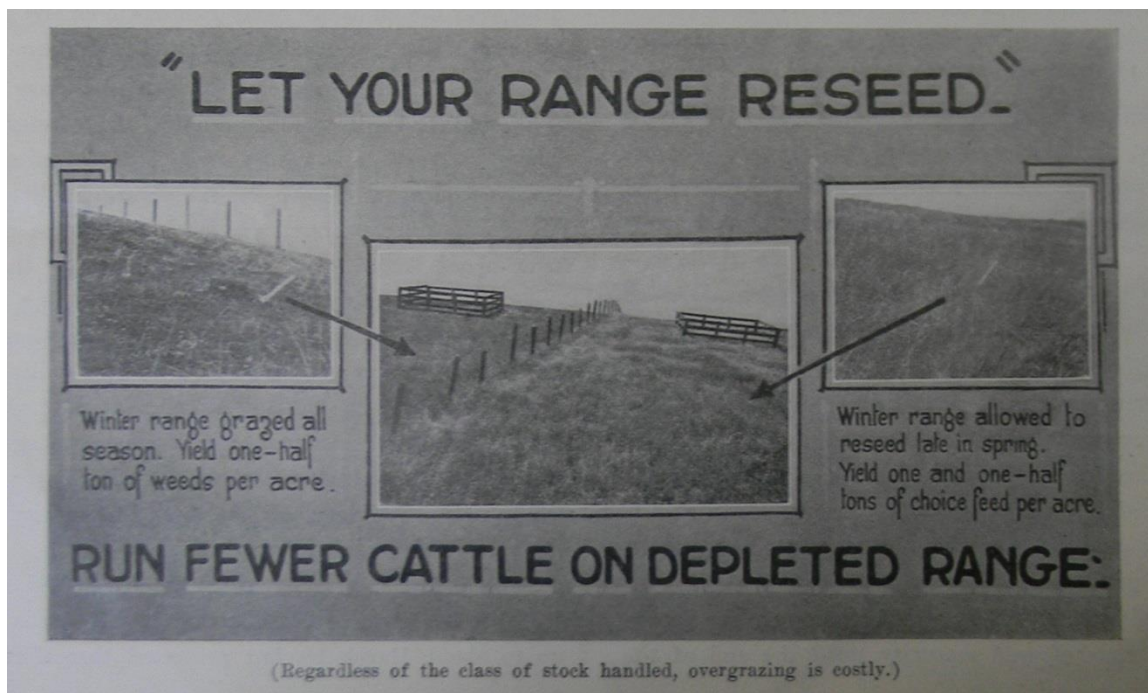


Image 8: Arthur Sampson Reseed Instructions for Ranchers. (Courtesy of National Archives and Records Administration II, College Park, MD)

Bibliography

- Adams, Romanzo. *Taxation in Nevada: A History*. Carson City: State Printing Office, 1918.
- Adams, Romanzo. "Public Range Lands—A New Policy Needed." *American Journal of Sociology*, Vol. 22 (November, 1916): 324-351.
- Albright, Horace and Schenk, Marion Albright. *Creating the National Park Service: The Missing Years*. Norman: University of Oklahoma Press, 1999.
- Alexander, Thomas G. *The Rise of Multiple-Use Management in the Intermountain West: A History of Region 4 of the Forest Service*, FS-399. Washington: United State Department of Agriculture, 1987.
- Alexander, Thomas G. *A Clash of Interests: Interior Department and Mountain West, 1863-1896*. Provo: Brigham Young University Press, 1977.
- Anker, Peder. *Imperial Ecology: Environmental Order in the British Empire*. Cambridge: Harvard University Press, 2001.
- Arrington, Leonard J. *Great Basin Kingdom: Economic History of the Latter-Day Saints, 1830-1900*, first published 1958. Lincoln: University of Nebraska Press, 1966.
- Austin, Mary. *The Flock*. Boston and New York: Houghton, Mifflin & Company, 1906.
- Barnes, Will C. *Apaches and Longhorns: The Reminiscences Will C. Barnes*. Los Angeles: The Ward Ritchie Press, 1941.
- Balzar, F. B. "Message of Gov. F. B. Balzar." *Appendix to Journals of Senate and Assembly of the Thirty-Fifth Session of the Legislature of the State of Nevada* Vol. I. Carson City: State Printing Office, 1931.
- Barringer, Mark Daniel. *Selling Yellowstone: Capitalism and the Construction of Nature*. Lawrence: University of Kansas Press, 2002.

- Barth, Gunther. *Instant Cities: Urbanization and the Rise of San Francisco and Denver*. New York: Oxford University Press, 1975.
- Bartlett, Richard A. *Great Surveys of the American West*. Norman: University of Oklahoma Press, 1989.
- Bein, Morris. "Influence of the Work of the Reclamation Service on the Forestry Movement." *Forestry and Irrigation*, XII (January, 1906): 46-48.
- Belich, James. *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783-1939*. Oxford: Oxford University Press, 2009.
- Bidwell, John. "The First Emigrant Train to California." *Century Magazine*, XLI (November, 1890).
- Blanchard, C. J. "Mutual Relations of the Forest Service and the Reclamation Service," *Forestry and Irrigation*, XII (January, 1906): 42-43.
- Boak, Cada C. "Dedication of Lehman Caves National Monument: Ascent and Perilous Descent of Mount Wheeler, August 1922." *Nevada Historical Society Quarterly*, Vol. XVI, No. 2 (Summer, 1973): 101-112.
- Bowers, Michael W. *The Sagebrush State: Nevada's History, Government, and Politics*. Reno: University of Nevada Press, 1996.
- Brechin, Gray. *Imperial San Francisco: Urban Power, Earthly Ruin*. Berkeley: University of California Press, 2006.
- Breen, Fred S. "Forest Reserves as Seen at Close Range." *Forestry and Irrigation*, XIII (April, 1907): 180-183.
- Brown, J. Rosse. *A Peep at Washoe and Washoe Revisited*. California: Paisano Press, 1959.
- Browne, Janet. *Charles Darwin: Voyaging*. New Jersey: Princeton University Press, 1995.
- Carhart, Arthur. *The National Forests*. New York: Alfred A. Knopf, 1959.
- Chaffin, Tom. *Pathfinder: The Course of American Empire*. New York: Hill and Wang, 2002.

- Childers, Leisl Carr. *The Size of the Risk: Histories of Multiple Use in the Great Basin*. Norman: University of Oklahoma Press, 2015.
- Church, James Edward. "Snow Surveying: Its Principles and Possibilities," *Geographical Review*, 23 (October 1933): 529-563.
- Church, James Edward. "The Human Side of Snow: The Saga of the Mount Rose Observatory," *Scientific Monthly*, 44 (February, 1937): 137-149.
- Church, James Edward. "The Human Side of Snow: Sport and Transport," *Scientific Monthly*, 54 (March 1942): 211-229.
- Cline, Gloria Griffin. *Exploring the Great Basin*. Norman: University of Oklahoma Press, 1963.
- Clements, Frederick E. *Plant Physiology and Ecology*. New York: Henry Hold, 1907.
- Clements, Frederick E., Weaver, John E., and Hanson, Herbert. *Plant Competition: An Analysis of Community Functions*. Washington: Carnegie Institute of Washington, 1929.
- Coates, Peter. *Nature: Western Attitudes since Ancient Times*. Berkeley: University of California Press, 2005.
- Conover, Milton. *The Office of Experiment Stations: Its History, Activities, and Organization*. Baltimore: The Johns Hopkins University Press, 1924.
- Coville, Frederick V. "A Report on Systems of Leasing Areas of Grazing Land: Together with an Outline of the Proposed System for the Regulation of Grazing on the Public Lands of the United States." *Report of the Public Lands Commission*. Washington: Government Printing Office, 1905.
- Coville, Frederick V. *Forest Growth and Sheep Grazing in the Cascade Mountains of Oregon*. Washington: Government Printing Office, 1898.
- Cox, Thomas. "Before the Casino: James G. Scrugham, State Parks, and Nevada's Quest for Tourism." *Western Historical Quarterly*, 24 (August, 1993): 332-350.
- Crane, Ralph and Fletcher, Lisa. *Cave: Nature and Culture*. London: Reaktion Books, 2015.

- Cronon, William. *Nature's Metropolis: Chicago and the Great West*. New York: W. W. Norton & Company, 1991.
- Crosby, Alfred. *Ecological Imperialism: The Biological Expansion of Europe*. Cambridge: Cambridge University Press, 2004.
- Crosby, Alfred. *The Columbian Exchange: Biological and Cultural Consequences of 1492*. Westport, Connecticut: Greenwood Press, 1972.
- Davies, Pete. *American Road: The Story of an Epic Transcontinental Journey at the Dawn of the Motor Age*. New York: Henry Holt and Company, 2002.
- Deakin, Alfred. *Irrigation in Western America, so far as it has relation to the circumstances in Victoria, and Irrigation in*. Victoria: Royal Commission on Water Supply, 1885.
- DeCourten, Frank L. *The Broken Land: Adventures in Great Basin Geology*. Salt Lake City: University of Utah Press, 2003.
- Domosh, Mono. *Invented Cities: The Creation of Landscape in Nineteenth Century New York and Boston*. New Haven: Yale University Press, 1996.
- Donahue, Debra. *The Western Range Revisited: Removing Livestock from the Public Lands to Conserve Native Biodiversity*. Norman: University of Oklahoma Press, 1999.
- Doten, Alfred. *The Journals of Alfred Doten*, edited by Walter Van Tilburg Clark. Reno: University of Nevada Press, 1973.
- Doten, Samuel Bradford. *An Illustrated History of the University of Nevada*. Reno: The University of Nevada, 1924.
- Drago, Harry Sinclair. *The Great Range Wars: Violence on the Grasslands*. New York: Dodd, Mead & Company, 1970.
- Dutton, Clarence. "Mount Taylor and the Zuni Plateau"
- Dutton, W. L. "History of Forest Service Grazing Fees." *Journal of Range Management* Vol. 6, No. 6 (November, 1953).

- Egan, Howard R. *Pioneering the West, 1846-1878: Major Howard Egan's Diary*. Salt Lake City: Skelton Publishing Company, 1917.
- Ekrich, Arthur A. *Man and Nature in America*. Lincoln: University of Nebraska Press, 1973.
- Elliott, Russell R. *History of Nevada*. Lincoln: University of Nebraska Press, 1973.
- Elliott, Russell R. *Nevada's Twentieth Century Mining Boom: Tonopah, Goldfield, Ely*. Reno: University of Nevada Press, 1966.
- Elliott, Russell R. "The Early History of White Pine County, Nevada, 1865-1887." *The Pacific Northwest Quarterly*, 30 (April 1939): 145-168.
- Engel, Ronald. *Sacred Sands: The Struggle for Community in the Indiana Dunes*. Middletown: Wesleyan University Press, 1983.
- Engelmann, Henry. "Report on the Geology of the Country between Fort Leavenworth, Kansas, and the Sierra Nevada, Near Carson Valley." *In Report of the Explorations Across the Great Basin of the Territory of Utah for a Direct Wagon-Route from Camp Floyd to Genoa, in Carson Valley, in 1859*, Captain James Hervey Simpson, first published 1876. Reno: University of Nevada Press, 1983.
- Farmer, Jared. *On Zion's Mount: Mormons, Indians, and the American Landscape*. Cambridge: Harvard University Press, 2008.
- Fernow, Bernard. "Pseudo-Science in Meteorology," *Science*, 71 (May, 1896): 706-707.
- Fernow, Bernard. *Forest Influences*. Washington: Department of Agriculture, 1893.
- Francaviglia, Richard V. *The Mapmakers of New Zion: A Cartographic History of Mormonism*. Salt Lake City: University of Utah Press, 2015.
- Francaviglia, Richard V. *Mapping and Imagination in the Great Basin: A Cartographic History*. Reno: University of Nevada Press, 2005.
- Francaviglia, Richard V. *Hard Places: Reading the Landscape of America's Historic Mining Districts*. Iowa City: University of Iowa Press, 1991.

- Franswa, Gregory M. and Peterson, Jesse G. *The Lincoln Highway: Nevada*. Tucson: The Patrice Press, 2004.
- Frémont, John C. "A Report of the Exploring Expedition to Oregon and North California in the Year of 1843-44." *In Report of the Exploring Expedition to the Rocky Mountains by John Charles Frémont*. Readex Microprint Corporation, 1966.
- Fulton, Robert L. "How Nature Regulates the Rains" *Science*, 3 (April, 1896): 547-549.
- Furgeson, Denzel and Nancy. *Sacred Cows at the Public Trough*. Bend, Oregon: Maverick Publications, 1983.
- Gates, Paul Wallace. *History of Public Land Law Development*, first published 1968. Florida: Gaunt and Sons, Inc., 1987.
- Gilbert, Grove Karl. *Studies in Basin and Range Structure*. Washington: Government Printing Office, 1928.
- Gilbert, Grove Karl. "Report on the Geology of portions of Nevada, Utah, California, and Arizona, examined in the Years 1871 and 1872." 1875.
- Gillieson, David. *Caves: Processes, Development, Management*. Oxford: Oxford University Press, 1996.
- Goetzmann, William. *Exploration and Empire: The Explorer and the Scientist in the Winning of the West*. Austin: Texas State Historical Society, 2000.
- Gould, Stephen Jay. *Time's Arrow, Times Cylce: Myth and Metaphor in the Discovery of Geologic Time*. Cambridge: Harvard University Press, 1987.
- Green, Michael S. *Nevada: A History of the Silver State*. Reno: University of Nevada Press, 2015.
- Griffiths, Tom and Robin, Libby eds. *Ecology and Empire: Environmental History and Settler Societies*. Seattle: University of Washington Press, 1997.

- Gruell, George E. *Nevada's Changing Wildlife Habitat: An Ecological History*. Reno: University of Nevada Press, 2012.
- Grusin, Richard. *Culture, Technology, and the Creation of America's National Parks*. Cambridge: Cambridge University Press, 2004.
- Hagan, Joel B. *An Entangled Bank: The Origins of Ecosystem Ecology*. New Brunswick: Rutgers University Press, 1992.
- Hagan, Joel B. "Clementsian Ecologists: The Internal Dynamics of a Research School." *Osiris*, 8 (1993): 178-195.
- Hallam, A. *Great Geological Controversies*, second edition. Oxford: Oxford University Press, 1989.
- Hardin, Garrett. "The Tragedy of the Commons." *Science*, Vol. 392 (December, 1968): 1243-1248.
- Harding, T. Swann. *Two Blades of Grass: A History of Scientific Development in the U.S. Department of Agriculture*. Norman: University of Oklahoma Press, 1947.
- Hardman, George. *James Edward Church: Bibliography of a Snow Scientist*, Bibliographical Series 4 (Reno: University of Nevada Press, 1964).
- Harley, J. B. "Maps, Knowledge, and Power." In *The Iconography of Landscape: Essays on the Symbolic Representations, Design and Use of Past Environments*, edited by Denis Cosgrove and Stephen Daniels, pp. . Cambridge: Cambridge University Press, 1988.
- Hays, Samuel P. *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920*. First published 1959. Pittsburgh: University of Pittsburgh Press, 1999.
- Heathcote, R. L. *Back of Bourke: A Study of Land Appraisal and Settlement in Semi-Arid Australia*. Victoria: Melbourne University Press, 1965.

- Helms, Douglas, Effland Anne B. W., and Phillips Steven E. *Profiles in the History of the U.S. Soil Survey*. Ames: Iowa State Press, 2002.
- Helms, Douglas, *The History of Snow Survey and Water Supply Forecasting*. U.S. Department of Agriculture: Natural Resources and Conservation Service, 2008.
- Hokanson, Drake. *The Lincoln Highway: Main Street across America*. Iowa City: University of Iowa Press, 1988.
- Houghton, Samuel G. *A Trace of Desert Waters: The Great Basin Story*. Salt Lake City: Howe Brothers, 1986.
- Howard, Anne Bail. *The Long Campaign: A Biography of Anne Martin*. Reno: University of Nevada Press, 1985.
- Hyde, Anne Farrar. *An American Vision: Far Western Landscape and National Culture, 1820-1920*. New York: New York University Press, 1990.
- Igler, David. *Industrial Cowboys: Miller & Lux and the Transformation of the Far West, 1850-1920*. Berkeley: University of California Press, 2005.
- Ise, John. *The United States Forest Policy*. New Haven: Yale University Press, 1920.
- Jackson, W. Turrentine. *Treasure Hill: Portrait of a Silver Mining Camp*. Tucson: University of Arizona Press, 1963.
- Jackson, W. Turrentine. *Wagon Roads West: A Study of Federal Road Surveys and Construction of the Trans-Mississippi West, 1846-1869*. Berkeley: University of California Press, 1952.
- James, George Wharton. *The Lake in the Sky: Lake Tahoe in the High Sierras of California and Nevada*. New York: Baker and Taylor, 1915.
- James, Ronald. *The Roar and the Silence: A History of Virginia City and the Comstock Lode*. Reno: University of Nevada Press, 1998.

- Jordan, Terry G. *North American Cattle-Ranching Frontiers: Origins, Diffusion, and Differentiation*. Albuquerque: University of New Mexico Press, 1993.
- Kaufman, Herbert. *The Forest Ranger: A Study in Administrative Behavior*. Baltimore: Johns Hopkins University Press, 1960.
- King, Clarence. "United States Geological Exploration of the 40th Parallel."
- Kingsland, Sharon E. *The Evolution of American Ecology, 1890-2000*. Baltimore: Johns Hopkins University Press, 2005.
- Kolvet, Renée Corona and Ford, Victoria. *The Civilian Conservation Corp in Nevada: From Boys to Men*. Reno: University of Nevada Press, 2006.
- Lambert, Darwin. *Great Basin Drama*. Niwot, Colorado: Roberts Rinehart Publishers, 1991.
- Landrum, Ney C. *The State Park Movement in America: A Critical Review*. Columbia: University of Missouri Press, 2004.
- Langston, Nancy. *Where Land and Water Meet: A Western Landscape Transformed*. Seattle: University of Washington Press, 2003.
- Langston, Nancy. *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West*. Seattle: University of Washington Press, 1995.
- Laxalt, Robert. *Sweet Promised Land*. New York: Harper Collins, 1957.
- Lekisch, Barbara. *Tahoe Place Names: The Origin and History of Names in the Tahoe Basin*. Great West Books, 1996.
- Lillard, Richard G. *Desert Challenge: An Interpretation of Nevada*. New York: Alfred K. Knopf, 1949.
- Lowenthal, David. *George Perkins Marsh: Prophet of Conservation*. Seattle: University of Washington Press, 2000.
- Marsh, George Perkins. *Man and Nature: or, Physical Geography as Modified by Human Action*. New York: Scribner, 1864.

- Martin, Anne. "Nevada: Beautiful Desert of Buried Hopes." *The Nation*, 115 (July, 1922): 89-92.
- Marx, Leo. *The Machine in the Garden: Technology and the Pastoral Ideal in America*. Oxford: Oxford University Press, 2000.
- May, Dean. *Three Frontiers: Family, Land, and Society in the American West, 1850-1900*. Cambridge: Cambridge University Press, 1994.
- McLane, Alvin. "Exploration and Early Mapping in Eastern Nevada." *Nevada Historical Society Quarterly*, XXXI (Winter 1998): 282-291.
- McLane, Alvin. *Silent Cordilleras*. Camp Nevada Monograph No. 4. Reno: Camp Nevada, 1978.
- McPhee, John. *Basin and Range*. New York: Farrar, Strauss, Gerrar, 1981.
- Meldahl, Keith Heyer. *Hard Road West: History and Geology along the Gold Rush Trail*. Chicago: University of Chicago Press, 2007.
- Mergen, Bernard. *Snow in American*. Washington: Smithsonian Institution Press, 1997.
- Mergen, Bernard. "Seeking Snow: James Edward Church and the Beginnings of a New Science," *Nevada Historical Society Quarterly*, 35 (Summer 1992): 75-104.
- Meringolo, Denise D. *Museums, Monuments, and National Parks: Toward a New Genealogy of Public History*. Amherst: University of Massachusetts Press, 2012.
- Miller, Perry. "The Romantic Dilemma in American Nationalism and the Concept of Nature." *Harvard Theological Review*, XLVIII (October, 1955).
- Mills, Stephen. *The American Landscape*. Edinburgh: Edinburgh University Press, 1997.
- Mitchell, Guy Elliott. "Re-conquest of Nevada." *Forestry and Irrigation*, IX (May, 1905): 220-223.
- Moehring, Eugene. "Comstock Urban Network." *Pacific Historical Review*, 66 (August, 1997): 337-362.

- Morgan, Dale L. *The Humboldt: High Road of the West*. New York: Farrar and Rinehart, Inc., 1943.
- Morgan, Dale L. *Jedediah Strong Smith and the Opening of the West*. New York: The Bobbs-Merrill Company, Inc., 1953.
- Morrill, Karen. *Public Lands and Political Meaning: Ranchers, Government, and the Property Between Them*. Berkeley: University of California Press, 2002.
- Muir, John. *Steep Trails*, edited by William Frederic Bade. Boston and New York: Houghton and Mifflin Company, 1918.
- Nash, Gerald D. *The American West Transformed: The Impact of the Second World War*. Bloomington: Indiana University Press, 1988.
- Nash, Linda. *Inescapable Ecologies: A History of Environment, Disease, and Knowledge*. Berkeley: University of California Press, 2006.
- Nash, Roderick Fraser. *Wilderness and the American Mind*. New Haven: Yale University Press, 2001.
- Nielson, Otto T. W. "Lehman Caves." *Zion and Bryce Nature Notes*. Department of the Interior: National Park Service Vol. 6, No. 4 (July-August, 1934): pp. 41-43
- Olmstead, Frederick Law. "Public Parks and the Enlargement of Towns" (1870).
- Oreskes, Naomi, ed. *Plate Tectonics: An Insider's History of the Modern Theory of the Earth*. Cambridge: Westview Press, 2003.
- Oreskes, Naomi. *The Rejection of Continental Drift: Theory and Method in American Earth Sciences*. New York: Oxford University Press, 1999.
- Orsi, Richard. *Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930*. Berkeley: University of California Press, 2007.
- Panofsky, Erwin. *Meaning in the Visual Arts: Papers in and on Art History*. New York: Overlook Press, 1974.

- Patterson, Edna, et al. *Nevada's Northeast Frontier*. Sparks, Nevada: Western Printing & Publishing Company, 1969.
- Paul, Rodman W. "The Wheat Trade between California and the United Kingdom." *Mississippi Valley Historical Review*, 45 (December, 1958): 391-412.
- Pauly, Phillip J. *Fruits and Plains: The Horticultural Transformation of America*. Cambridge: Harvard University Press, 2007.
- Peffer, E. Louise. *The Closing of the Public Domain: Disposal and Reservation Policies, 1900-1950*. Stanford: Stanford University Press, 1951.
- Peterson, Charles S. *Look to the Mountains: Southeastern Utah and the La Sal National Forest*. Provo: Brigham Young University Press, 1975.
- Pinchot, Gifford. *Breaking New Ground*. New York: Harcourt, Brace and Company, 1947.
- Pisani, Donald J. *To Reclaim a Divided West: Water, Law, and Public Policy, 1848-1902*. Albuquerque: University of New Mexico Press, 1992.
- Pisani, Donald J. "Irrigation, Water Rights, and the Betrayal of Indian Allotment," *Environmental Review*, 10 (Autumn 1986): 157-176.
- Pisani, Donald J. "Federal Reclamation and Water Rights in Nevada," *Agricultural History*, 51 (July 1977): 540-558.
- Pisani, Donald J. "Lost Parkland: Lumbering and Park Proposals in the Tahoe Truckee Basin," *Journal of Forest History*, 21 (1977): 4-17.
- Pomeroy, Earl. *In Search of the Golden West: The Tourist in Western America*. New York: Alfred A. Knopf, 1957.
- Potter, Albert F. "Questions Regarding the Public Grazing Lands of the Western United States." *Report of the Public Lands Commission*. Washington: Government Printing Office, 1905.

- Powell, Fred Wilbur. "The Bureau of Plant Industry: Its History, Activities, and Organization." *Institute for Government Research: Service Monographs for the United States Government, No. 47*. Johns Hopkins University Press, 1927.
- Pyne, Stephen J. *Grove Karl Gilbert: A Great Engine of Research*. Austin: University of Texas Press, 1990.
- Quille, Dan de. *History of the Big Bonanza: An Authentic Account of the Discovery, History, and Working of the World Renowned Comstock Silver Lode of Nevada*. Washington: American Publishing Company, 1876.
- Raymond, C. Elizabeth. "When the Desert Won't Bloom: Environmental Limitation in the Great Basin." In *Many Wests: Place, Culture, and Regional Identity*, edited by David M. Wrobel and Michael C. Steiner. Lawrence: University Press of Kansas, 1997.
- Raymond, C. Elizabeth. *George Wingfield: Owner and Operator of Nevada*. Reno: University of Nevada Press, 1992.
- Raymond, C. Elizabeth. "'A Place One Never Tires of': Changing Landscape and Image at Lake Tahoe." In *Stopping Time: A Rephotographic Survey of Lake Tahoe*, Peter Goin, pp. 11-23. Albuquerque: University of New Mexico Press, 1992.
- Raymond, C. Elizabeth. "Sense of Place in the Great Basin." In *East of Eden, West of Zion: Essays on Nevada*, edited by Wilbur S. Shepperson, pp. 17-29. Reno: University of Nevada, Reno.
- Richards, W.A., Newell, F.H., and Pinchot, Gifford. "Partial Report of the Public Lands Commission. *Report on the Public Lands Commission*. Washington: Government Printing Office, 1905.
- Roberts, Paul H. *Hoof Prints on the Forest Ranges: The Early Years of the National Forest Range Administration*. San Antonio: The Naylor Company, 1963.

- Robbin, William G. *American Forestry: A History of National, State, & Private Cooperation*. Lincoln: University of Nebraska Press, 1985.
- Robinson, Glen O. *The Forest Service: A Study in Public Land Management*. Baltimore: Johns Hopkins University Press, 1975.
- Roosevelt, Theodore. "The President on Public Lands, Irrigation and Forestry." *Forestry and Irrigation*, XI (December, 1905): 546-547.
- Rothman, Hal. *America's National Monuments: The Politics of Preservation*. Lawrence: University of Kansas Press, 1994.
- Rothman, Hal. "Second-Class Sites: National Monuments and the Growth of the National Park System." *Environmental Review*, 10 (Spring 1986): 44-56.
- Rowley, William D. "From Open Range to Closed Range on the Public Lands." In *Land in the American West: Private Claims and the Common Good*, edited by William G. Robbins and James C. Foster. Seattle: University of Washington Press, 2000.
- Rowley, William D. "People of Good Hope in the Land of Nod." *Nevada Historical Society Quarterly*, 42 (Spring 1999): 3-20.
- Rowley, William D. *Reclaiming the Arid West: The Career of Francis G. Newlands*. Bloomington: Indiana University Press, 1996.
- Rowley, William D. "Forests and Water Supply: Robert L. Fulton, Science, and U.S. Forest Policies." *Nevada Historical Society Quarterly*, 37 (Fall 1994): 215-224.
- Rowley, William D. *U.S. Forest Service Grazing and Rangelands: A History*. College Station: Texas A&M University Press, 1985.
- Rudwick, Martin J. S. *The Great Devonian Controversy: The Shaping of Scientific Knowledge among Gentlemanly Specialists*. Chicago: University of Chicago Press, 1985.

- Ryan, Simon. "Inscribing the Emptiness: Cartography, Exploration and the Construction of Australia." In *Describing Empire: Post-Colonialism and Textuality*, edited by Chris Tiffin and Alan Lawson. London: Routledge, 1994.
- Sachs, Arron. *The Humboldt Current: Nineteenth Century Exploration and the Roots of American Environmentalism*. New York: Penguin Books, 2006.
- Sampson, Arthur W. "Succession as a Factor of Range Management." *Journal of Forestry*, 4 (May, 1917): 593-596.
- Sargent, Shirley, ed. *Seeking the Elephant, 1849: James Mason Hutchings' Journal of His Overland Trek to California, 1848, and Letters from the Mother Lode*. Arthur H. Clark, 1981.
- Sawyer, Byrd Wall. *Nevada Nomads: A Story of the Sheep Industry*. San José: Harlan Young Press, 1971.
- Sayre, Nathan F. *The Politics of Scale: A History of Rangeland Science*. Chicago: University of Chicago, 2017.
- Schultheis, Rob. *The Hidden West: Journeys in the American Outback*. New York: Random House, 1982.
- Scott, James. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press, 1998.
- Shaffer, Marguerite S. *See America First: Tourism and National Identity, 1880-1940*. Washington: Smithsonian Institution Press, 2001.
- Shidler, James H. *Farm Crisis, 1919-1921*. Berkeley: University of California Press, 1957.
- Shinn, Charles Howard. "Work in a National Forest: Sheep in the High Sierras." *Forestry and Irrigation*, XIII (November, 1907): 592-595.
- Shinn, Charles Howard. "Work in the National Forests." *Forestry and Irrigation* Vol. XIII, No. 10 (October, 1907).

- Slotkin, Richard. *The Fatal Environment: The Myth of the Frontier in the Age of Industrialism, 1800-1890*. Norman: University of Oklahoma Press, 1994.
- Smith, Darrell H. *The Forest Service: Its History, Activities and Organization*. Washington: The Brookings Institution, 1930.
- Smith, Henry Nash. *Virgin Land: The American West as Symbol and Myth*, twentieth printing. Cambridge: Harvard University Press, 2007.
- Smythe, William E. "The Homemaker or Speculator?" *Forestry and Irrigation*, XI (September, 1903): 442-446.
- Starrs, Paul. "Ranching: An Old Way of Life in the New West." In *Ranching West of the 100th Meridian: Culture, Ecology, and Economics*, edited by Richard L. Knight, Wendell C. Gilbert, and Ed Marston. Washington D.C.: Island Press, 2002.
- Starrs, Paul. *Let the Cowboy Ride: Cattle Ranching in the American West*. Baltimore: Johns Hopkins University Press, 1998.
- Steen, Harold. *The US. Forest Service: A History*. Seattle: University of Washington Press, 2004.
- Stegner, Wallace. *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West*. New York: Penguin Books, 1992.
- Stensvaag, James T. "The Life of My Child: Jeanne Wier, The Nevada Historical Society, and the Great Quarters Struggle on the 1920s." *Nevada Historical Society Quarterly*, 23, (Spring 1980): 3-20.
- Stine, Scott. *A Way Across the Mountain: Joseph Walker's 1833 Trans-Sierran Passage and the Myth of the Yosemite's Discovery*. Norman: University of Oklahoma Press, 2015.
- Stott, Clifford. *Search for Sanctuary: Brigham Young and the White Mountain Expedition*. Salt Lake City: University of Utah Press, 1984.

- Strauss, Fred A. "Forecasting Water Supply through Snow Surveys," *American Water Works Association*, 46 (September 1954): 853-863.
- Strong, Douglas H. *Tahoe: From Timber Barons to Ecologists*. Lincoln: University of Nebraska Press, 1984.
- Strong, Douglas H. "Preservation Efforts at Lake Tahoe," *Journal of Forest History*, 25 (April 1981): 78-97.
- Sutter, Paul. *Driven Wild: How the Fight Against Automobiles Launched the Modern Wilderness Movement*. Seattle: University of Washington Press, 2002.
- Tidestrom, Ivar. "Flora of Utah and Nevada." *Smithsonian Institution: Contributions from the United States Herbarium* Vol. 25. Washington: Government Printing Office, 1925.
- Tippets, David, editor. "Range Father Arthur W. Sampson" *INTercom* Ogden: Intermountain Research Station (Jan/Feb, 1991).
- Tobey, Ronald C. *Saving the Prairies: The Life Cycle of the Founding School of American Plant Ecology, 1895-1955*. Berkeley: University of California Press, 1981.
- Townley, John M. *Turn this Water into Gold: The Story of the Newlands Project*. Reno: Nevada Historical Society, 1977.
- Townley, John M. "Management of Nevada's State Lands, 1864-1900." *Journal of the West* Vol. 17, Issue I (January, 1978).
- Trimble, Steven. *Sagebrush Ocean: A Natural History of the Great Basin*, tenth anniversary edition. Reno: University of Nevada Press, 1999.
- Turner, Frederick. *Beyond Geography: The Western Spirit Against Itself*. New Jersey: Rutgers University Press, 1992.
- Twain, Mark. *Roughing It*. Hartford: American Publishing Company, 1872.
- Unknown. "The Up-building of Nevada," *Forestry and Irrigation*, XI (June 1905): 270-274.
- Unknown. "Homes in Nevada," *Forestry and Irrigation*, XIII (March, 1907): 144-147.

- Unknown. "Modern Highways Unify Nevadans," *Nevada State Highways and Parks*, 1 (January 1936): 1-2.
- Unknown. "Nevada Makes Scenic Desert Safe," *Nevada State Highways and Parks*, 1 (January 1936): 3-5.
- Unknown: "Snow Surveying: A New Science," *Nevada Highways and Parks*, II (January 1937): 1-3.
- Unrau, Harlan. *Basin and Range: A History of the Great Basin National Park*. U.S. Department of the Interior: National Park Service, 1990.
- Veracini, Lorenzo. *Settler Colonialism: A Theoretical Overview*. England: Palgrave Macmillan, 2010.
- Veblen, Thorstein. *The Theory of the Leisure Class*, Oxford's World Classics. Oxford: Oxford University Press, 2007.
- Voto, Bernard de. "The West: a Plundered Province." *Harper's Magazine* Vol. 169 (August, 1934).
- Wegener, Alfred. *The Origins of Continents and Oceans*, first published 1915. New York: Dover Publications, 1966.
- Wheeler, George Montague. *Annual Report Upon the Geographical Surveys West of the 100th Meridian*. Washington: Government Printing Office, 1877.
- Wheeler, George Montague. *Preliminary Report on a Reconnaissance through Southern and Southeastern Nevada, Made in 1869*. Washington: Washington Printing Office, 1875.
- Wheeler, Sessions. *Tahoe Heritage: The Bliss Family of Glenbrook, Nevada*. Reno: University of Nevada Press, 1997.
- Wiebe, Robert. *The Search for Order, 1877-1920*. New York: Hill and Wang, 1967.
- Wier, Jeanne. "The Mission of the State Historical Society." *State of Nevada: First Biennial Report of the Nevada Historical Society, 1907-1908*. Carson City: State Printer, 1909.

- Wilson, Dick. *Sawdust Trails in the Truckee Basin: A History of Lumbering Operations*. Nevada City: Nevada County Historical Society, 1992.
- Wilusz, John P. "The Colorful History of the California/Nevada State Boundary." *Professional Surveyor* (January, 2002).
- Worster, Donald. *Nature's Economy: A History of Ecological Ideas*. Cambridge: Cambridge University Press, 1994.
- Wuerthner, George and Matteson, Mollie. *Welfare Ranching: The Subsidized Destruction of the American West*. Chicago: Island Press, 2002.
- Young, James A. and Clements, Charlie D. *Cheatgrass: Fire and Forage on the Range*. Reno: University of Nevada Press, 2009.
- Young, James A. *Cattle in the Cold Desert*. First Published 1985. Reno: University of Nevada Press, 2002.
- Young, James A. "Israel Cook Russell in the Great Basin." *Nevada Historical Quarterly*, XXIV (Summer, 1981): 158-169.
- Zanjani, Sally. *Devils Will Reign: How Nevada Began*. Reno: University of Nevada Press, 2006.