

THE ETIOLOGY OF RANGELAND DEGRADATION IN NORTHERN NEW MEXICO: A CRITIQUE OF ESTABLISHMENT EXPLANATIONS

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This article examines the history of rangeland management on the El Rito District of the Carson National Forest in northern New Mexico. The area became part of the U.S. Forest Service system in the late nineteenth century, when Mexican land grants in the area were not confirmed by U.S. courts. In the 1940s, the Forest Service implemented a series of grazing restrictions in the district. The article links these grazing reductions to both neo-Malthusian theories of natural-resource use that delegitimized local subsistence agropastoralists and to early rangeland-ecology models of herbivory impacts in semi-arid environments that privileged capital-intensive, market-based livestock production. Range-science models of ecosystem processes defined restoration as the application of practices ultimately benefiting commercial operations. Such an approach offered a rationale for restricting agropastoralists. Environmental histories of the region blamed environmental degradation on local cultural traits that constructed Hispano agropastoralists as ignorant of economically and ecologically sound management principles. *Key Words:* range science, environmental history, New Mexico, agropastoralism, U.S. Forest Service.

In 1947, the El Rito District Ranger in the Carson National Forest in northern New Mexico declared that forest rangelands were severely overgrazed. The claim was based on a visual inspection of the forage layer in selected district ranges, a method long favored by the United States Forest Service (USFS).¹ This determination led to a series of stock-reduction programs in the district that had both immediate and long-term consequences for local permittees. Unlike the large, commercial cattle operations that dominated cattle production on western ranges in the 1940s, local permittees in El Rito engaged in transhumant pastoralism on the montane rangelands of the El Rito District, a practice begun with the arrival of Spanish settlers in the sixteenth century. Throughout New Spain, settlers relied on

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an agropastoral subsistence strategy characterized by the integration of small household agricultural fields irrigated by a system of community-managed *acequias*, or gravity-fed irrigation ditches, along with the grazing of livestock on upland rangelands. The semi-arid conditions in northern New Mexico made dry-land farming impossible. As a result, uplands managed collectively by villages served as important rangelands for sheep, goats, and cattle, as well as for collecting fuel wood and building materials and hunting.² Beginning with the United States' control of the region in 1848, a series of enclosures has eroded local access to, and control of, critical upland resources. This article focuses on the history of grazing reductions in the El Rito District that I argue played a key role in the process of land and water dispossession for local subsistence agropastoralists.

Geographers have long been interested in understanding the origins, diffusion, and evolution of livestock production in North America.³ This research has been particularly important for understanding the social and ecological impacts of sheep and cattle production. An especially robust area of scholarship has focused on the influence of Iberian-derived ranching forms in what is today the American West (Jones 1979; Libecap and Alter 1982; Butzer 1988; Jordan 1993; Sluyter 1996). Northern New Mexico holds a central place in this history. Beginning in the sixteenth century, the first domesticated cattle and sheep herds arrived during a series of Spanish expeditions, culminating in Juan de Oñate's 1598 campaign to the Rio Arriba region of what is today northern New Mexico (Baxter 1987; Simmons 1991; Starrs 1998). The Spanish settlers brought subsistence agropastoral production to the semi-arid montane rangelands and valleys of New Mexico, a strategy that was particularly adaptable to the geographic diversity and climatic variation of the area (Sluyter 1996).

Despite the multiplicity of origins that characterize ranching in North America, researchers note the persistence of uniquely Spanish-derived livestock-production methods in northern New Mexico (Van Ness 1987; Starrs 1998; Raish and McSweeney 2003). Despite this persistence, an array of political, bureaucratic, scientific, and commercial imperatives related to rangeland management coalesced between the mid-nineteenth and mid-twentieth century, which influenced specific

federal-lands management practices and radically altered the landscape of Hispano⁴ agropastoralism in northern New Mexico (Figure 1).

Although many local residents in and around the El Rito District continue to raise livestock today, they do so only if they are able to negotiate a patchwork landscape dominated by federal land ownership (Figure 2). Lost are the communal-property relations critical to the type of ranching brought to New Mexico by the Spanish. In the 1930s and 1940s, forest rangers throughout the American Southwest claimed that unregulated livestock grazing had depleted Forest Service ranges. Despite significant interregional variation, many rangers saw the Southwest as uniformly degraded.⁵

The El Rito District's 1947 claim of overgrazing initiated a district-wide case study regarding the problem of locally degraded ranges. The resulting report, delivered to Carson Forest Supervisor L. F. Cottam in March of 1947, focused solely on the poverty of local permittees. No fieldwork was conducted regarding ecological conditions, and no explanation was offered as to how the district determined that ranges were overgrazed.⁶ In early 1948, the USFS imposed grazing reductions on all 141 smallholder Hispano grazing permittees. The grazing restrictions and reductions on federal lands in northern New Mexico were based on an understanding of ecosystem functioning that assumed pastoralist production to be lacking key practices necessary to maintain ecosystem equilibrium. Such a view made it possible to demonstrate overgrazed ranges through an economic analysis of the region. In El Rito, rangers assumed that agropastoralism was the cause of significant and persistent poverty. This view, however, ignored the significant differences between the environmental and economic impacts of commercial ranching and pastoralist production as practiced in northern New Mexico. Through these grazing reductions, the Forest Service contributed to the land and water dispossession that began for Hispano land grantees and land-grant heirs with the arrival of the United States in 1848.

The rise of commercial ranching in the American West in the late nineteenth and early twentieth centuries and the influence of certain rangeland-ecosystem models in federal land management transformed production practices in the El Rito

Figure 1. Restrictions and enclosures applied over time to local, agropastoral practices in northern New Mexico.

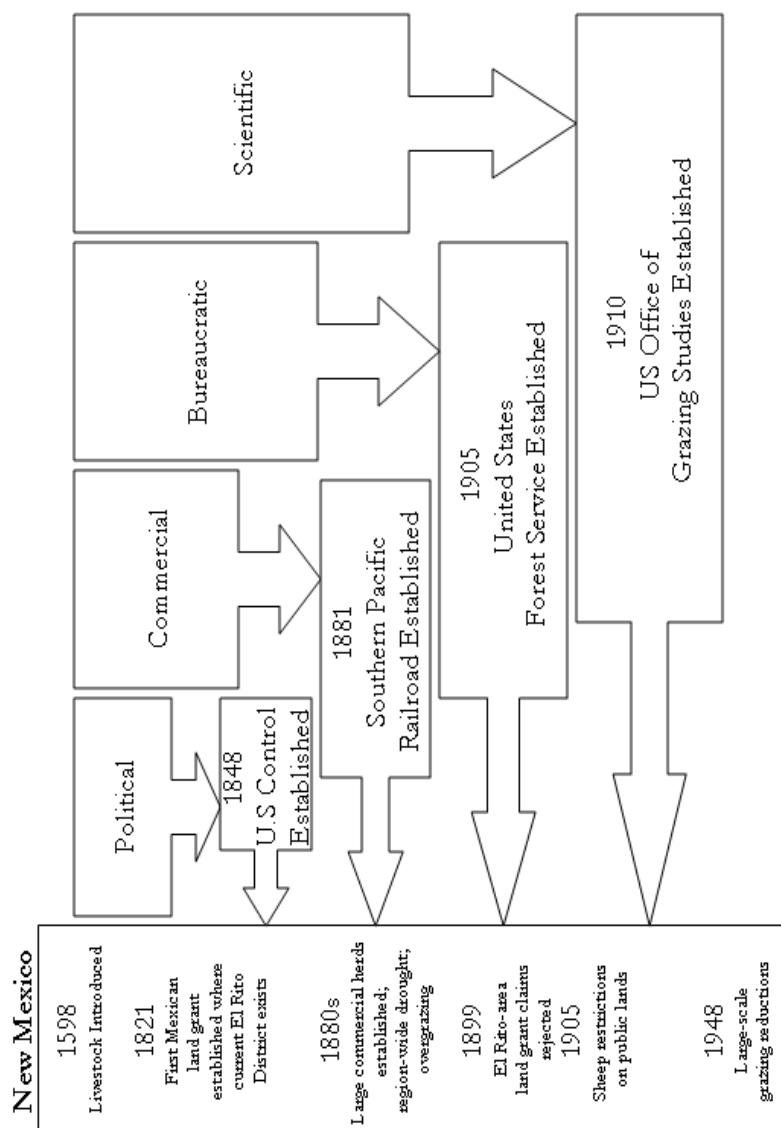
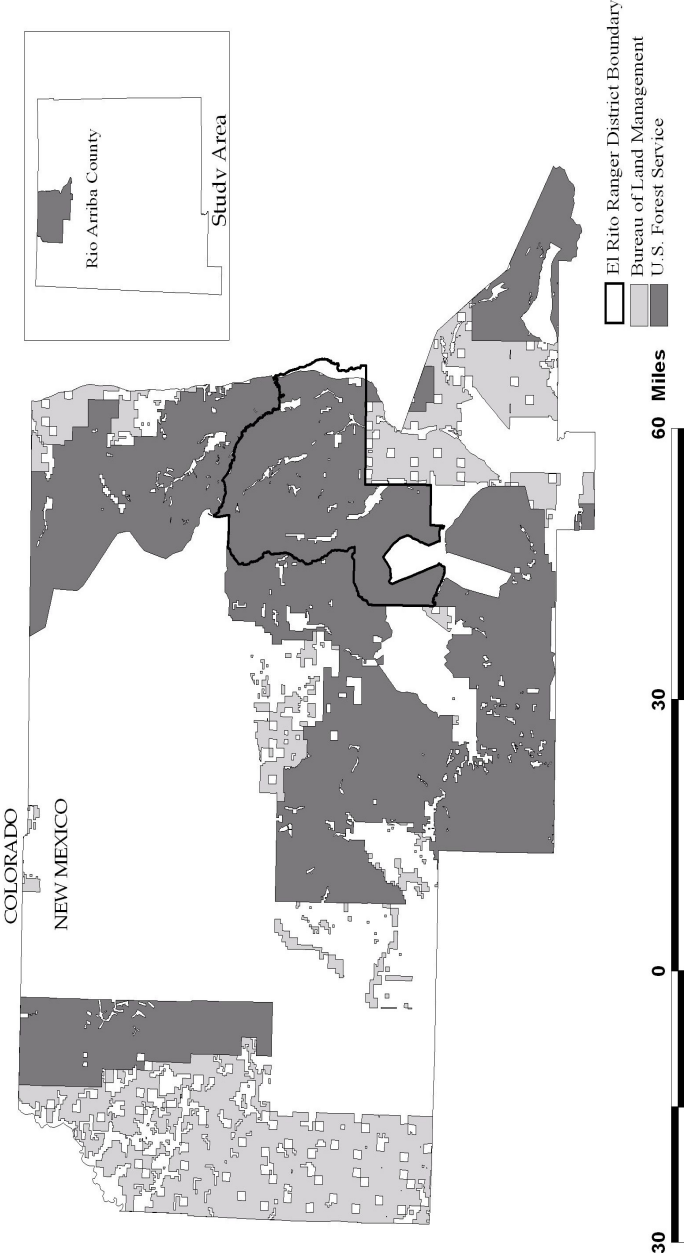


Figure 2. Federal land ownership in Rio Arriba County, New Mexico.



District in the 1940s. Throughout the Southwest in the 1880s, a form of cattle production emerged that replaced pastoralist livestock production based on animals' natural reproductive capacities with a capitalist model based on market mechanisms and capital investments, profoundly altering animal–plant interactions (Rico 1998; Sayre 1999, 2002). As many Africanist range scholars have noted (Hoben 1995; Scoones 1995; Angassa and Baars 2000), range science emerged to support the needs of capital-intensive, market-based livestock production on arid and semi-arid ranges. Capital-intensive methods to maintain range productivity (such as range reseeding, breeding, fencing, and veterinary care) became the dominant paradigm of range management (Clements 1928; Dyksterhuis 1949). The Clementsian model, as it came to be known, offered a set of practices and proposed measures for the restoration of degraded rangelands. The proponents of the model considered pastoralists incapable of mitigating ecosystem disturbances caused by livestock grazing.

This study begins by first considering the history of livestock production in northern New Mexico in the context of an emerging focus by the Forest Service on capital-intensive stock raising. It is in this context that smallholder agropastoralists in northern New Mexico became a focus of grazing restrictions. Following this, the study evaluates the role of Clementsian ecological models and the methods of range science that served as the foundation of Forest Service regulatory efforts. Lastly, the study reviews two environmental histories of the region representative of the neo-Malthusian social models of natural-resource use that incorporated Clementsian ecological models, further delegitimizing Hispano agropastoralists. Despite extensive research that now acknowledges the critical economic and ecological services provided by pastoral production (*e.g.*, Ellis and Swift 1988; Perevolotsky and Seligman 1998), these narratives motivated practices in El Rito and elsewhere that divested agropastoralists of critical natural resources.

Whereas rangeland ecologists have debated the utility of the Clementsian model in constructing management regimes capable of supporting livestock without degrading ranges (Friedel 1991; Laycock 1991), geographers have focused on both the ecological and social impacts of the practices prescribed by these mod-

els. Human–environment research in geography, such as political ecology, has attempted to address the disconnect between ecological models of arid rangelands and the sociopolitical processes of rangeland management (Bassett 1988; Turner 1993; Turner and Williams 2002). Political-ecology research seeks to “trace the environmental impacts of socioeconomic practices across scale” (Robbins 2002, 1509). This study employs a political-ecology approach by positing that ecological change is both an environmental and a political-economic process. This study demonstrates that the erosion of the agropastoral economy of Hispano communities in Rio Arriba has been a sociopolitical process of capital accumulation, supported by ecological models privileging commercial users and neo-Malthusian models deligitimizing Hispano agropastoralists that ultimately led to the divestment of key resources from agropastoral producers.

Stock Raising in New Mexico

When Juan de Oñate established the first permanent Spanish settlement in New Mexico in 1598, he marched northward from Zacatecas along the Rio Grande leading a long wagon train of 600 soldiers, settlers, and Franciscan friars, followed by a herd of cattle, sheep, and horses sufficient to serve the colony. This herd would form the foundation of three centuries of stock raising in New Mexico (Jones 1979; Simmons 1991). The Spanish immediately established settlements supported by a militarily enforced *encomienda* system of obligatory labor, in which Spanish elites extracted labor from Pueblo Indians as a mandatory tribute to the colony. By 1680, the combination of Spanish brutality, drought, and smallpox, had reduced by half the number of occupied Pueblos in the region (Barrett 2002). The Pueblo Revolt of 1680 expelled the Spanish colonists from New Mexico until 1692, when Diego de Vargas reconquered the region for Spain. Prior to the revolt, the Spanish crown distributed land grants to individuals in return for military or administrative service. The failure of the *encomienda* system, however, forced the Spanish to alter colonial policies. Although the promise of riches that compelled Oñate failed to materialize, the region remained strategic to the Spanish as a buffer for more important mineral-producing regions south of the Rio Grande. The strat-

egy of colonization ultimately led the Spanish to also offer land grants to settlers willing to establish self-sustaining communities in the arid regions of New Mexico.

The settlements established after 1692 were organized around communal land uses. The harshness of the climate and occasional Comanche and Apache raids forced Spanish and Pueblo communities to cooperate in economic and social activities. Even household subsistence-crop production required community cooperation through collective management of the *acequia* irrigation. Research has documented the social networks and reciprocity of the villages in the remote areas of the region (Swadesh 1974; Jones 1979; Kutsche and Van Ness 1981; Ebright 1987; Rodriguez 1987; Van Ness 1987; Rivera 1998).

The history of sheep and cattle ranching in northern New Mexico after the reconquest contrasts starkly with the destructive patterns of commercial production elsewhere in the arid West. Despite the Denver and Rio Grande Railroad, which first bisected the Rio Grande Valley in the early 1880s, potentially connecting the area to outside markets, commercial grazing practices were not adopted by Hispano smallholders in northern New Mexico.⁷ Although animal husbandry was the central component of the agropastoral economy of northern New Mexico, the goal of production was not to capture profits in the market, but to utilize animal products for local subsistence. Despite views of the Hispano land grant as an unmanaged commons overexploited by self-interested ranchers lacking formal management mechanisms, Van Ness (1987) has shown how legal and social obligations were established both regionally and locally to manage and conserve the upland commons.⁸ Likewise, the ruggedness of the terrain, the lack of market imperatives, and the limited pasturage options and household-labor availability kept herd sizes at sustainable levels. Well into the 1930s, Hispano farmers grazed animals on upland-forest pasture ranges in the El Rito District in a seasonal cycle of transhumance that took advantage of changing temperatures, precipitation, and vegetation at different elevations. During the growing season, sheep and cattle were grazed at lower elevation pastures and gradually driven higher into montane-forest pastures as increasing temperatures offered improved grazing opportunities. After the harvest, individual family plots became communal land as

livestock grazed stubble or were maintained with fodder (Van Ness 1987; Peña and Martinez 1998; Raish and McSweeney 2003).

In 1935, 210 El Rito households farmed, on average, eight irrigated acres each, with one landowner irrigating 71 acres. Three families owned large herds, grazing a combined total of 3,260 sheep, and one family maintained 300 goats, but most households maintained fewer than seven animals (Weigle 1975).⁹ Although the herds were small, federal land managers in the Carson National Forest began a process of grazing reductions in 1948, based on their 1947 case study that concluded that livestock had “caused surrounding national forest ranges to become depleted of vegetative cover to such an extent that a reduction in permitted grazing use is necessary.”¹⁰ The claims of overgrazed and depleted ranges more likely emerged from a combination of management decisions related to regional drought conditions, political pressures related to federal-land grazing policies, and the bureaucratic imperatives that developed in response to this political pressure.¹¹

Throughout New Mexico, Texas, and Arizona, a severe drought beginning in 1943 and lasting into the late 1950s led to severe rangeland degradation on many forest-service ranges (Osborn 1950; Fowler 2000). Lower stocking rates and average to better-than-average precipitation patterns in El Rito (Figure 3) suggest that local foresters misidentified local ranges as depleted.¹² As a result of region-wide estimates of massive rangeland forage depletion in the 1930s, the El Rito District fell under a wide net of stricter grazing controls, which the Forest Service cast over the entire Southwest region. Although it seems unlikely that pastoralist livestock practices alone, if at all, were responsible for depleted ranges, El Rito District rangers reduced the number of permits available for locally owned cattle at the same time as they increased access to timber by outside commercial-timber operators.¹³ For the next twenty years, district rangers continued to reduce grazing permits in the district while increasing timber harvesting.¹⁴

The causes of rangeland depletion can be traced to commercial cattle ranching during the late-nineteenth-century cattle boom, rather than to the actions of smallholder Hispano graziers in the 1940s. In 1881, the arrival of the Southern Pacific Railroad in southern New Mexico and the influx of significant foreign and

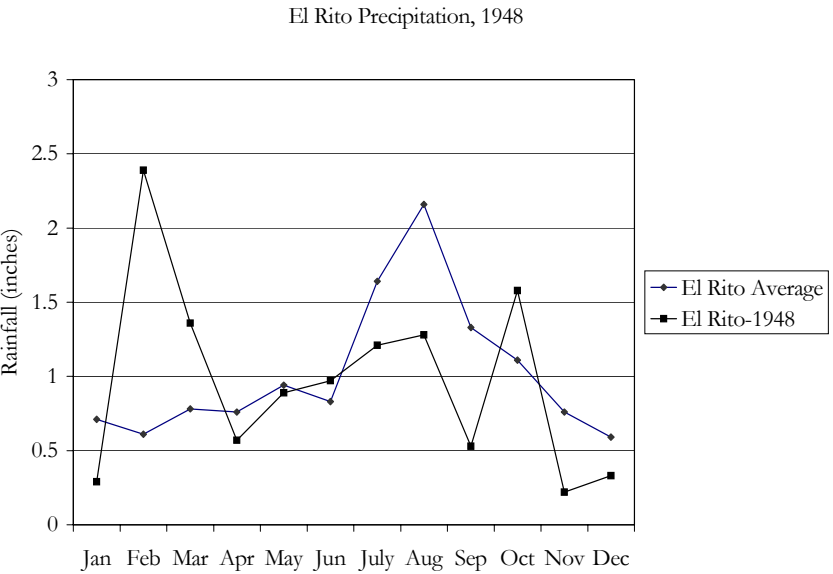
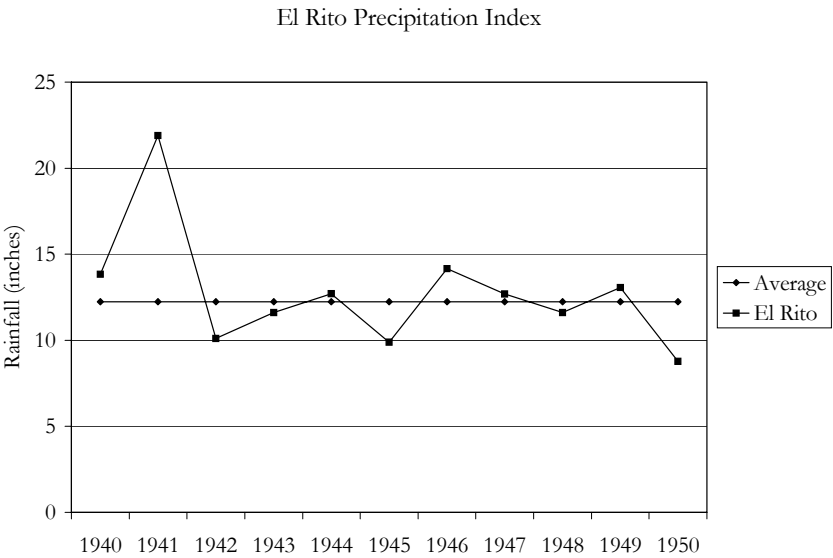


Figure 3. Snowfall in the winter of 1947–48 was 180 percent above median, and February and March of 1948, the months prior to the imposition of the stock reduction program, remain the wettest two-month period ever recorded in El Rito, New Mexico. Source: Western Regional Climate Center.

eastern-U.S. capital investments precipitated a boom in ranching and ranching investments throughout the arid Southwest (Rico 1998; Sayre 1999; Fowler 2000). In New Mexico and Arizona, large commercial-ranching operations began to take advantage of new transportation networks to exploit open ranges. The 1.6 million sheep grazing in New Mexico in 1870 increased to 5.2 million by 1883 (Raish and McSweeney 2003). Between 1870 and 1890, New Mexico range-cattle numbers increased from fewer than 200,000 to more than 1.3 million (Dahms and Geils 1997). Severe drought in the early 1890s led to massive rangeland degradation in New Mexico and Arizona when commercial ranchers left cattle on depleted ranges. The same access to cheap credit that enabled ranchers to increase herd sizes in the 1880s also restricted their ability to decrease herds during the droughts of the 1890s. For many ranchers, praying for rain became a more sensible act than accepting an economic loss by removing herds from ranges. Drought or no drought, finance capital demanded a return on its investment. As Sayre (2002, 52) noted,

...these [ecological] conditions were highly variable and subject to periods of drought, which could dramatically reduce the amount of feed available for stock. As an input in the accumulation of capital, however, the grasses were a link in a much larger financial system that demanded regular, reliable returns, regardless of interannual variations in forage.

After the drought of the 1890s, range numbers declined across the Southwest (Wildeman and Brock 2000), but by 1920, commercial herd sizes had returned to, and in some places exceeded, pre-drought numbers. In New Mexico, cattle numbers reached 1.9 million head (Fowler 2000), and sheep herds exceeded 2 million head in 1920 (Dahms and Geils 1997). The region-wide drought beginning in 1945, which was particularly extensive in New Mexico, coincided with the decision of El Rito rangers to restrict grazing and restructure the local economy away from subsistence livestock production and toward commercial timber production.

Ecological Models of Rangeland Degradation

Public-lands management practices of the Forest Service in the 1930s and 1940s were based on range-science research that sought to redress the ecological problems of large-scale use of western rangelands. In 1895, a USDA researcher

summarized the commercial goal of stock reduction programs:

The cattle on the breeding grounds of the West and Southwest died by thousands from thirst and starvation. It may seem like throwing away money not to have all the grass eaten down, but in the long run there will be more profit if there are fewer head carried per square mile. (Smith 1895, 322)

Subsequent research focused on developing assessment techniques and methods to monitor and improve the forage layer and restore rangelands to their climax condition (Sampson 1919; Clements 1928; Dyksterhuis 1949). The early success of federal land-management policies based on early range-science models contributed to the view that commercial production provided superior productivity to pastoralism, and that capital-intensive methods of range improvement supporting commercial production mitigated the environmental impacts of livestock grazing. This overemphasis on livestock as a factor in ecosystem disturbance overshadows other potential influences. As Turner (2003, 160) has argued, “[t]his is especially important in the dryland tropics where changes in soil or vegetation have often been misdiagnosed as caused by livestock when in fact they may be caused by climate fluctuations.” Under the Clementsian ecological model, degraded ranges were those that were depleted of vegetation through the grazing of livestock, disrupting plant succession. The Clementsian paradigm relied on ecological benchmarks against which deviation from a theoretical climax condition could be judged. Ranges were either in or out of equilibrium, and disturbance from equilibrium, such as livestock grazing, disrupted the linear progress to climax. Rangeland managers sought to return ranges to equilibrium, primarily through prescribed rest, limited stocking rates, and fencing, which remain crucial elements of rangeland management today. The Clementsian model has long been the basis for federal land-management agencies such as the Forest Service and the Bureau of Land Management (Meeker and Merkel 1984).

The consequences of the cattle boom during the drought years of the 1890s, and again during severe drought years in New Mexico between 1945 and 1954, reinforced the dominant view that the arid Southwest required strict grazing controls for the restoration of depleted ranges. The El Rito rangers responded by

implementing a set of practices preoccupied with carrying capacity that disregarded climatic, spatial, and temporal variation of livestock impacts, as well as the ecological impacts of economic organization among operations. The needs and problems of commercial operations were paramount. Because pastoralism was considered less economically important, it generated little research interest or attention other than efforts to “modernize” production.

Beginning in the 1990s, criticism of the Clementsian model by range scientists focused both on its oversimplification of ecological processes (Friedel 1991; Laycock 1991), and the growing awareness that management practices that rely on this model may in fact contribute to environmental degradation (Savory 1988; Perevolotsky and Seligman 1998). Research in range science has since considered the potential benefits of livestock grazing on arid and semi-arid ranges under pastoral production regimes (Gamougoun *et al.* 1984; Ellis and Swift 1988; Perevolotsky and Seligman 1998; Angassa and Baars 2000).

Environmental histories of natural-resource use in New Mexico, however, ignored the growing body of range-science research on domestic herbivores and environmental degradation and attributed regional poverty and ecological degradation entirely to Hispano cultural traits (deBuys 1985; Rothman 1989, 1992). This neo-Malthusian view of human–environment interaction posited that the eventual overexploitation of resources resulting from a reliance on common-property resources is inherent to Hispano cultural systems. Such a view offered a powerful rationale to maintain grazing restrictions and property relations that tightly controlled Hispano grazing. Neo-Malthusian views that incorporated Clementsian models of ecosystem function combined with racial and ethnic stereotypes of Hispanos in northern New Mexico served to marginalize Hispano agropastoralists (Pulido 1996). The following section examines two environmental histories of livestock-induced impacts on northern New Mexico’s rangelands (deBuys 1985; Rothman 1989), which reanimated Clementsian models of range ecology with neo-Malthusian arguments of environmental degradation, resulting in a narrative that causally linked environmental degradation to agropastoral production and Hispano culture.

Environmental Histories

According to the Clementsian model, pastoralism, by virtue of its inability to incorporate necessary range-improvement methods, is an inherently destructive practice. This internal failure in the system is related directly to culture. As Stoddart *et al.* (1975, 79) argued,

...although the principles of range management are largely unknown among pastoralists, there is some degree of ecological soundness and viability in pastoral systems. But, if the culture is changed through an input in technology and new wants develop, environmental degradation follows.

This view is central in Rothman's and deBuys's environmental histories of livestock production in New Mexico. Although the purpose of this article is not to offer a comprehensive critique of environmental histories of the region,¹⁵ I review the themes from these two histories to show how the hegemonic ecological models in range management of the 1940s offered powerful and persuasive themes for environmental histories of perceived environmental degradation among Hispano agropastoralists. These neo-Malthusian environmental histories reified "modernization"—in this case understood as the application of market pressures, technology, private property, and scientific management practices—as the solution to ecological damage.

Rothman (1989) offered a history of livestock impacts in northern New Mexico in "Cultural and Environmental Change on the Pajarito Plateau."¹⁶ Rothman suggests in this article that the benefits of market-based production "filled the gap" in a region populated by people who possessed neither the "cultural prohibition nor understanding of the land's fragile character to prevent herdsmen from overgrazing" (Rothman 1989, 187, 197). Although Rothman agreed that Hispano communities cooperated to conserve natural resources, he argued that they "sowed the seeds of an ominous future" (Rothman 1989, 197). Fundamental to this view is the notion that Hispanos represent a traditional culture ignorant of economically and ecologically sound management principles, as evidenced by their "informal" management practices in critical common lands (Rothman 1989, 196). Likewise, Rothman argues that land-grant boundaries were "drawn informally," which implies a lack of

management and control (Rothman 1989, 197). In this view, poverty and ignorance produced environmental degradation, and the arrival of federal land managers brought “the idea of conservation, using land wisely in scientific fashion” (Rothman 1989, 208). What Hispanos lacked, Anglos made up for with an ecological legitimacy based on “the efficient management of natural resources” (Rothman 1989, 208). By ignoring the complexity of ecosystem processes, Rothman reinforced the utility of a modernization strategy to disrupt agropastoral practices as the only means available to restore and protect rangelands.

William deBuys offered an examination of rangeland degradation which, similar to Rothman’s view of rangeland exploitation, implicated Hispanos in rangeland destruction. In his book, *Enchantment and Exploitation: The Life and Hard Times of a New Mexican Mountain Range* (1985), which employed a “tragedy of the commons” thesis to explain environmental degradation in northern New Mexico, deBuys argued that the common-property upland, or *ejido*,¹⁷ organization of rural Hispano villages was responsible not only for locally entrenched poverty, but also for environmental degradation. DeBuys develops an argument based on a view of human–environment interaction restrained by finite natural resources. As he argued, “[s]elf-restraint was self-punishment: it inevitably allowed someone else to reap the harvest, and the riches, first” (deBuys 1985, 236). This Malthusian-inspired analysis of Hispano land use blames poor Hispano farmers for interlocking cycles of environmental degradation and continued poverty. Explicit in deBuys’s argument is the idea that the new U.S. authority in the mid-nineteenth century and the scientific practices of federal land managers saved the region from far greater damage: “Until the government stepped into the business of land management, the western commons were harshly abused, both by those who cared nothing for the land and by those who loved it” (deBuys 1985, 236). Yet, despite evidence that the Forest Service restructured local economies in a manner that ultimately benefited commercial interests rather than ecological conditions (*e.g.*, Correia 2005), deBuys (1985, 246) argued that “from the inception of its grazing program, the Forest Service sought to regulate existing patterns of range use, not to rearrange those patterns for the benefit of a single group.” From this vantage point, deBuys

understands local resistance to federal land-management strategies as a lack of ecological knowledge. Rather than resisting the enclosure of their commons, deBuys (1985, 259) argued that locals were simply, “deaf to the rangers’ arguments about protecting rangelands”—this, despite admitting that these modern, scientific methods of range management were fraught with “a great deal of guesswork” (deBuys 1985, 243) along with “a certain amount of faking built into the procedures” (deBuys 1985, 249). DeBuys credits the Forest Service for the restorative practices of rotational pasturage, which “divided allotments into two or more pastures so that each could be rested from the grazing periodically in order to coax maximum productivity from the range plants growing there” (deBuys 1985, 267). This practice, however, merely mimics the benefits of the kind of transhumant grazing long practiced by Hispano communities in the area but suppressed by the Forest Service. DeBuys (1985, 274–275) concludes his analysis by contending,

...those who argue that the Hispanos of northern New Mexico are essentially a Third World people who face the Third World problems of economic imperialism and cultural aggression should bear in mind that the most pressing and most serious problems of the Third World have little to do with imperialism or ideology. They are the demographic and environmental problems of desertification, deforestation, and erosion, all of which undermine the capacity of the land to meet the needs of growing populations.

DeBuys and Rothman offer a depiction of nature–society interaction that reinforces a view of rangeland degradation as always and everywhere inevitable without the mediating control of markets and modern scientific methods. DeBuys’s and Rothman’s arguments of ecologically unsustainable Hispano land-use practices hinge on a crude neo-Malthusian approach to human–environment interaction founded on the idea that finite natural resources are being gobbled up by irresponsible impoverished locals incapable of controlling their population and ultimately exhausting nature’s limited bounty. DeBuys considers this view “unpolitical” (deBuys 1985, 275); however, these environmental histories have had real consequences for Hispanos in northern New Mexico. As Pulido (1996, 46) has observed:

...considerable energy has been spent on debating the grazing practices of Hispanos. Because this literature blames Hispanos for environmental degrada-

tion, they are “delegitimized” as successful resource managers. This delegitimization is based on specific grazing practices (overgrazing, grazing at the wrong time, too small farm size), as well as a general moral shortcoming, as evidenced by the failure to practice an appropriate environmental ethic.

Environmental histories such as deBuys’s and Rothman’s seek to depoliticize natural-resource use and management by advancing a fiction of Hispano ecological illegitimacy to rationalize the erosion of the Hispano land base in northern New Mexico.

Two themes figure prominently in deBuys’s and Rothman’s analyses and deserve closer examination. First is the idea that Spanish and Mexican land grants were open-access, common-pool resources, which caused ecological destruction through the self-interested actions of individuals overusing scarce resources. Second is the belief that the application of technology and scientific management practices could overcome the environmental degradation caused by poverty by maximizing profits while also improving local livelihoods and restoring overgrazed ranges.

The first theme, based on the “tragedy of the commons” thesis developed by Garrett Hardin (1968), assumes that inherent to common-pool resource regimes is a propensity toward overuse based on the benefit that accrues to atomized individuals who overuse resources ultimately to the detriment of collective utility. Applying such a view to the case of northern New Mexico obscures the history of community land-grant management. The Hispano land grant was never an open-access commons but rather a tightly controlled, village-level resource. As many scholars have shown, a suite of formal and informal mechanisms protected the upland resource base (Ebright 1987; Van Ness 1987; Gonzalez 2003). Furthermore, claims of degradation linked to a lack of cultural prohibitions ignore the history of land-grant adjudication that severely limited the ability of local communities to retain any control or management of community uplands. This was certainly true for land-grant heirs in El Rito.

All of the land currently managed as the El Rito District of the Carson National Forest comprises two community land grants made during Mexican control of the region: the Town of Vallecitos de Lovato grant made in 1824, and the Petaca grant

made in 1836. Although the Petaca land grant was confirmed by the United States in 1899, its boundaries were radically reduced during the adjudication process. Only the agricultural fields were confirmed. The Town of Vallecitos de Lovato grant was never confirmed. In adjudicating the Vallecitos claim, the court relied on an 1897 Supreme Court case, *U.S. v. Sandoval* (67 U.S. 278), which concluded that Mexico offered only *possession* to settlers, retaining *title* to all community land grants. The court concluded in the Vallecitos case that, “at the very commencement, therefore, we find that the petition was not one for the granting of title, but simply one for the granting of possession to land, in order that they might plant their grain for harvesting” (175 U.S. 546). The court found that “there was no sufficient evidence of any grant whatever” and claimed U.S. ownership of the entire grant. The land grant fell entirely into the federal domain, and was eventually managed by the United States Forest Service.

Views of environmental degradation such as deBuys’s and Rothman’s deemphasize or ignore altogether the political history of struggles over land and the material consequences of dispossession. The real problem, they argue, is the character and behavior of impoverished land users. This view is evident in both environmental histories; for example, when deBuys (1985, 267) argued that any solution requires the “habits of animals and their owners be changed,” or when Rothman (1989, 210) dismissed the importance of the erosion of the land base by arguing that “only the volume of use differentiated Anglos from their predecessors.” In this view, despite the injustice of land-grant adjudication that severed Hispano communities from their land base, efforts to return grant lands would result in more environmental degradation. As deBuys (1985, 277) argued, “in some instances a measure of ecological harmony and stability can only be won at the painful cost of cultural and social conflict.”

The second theme of deBuys’s and Rothman’s analyses—the view that scientific management practices can maximize profits while improving local livelihoods and restoring overgrazed ranges—relies on Clementsian models of ecological processes in arid rangelands, which assume that pastoralism is inherently damaging to ecosystem functioning. This argument served as the rationale for industrial

restructuring in the El Rito District and provided a neo-Malthusian theoretical framework for environmental histories. Scientific management and technology, the argument goes—not traditional practices—offer the most effective means to protect scarce resources while also improving incomes. As range scientist Arthur Sampson (1952, 3) argues,

...since nomadic grazing is associated with isolation, lack of formal markets, sparse vegetation, limitless free range, inferior animals, inadequate water, and almost continuous moving of the stock, management of the forage crop receives no consideration. Modern commercial grazing, on the other hand, is associated with investment in land, improvement at ranch or farm headquarters, scientific breeding of livestock, sustained yield grazing, and maximum production of quality animals.

This view of pastoralism has been challenged by research documenting the social and ecological complexities of pastoral production.¹⁸ In comparing subsistence livestock systems with commercial ranching systems, Briske *et al.* (2003, 608) have argued that “confined livestock grazing, supported by water development, veterinary care and supplemental feeding, will have a greater potential to impact vegetation dynamics adversely than pastoralist systems, where herbivore numbers are directly influenced by the prevailing environmental conditions.” In the case of northern New Mexico, transhumant grazing took into account factors such as precipitation, temperature, season, labor availability, local needs, and forage capacity in managing the distribution and impact of livestock (Van Ness 1987; Raish and McSweeney 2003). Rangeland management practices that rely on the Clementsian model focus attention on stocking rates to the exclusion of other variables in a process that Turner (1993, 402) has shown, “exclude[s] social processes from the etiology of grazing-induced degradation.”

Conclusion

The claims of overgrazing in the Carson National Forest in 1947 were linked to the emerging science of rangeland ecology. The Clementsian model of ecosystem function prescribed capital-intensive range improvements such as fencing, water development, and reseeding, as a crucial element in ecological management.

Throughout the 1960s, El Rito District rangers continued to restrict grazing practices, complaining that local permittees were “in opposition to proposed range improvement and management plans on the El Rito district.”¹⁹ Local permittees, however, viewed range improvements not as ecological practices, but rather as political tactics to further limit their access to local ranges.

Grazing reductions and restrictions on the El Rito District have had long-term ecological impacts as well. Historically, southern Rocky Mountain ponderosa pine-forest ecosystems were comprised of dense patches of trees surrounded by open, park-like grasslands (Savage 1991). Ponderosa pine forests appear to be “island remnants of late Pleistocene forests that were more widespread 20,000–10,000 years ago than today” (Buskirk *et al.* 2000, 7). This forest structure has undergone a radical transformation since the annexation of the Territory of New Mexico by the United States. Dendroecological studies of ponderosa pine forests in the American Southwest indicate that

...tree establishment ranged ~1–4 trees per hectare per decade over the 300 yr before 1876. This rate is several orders of magnitude below the hundreds to thousands of trees per hectare which were established following grazing and fire exclusion in the early 20th century. (Moore *et al.* 1999, 1269)

These changes are significant because they have altered the ecologies in which plant and animal species evolved, and upon which agropastoralists depended. Throughout the southern Rockies, these modern forest-management practices produced a dense forest ecosystem, with some sample sites more dense than reference conditions by a factor of 20 (Moore *et al.* 1999).

In New Mexico, Forest Service range managers restricted livestock grazing, suppressed localized forest fires, and increased commercial timber production. By 1993, after 45 years of these management practices, total tree biomass in the El Rito District had increased by over 600 percent,²⁰ radically reducing the total area of viable montane rangelands available for grazing in the district.

The claims of land degradation made by federal land managers in 1947, illustrate the political-economic foundation of the restrictions. Land degradation is an ecological process mediated by a sociopolitical system of land management (Robbins 2004). In the case of northern New Mexico, this land-management regime

has been characterized by its use of Clementsian ecosystem models more attuned to the imperatives of economic markets than to the needs of local users or to the variable ecologies of forest and grassland ecosystems.

The type of livestock production that developed in New Mexico was a form of transhumant pastoralism that exploited the elevation and precipitation variation on the upland *ejidos* of northern New Mexico. The limited seasonal access to irrigated pastures for livestock meant that grant members were expected to control and restrict domestic herbivore movements. The unpredictability of rainfall (in amount, intensity, and frequency) necessitated constantly moving herds. Livestock herding was based on rangeland conditions and prevailing climatic conditions.

This pattern, however, was interrupted with the enclosure of the land-grant commons. The models of ecosystems processes that formed the foundation of Forest Service practices differentiated livestock impacts only by ecological conditions of rangelands prior to disturbance, disregarding other significant differences. Whereas pastoralist systems produced surpluses for local consumption based on the natural productivity of animal herds, commercial systems used methods of production designed to increase productivity beyond the natural limits imposed by arid rangelands. These methods (such as water development, supplemental feed, and reseeding) attempted to increase the carrying capacity of a given area. The costs associated with range improvements tied commercial ranchers to distant markets, making market imperatives and price fluctuations the driving forces behind range-management practices (Rico 1998; Starrs 1998; Sayre 1999). This contrasts with recent range-ecology research that has shown that pastoralist land-use decisions in arid regions are tied to prevailing environmental conditions and offer important economic and ecological benefits (Ellis and Swift 1988; Turner 1993; Perevolotsky and Seligman 1998; Mapinduzi *et al.* 2003).

Beginning with the stock-reduction programs in 1948, the view of El Rito rangelands as severely overgrazed has resulted in efforts by federal land managers to restructure the local economy around alternative economic activities, reducing the importance of livestock production. Rangers believed that the agropastoral

economy was a source of both environmental and economic problems in the region. The imposition of wage-labor jobs, it was thought, could improve local livelihoods. Instead, such efforts have continued a process of land and water dispossession among Hispano land-grant heirs. The focus on capital-intensive, corporate-controlled, commercial timber production on the El Rito District, however, has proven economically infeasible and environmentally unsustainable (Peña and Martinez 1998; Wilmsen 2001).

The legacy of the cattle boom and the failure of early ecological models to both restore degraded ranges and offer effective means for range managers to assess the impact of grazing practices have imprinted and continue to influence struggles over land-management practices on the El Rito District. The failure of economic restructuring indicates that, short of returning lands to the descendants of the original land-grant recipients, a more ecologically and economically appropriate range-management strategy would be to restore agropastoral practices on the upland ranges of the El Rito District.

Notes

¹Volume 1 of the Vallecitos Federal Sustained Yield Archive, on file at the El Rito Ranger District in El Rito, New Mexico. For a review of the history of range-monitoring methods by the USFS, see Smith 2003.

²See Van Ness 1987 for a discussion of agropastoralism in northern New Mexico.

³See Jordan 1993 for a review of the historical antecedents of contemporary North American ranching typologies.

⁴Throughout this article, the term “Hispano” refers to Spanish-speaking residents in northern New Mexico. See the Nostrand debate in the *Annals of the Association of American Geographers* 74 (1): 157–164.

⁵See Rowley 1985 for a discussion of the political context of 1930s and 1940s rangeland management in the American Southwest.

⁶VFSYU Archive, Vol. 1, document #21.

⁷Although a number of Hispano elites controlled large herds, these herds

were based south of the Rio Arriba region. Of the 250,000 sheep grazing in New Mexico in 1827, 217,000 were concentrated around Albuquerque and Santa Fe (Peña and Martinez 1998). See also Baxter 1987 for a discussion of the development of the sheep industry in New Mexico.

⁸See also Ebright 1987, 1993, 1994.

⁹By 1935, the Forest Service had forced most permittees to switch from raising sheep to raising cattle. The *churro* sheep, the animal of choice for agropastoralists for its ability to thrive in the semi-arid conditions of northern New Mexico while providing both meat and wool, was seen as far more damaging to montane rangelands by the Forest Service.

¹⁰VFSYU Archive Vol. 1, document #21.

¹¹Despite USFS regulations requiring field evaluations of rangelands (see Pinchot 1905), no record exists in the VFSYU archive regarding the method that rangers used to determine carrying capacity. The only mention anywhere in the archive to range conditions is the conclusion by Scott delivered to Supervisor Cottam in the case study.

¹²For a discussion of the primary (climatic) and secondary (livestock grazing) factors affecting ecosystem processes, see Heitschmidt *et al.* 1999.

¹³VFSYU Archive Vol. 1, document #17.

¹⁴VFSYU Archive Vol. 4, document #427A.

¹⁵For such a review, see Pulido 1996 and Peña and Martinez 1998.

¹⁶See also Rothman 1992.

¹⁷The term *ejido* refers to the upland portion of the land grant used for common purposes, such as grazing, fuelwood, or timber harvesting. Community-lands grants distributed by Spain and Mexico included ejidos along with individual plots devoted to irrigated agriculture.

¹⁸See Barfield 1978 for a review of pastoralist production strategies.

¹⁹VFSYU Archive, Vol. 4, document #447.

²⁰1993 VFSYU Timber Inventory, on file at the El Rito Ranger District, El Rito, New Mexico.

References

- Angassa, A., and R. Baars. 2000. Ecological Condition of Encroached and Non-encroached Rangelands in Borana, Ethiopia. *African Journal of Ecology* 38 (4): 321–328.
- Barfield, T. 1978. *The Nomadic Alternative: Modes and Models of Interaction in the African–Asian Deserts and Steppes*. The Hague: Mouton.
- Barrett, E. 2002. The Geography of the Rio Grande Pueblos in the Seventeenth Century. *Ethnohistory* 49 (1): 123–169.
- Bassett, T. 1988. The Political Ecology of Peasant–Herder Conflicts in the Northern Ivory Coast. *Annals of the Association of American Geographers* 78 (3): 453–472.
- Baxter, J. 1987. *Las Carneradas: Sheep Trade in New Mexico, 1700–1860*. Albuquerque: University of New Mexico Press.
- Briske, D., S. Fuhlendorf, and F. Smeins. 2003. Vegetation Dynamics on Rangelands: A Critique of the Current Paradigms. *Journal of Applied Ecology* 40: 601–614.
- Buskirk, S., W. Romme, F. Smith, and R. Knight. 2000. An Overview of Forest Fragmentation in the Southern Rocky Mountains. In *Forest Fragmentation in the Southern Rocky Mountains*, R. Knight, F. Smith, S. Buskirk, W. Romme, and W. Baker (eds), 3–14. Boulder: University Press of Colorado.
- Butzer, K. 1988. Cattle and Sheep from Old to New Spain: Historical Antecedents. *Annals of the Association of American Geographers* 78 (1): 29–56.
- Clements, F. 1928. *Plant Succession and Indicators*. New York: H.W. Wilson Co.
- Correia, D. 2005. From Agropastoralism to Sustained Yield Forestry: Industrial Restructuring, Rural Change, and the Land-Grant Commons in Northern New Mexico. *Capitalism, Nature, Socialism* 16 (1): 25–44.
- Dahms, C., and B. Geils. 1997. An Assessment of Forest Ecosystem Health in the Southwest: USDA Forest Service: Rocky Mountain Forest and Range Experiment Station.
- deBuys, W. 1985. *Enchantment and Exploitation: The Life and Hard Times of a New Mexico Mountain Range*. Albuquerque: University of New Mexico Press.

- Dyksterhuis, E. 1949. Condition and Management of Range Land Based on Quantitative Ecology. *Journal of Range Management* 2: 104–115.
- Ebright, M. 1987. New Mexican Land Grants: The Legal Background. In *Land, Water, and Culture: New Perspectives on Hispanic Land Grants*, C. Briggs and J. Van Ness (eds), 15–64. Albuquerque: University of New Mexico Press.
- . 1993. *The Tierra Amarilla Grant: A History of Chicanery*. Santa Fe: The Center for Land Grant Studies.
- . 1994. *Land Grants and Lawsuits*. Albuquerque: University of New Mexico Press.
- Ellis, J., and D. Swift. 1988. Stability of African Pastoral Ecosystems: Alternate Paradigms and Implications for Development. *Journal of Range Management* 41 (6): 450–459.
- Fowler, J. 2000. Historic Range Livestock Industry in New Mexico. In *Livestock Management in the American Southwest: Ecology, Society, and Economics*, R. Jemison and C. Raish (eds), 419–444. Amsterdam: Elsevier.
- Friedel, M. 1991. Range Condition Assessment and the Concept of Thresholds: A Viewpoint. *Journal of Range Management* 44 (5): 422–426.
- Gamougoun, N., R. Smith, M. Wood, and R. Pieper. 1984. Soil, Vegetation, and Hydrologic Responses to Grazing Management at Fort Stanton, New Mexico. *Journal of Range Management* 37 (6): 538–541.
- Gonzalez, P. 2003. Struggle for Survival: The Hispanic Land Grants of New Mexico, 1848–2001. *Agricultural History* 77 (2): 293–324.
- Hardin, G. 1968. The Tragedy of the Commons. *Science* 162: 1243–1248.
- Heitschmidt, M., M. Haferkamp, M. Karl, and A. Hild. 1999. Drought and Grazing: I. Effects on Quantity of Forage Produced. *Journal of Range Management* 52 (5): 440–446.
- Hoben, A. 1995. Paradigms and Politics: The Cultural Construction of Environmental Policy in Ethiopia. *World Development* 23 (6): 1007–1021.
- Jones, O. 1979. *Los Paisanos: Spanish Settlers on the Northern Frontier of New Spain*. Norman: University of Oklahoma Press.
- Jordan, T. 1993. *North American Cattle-Ranching Frontiers: Origins, Diffusion,*

- and Differentiation*. Albuquerque: University of New Mexico Press.
- Kutsche, P., and J. Van Ness. 1981. *Cañones: Values, Crisis, and Survival in a Northern New Mexico Village*. Salem: Sheffield Publishing Company.
- Laycock, W. 1991. Stable States and Thresholds of Range Condition on North American Rangelands: A Viewpoint. *Journal of Range Management* 44 (5): 427–433.
- Libecap, G., and G. Alter. 1982. Agricultural Productivity, Partible Inheritance and the Demographic Response to Rural Poverty: An Examination of the Spanish Southwest. *Explorations in Economic History* 19: 184–200.
- Mapinduzi, A., G. Oba, R. Weladji, and J. Colman. 2003. Use of Indigenous Ecological Knowledge of the Maasai Pastoralists for Assessing Rangeland Biodiversity in Tanzania. *African Journal of Ecology* 41 (4): 329–336.
- Meeker, D., and D. Merkel. 1984. Climax Theories and a Recommendation for Vegetation Classification: A Viewpoint. *Journal of Range Management* 37 (5): 427–430.
- Moore, M., W. Covington, and P. Fule. 1999. Reference Conditions and Ecological Restoration: A Southwestern Ponderosa Pine Perspective. *Ecological Applications* 9 (4): 1266–1277.
- Osborn, B. 1950. Some Effects of the 1946–48 Drought on Ranges in Southwest Texas. *Journal of Range Management* 3 (1): 1–15.
- Peña, D., and R. Martinez. 1998. The Capitalist Tool, the Lawless, the Violent. In *Chicano Culture, Ecology, Politics: Subversive Kin*, D. G. Pena (ed.), 141–176. Tucson: University of Arizona Press.
- Perevolotsky, A., and N. Seligman. 1998. Role of Grazing in Mediterranean Rangeland Ecosystems. *Bioscience* 48 (12): 1007.
- Pinchot, G. 1905. *The Use of the National Forest Reserves: Regulations and Instructions*. Washington, D.C.: United States Department of Agriculture.
- Pulido, L. 1996. Ecological Legitimacy and Cultural Essentialism: Hispano Grazing in the Southwest. *Capitalism, Nature, Socialism* 7 (4): 37–58.
- Raish, C., and A. McSweeney. 2003. Economic, Social, and Cultural Aspects of Livestock Ranching on the Espanola and Canjilon Ranger Districts of the

- Santa Fe and Carson National Forests: A Pilot Study. USDA Forest Service: Rocky Mountain Research Station.
- Rico, M. 1998. The Cultural Contexts of International Capital Expansion: British Ranchers in Wyoming, 1879–1889. *Antipode* 30 (2): 119–134.
- Rivera, J. 1998. *Acequia Culture: Water, Land, and Community in the Southwest*. Albuquerque: University of New Mexico Press.
- Robbins, P. 2002. Obstacles to a First World Political Ecology? Looking Near Without Looking Up. *Environment and Planning A* 34 (8): 1509.
- . 2004. *Political Ecology: A Critical Introduction*. Oxford: Blackwell.
- Rodriguez, S. 1987. Land, Water, and Ethnic Identity in Taos. In *Land, Water, and Culture: New Perspectives on Hispanic Land Grants*, C. Briggs and J. Van Ness (eds.), 313–403. Albuquerque: University of New Mexico Press.
- Rothman, H. 1989. Cultural and Environmental Change on the Pajarito Plateau. *New Mexico Historical Review* 64 (2): 185–212.
- . 1992. *On Rims and Ridges: The Los Alamos Area Since 1880*. Lincoln: University of Nebraska Press.
- Rowley, W. 1985. *U.S. Forest Service Grazing and Rangelands*. College Station: Texas A&M University Press.
- Sampson, A. 1919. Plant Succession in Relation to Range Management. U.S. Department of Agriculture Bulletin No. 791. Washington D.C.: Government Printing Office.
- . 1952. *Range Management: Principles and Practices*. New York: John Wiley & Sons.
- Savory, A. 1988. *Holistic Resource Management*. Washington, D.C.: Island Press.
- Sayre, N. 1999. The Cattle Boom in Southern Arizona: Towards a Critical Political Ecology. *Journal of the Southwest* 41 (2): 239–271.
- . 2002. *Ranching, Endangered Species, and Urbanization in the Southwest*. Tucson: University of Arizona Press.
- Scoones, I. 1995. Exploiting Heterogeneity: Habitat Use by Cattle in Dryland Zimbabwe. *Journal of Arid Environments* 29: 221–237.
- Simmons, M. 1991. *The Last Conquistador: Juan de Oñate and the Settling of the*

- Far Southwest*. Norman: University of Oklahoma Press.
- Sluyter, A. 1996. The Ecological Origins and Consequences of Cattle Ranching in Sixteenth-Century New Spain. *The Geographical Review* 86 (2): 161–177.
- Smith, J.G. 1895. Forage Conditions of the Prairie Region. In *U.S. Department of Agriculture Yearbook*, 309–324. Washington, D.C.: U.S. Government Printing Office.
- Smith, L. 2003. The Struggle for a Uniform Monitoring System. *Arid Land Research and Management* 17 (4): 347–358.
- Starrs, P. 1998. *Let the Cowboy Ride: Cattle Ranching in the American West*. Baltimore: Johns Hopkins University Press.
- Stoddart, L., A. Smith, and T. Box. 1975. *Range Management*. Third ed. New York: McGraw–Hill Book Company.
- Swadesh, F. 1974. *Los Primeros Pobladores: Hispanic Americans of the Ute Frontier*. Notre Dame, Ind.: University of Notre Dame Press.
- Turner, M. 1993. Overstocking the Range: A Critical Analysis of the Environmental Science of Sahelian Pastoralism. *Economic Geography* 69 (4): 402–421.
- . 2003. Environmental Science and Social Causation in the Analysis of Sahelian Pastoralism. In *Political Ecology: An Integrative Approach to Geography and Environment-Development Studies*, K. S. Zimmerer and T. J. Bassett (eds.), 159–178. New York: Guilford Press.
- Turner, M., and T. Williams. 2002. Livestock Market Dynamics and Local Vulnerabilities in the Sahel. *World Development* 30 (4): 683.
- Van Ness, J. 1987. Hispanic Land Grants: Ecology and Subsistence in the Uplands of Northern New Mexico and Southern Colorado. In *Land, Water, and Culture: New Perspectives on Hispanic Land Grants*, C. Briggs and J. Van Ness (eds.), 141–214. Albuquerque: University of New Mexico Press.
- Weigle, M., ed. 1975. *Hispanic Villages of Northern New Mexico: A Reprint of Volume II of the 1935 Tewa Basin Study*. Santa Fe: The Lightning Tree.
- Wildeman, G., and J. Brock. 2000. Grazing in the Southwest: History of Land Use and Grazing Since 1540. In *Livestock Management in the American Southwest: Ecology, Society, and Economics*, R. Jemison and C. Raish (eds.), 1–26.

Amsterdam: Elsevier.

Wilmsen, C. 2001. Sustained Yield Recast: The Politics of Sustainability in Vallecitos, New Mexico. *Society and Natural Resources* 14: 193–207.

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