

RANGELAND GRAZING IN NORTH AMERICAN COMMERCIAL RANCHING

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Keywords: livestock management, ecological services, feedlot industry, grazing systems, rangelands, range management, markets, predation, grazing ecology, grazing systems, land tenure, mobility

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Summary

In the arid western regions of North America, ranchers and their production practices have been dramatically influenced by the development of commercial livestock feeding and meat marketing in the mid-twentieth century. In concert with the specialization and standardization of products that has accompanied the evolution of mass production in developed economies, United States (U.S.) ranchers raise mostly beef cows, generally of Hereford and/or Angus breeding, with far fewer operations raising sheep, goats or mixed livestock. In this system, ranchers must market a homogeneous product, or calf-crop, in order to get a top price. Weaned young animals not used for breeding stock are fed to slaughter weight in a feedlot, sometimes with intermediate steps on pasture or rangeland, allowing the production of more beef in a shorter amount of time than can be produced using rangeland forage alone. Although some elements of the U.S. context remain unique, the basic principles of the shift to commercial production are widespread, and draw on the livestock, feed sources, and economies of adjoining Mexico and Canada. A chain of production with various levels of consolidation that includes base-

line “manufacturing”, mid-level processing, and retail has evolved, along with a cost of capital that is often borne as debt, the accumulation of extensive areas of land that are either owned, leased, or controlled by the livestock owner, the ability to ship animals and product to multiple destinations, and the globalization of markets, including competition for markets. At the rangeland level, herds that are managed for an even-aged calf crop have exaggerated peaks and troughs in nutritional demand that increase risk to the producer and often require supplemental feeding when forage production fails to keep up. The use of growth hormones to speed growth, and antibiotics to reduce the impacts of feedlot crowding and high-energy feeds, has become widespread.

This chapter compares current livestock production systems with more traditional systems, with attention to the implications for grazing practices. Currently, grazing restrictions aiming to protect wildlife and water quality, and changing priorities for public lands, are causing further changes in rangeland livestock production systems. Ranchers in the U.S. retain some characteristics that are typical of more traditional pastoralists, including a deep attachment to the lifestyle, the use of land without secure tenure, a support network of peers, and an abhorrence of outside authority. Some of these traits may help ranchers take advantage of emerging markets for ecosystem services, habitat improvement, fire hazard reduction, land conservation, and niche livestock products.

1. Introduction: Commercial Livestock Production in North America

In the late nineteenth century in semi-arid North America, an influx of speculative money, funded by industrial wealth and family fortune, often from distant shores, drove the rapid development of a commercial livestock industry based on access to low-cost, uncontrolled land, and the ability to transport livestock to distant markets. Profiteering from running cattle crashed toward the end of the century with overstocked ranges, inadequate and badly placed fences, and a few brutal winters. The government asserted control over this range in the early twentieth century. Most summer range was reserved out of the public domain into the National Forests, and now is under the jurisdiction of the United States Forest Service (USFS). Most lowland ranges eventually came under the jurisdiction of the United States Bureau of Land Management (BLM). First priority for allocation of government rangeland, or ‘public lands’, went to those owning land with a home ranch nearby. ‘Grazing allotments’, areas of land individuated to households whenever possible, were then allocated and a fee set for grazing on a per head basis. Emphasis on ownership of nearby private property meant that transhumant and sedentary cattle producers had the advantage over shepherds and others who did not own proximate land.

Though ranches are of course a function of the culture of settlers and the details of the local environment, a typical cattle ranch evolved to have a ranch house and private ‘deeded acres’ located on water or a water development. On the deeded land is found irrigated pasture, used in some parts of the livestock production cycle, hay fields, and sometimes, crops. But there is considerable variation: in Texas, there is little public land as a result of an agreement when Texas joined the union; in the southwest and California, community and individual land grants under the Spanish and Mexican governments have created divergent property ownership patterns; in the southwest, Native American reservations have still different grazing and tenure practices.

In the arid western regions of North America, the ranchers that have persisted and their production practices have been dramatically influenced by the development of commercial livestock feeding and meat marketing in the mid-twentieth century. In this chapter, we focus on the management of grazing as part of commercial ranching. Driven in no small part by an overabundance of unmarketable grains that developed in the mid-twentieth century, the United States is where commercial, grain-fed, livestock production first evolved. This chapter focuses on the use of rangelands in commercial ranching, with an emphasis on the United States, but with qualifying notes where there are departures from those norms in adjoining countries. It is not an analysis or review of the impacts of grazing on rangeland ecosystems in the U.S. or elsewhere.

In fact, considerable numbers of cattle and sheep are produced on the North American continent solely on hay, grains, silage, irrigated pasture, and agricultural by-products, however rangelands often play an important role in the western U.S. particularly in calf production. Estimates of the relative contribution of different sorts of feedstock, whether in the United States, Mexico, and Canada, or globally, are complicated by the diverse and variable ways of feeding livestock. Further, the industry has stratified into several layers, each with regional variations, which means that the use of different kinds of feeds, and rangeland, not only varies regionally and temporally, but with the level of the operator in the production chain. In general, commercial livestock operators make use of what they can get, and they share this trait with even the most traditional pastoralists (see *Range Livestock Production Systems in the Near East*). Whereas traditional herders strategically take advantage of what the weather and other factors bring, commercial ranchers often have access to a large menu of feeds and pastures, with costs for each that vary each year and may be affected by local and global markets. And while the herder may move or make adventitious use of a quick variation or improvement in conditions, the commercial rancher is more likely bound by contract, conventions, and the strictures of lenders and partners. At the global level, the advent of the “ethanol economy” has seriously affected the relative costs of many feedstuffs, and at the same time, created a supply of “distillers grains” that can be used as feed. Feed and animals can equally be shipped long distances – while also at a carbon and cash cost.

The multiple-tiers of commercial livestock production reflect the cost-savings of specialization and the different kinds of resources, management, and financial skills needed at each level. Each tier may have distinct ownerships and levels of consolidation, though consolidation tends to increase as you go up the chain. In arid North America, at the bottom is what is commonly referred to as the rancher, or calf producer. The rancher maintains a brood herd of cattle that produces calves every year. These calves may be kept by the rancher after weaning, or sold at weaning to another producer who specializes in weanlings. If the animals are grazed during the year after weaning, they are referred to as stockers and that owner is also, by consensus, a rancher. Weanlings and stockers are generally eventually put onto feeds of one sort or another, usually in feedlots. Though some ranchers may own or invest in feedlots, or lease feedlot spaces, feedlots often are owned by “feedlot operators”. They purchase animals from ranches and farms and place them on feed for 100 to 150 days. These animals, in turn, are slaughtered at about 1.5 years of age and sold to processors and retailers for sale through stores. Vertical integration, from birth to weanling to rangeland through feedlot and out the door of the supermarket, does happen but rarely so, and especially rare is integration

beginning at the ranch level. Contracting by feedlots from that level, for calves that manifest specific qualities (uniform appearance, coloration, weight, frame, or age), is relatively common. Some ranchers retain ownership of calves as they pass through the production chain, paying a charge to a feedlot owner based on gain, and so forth. While the United States has the largest cattle feeding industry in the world, grain feeding is also a part of production in other countries. Most Australian and South American beefs are grass or pasture fed, though there has been expanding use of grains, with about a third of Australia's beef finished on grain today. The model remains most widely embraced in the United States, with Canada and Mexico providing calves and stockers shipped to the grain-producing Great Plains of the United States, where animals are warehoused and fed to slaughter weight in huge feedlot operations close to Midwestern grain fields (Figure 1). On January 1 of 2009 there were about 32 million beef cows in the United States, with 13.9 million cattle in feedlots.

Commercial cattle production is considered driven by a "cattle cycle" based on changes in supply and demand. Reduced cattle supplies invoke higher slaughter prices. Large cattle supplies invoke lower slaughter prices. When the cost per kg of gain in the feedlot becomes high relative to finished cattle prices, calf prices are lowered relative to both yearling and fed cattle prices. Cheap calf prices, in relation to yearling prices, favor keeping animals on pasture or hay, termed "backgrounding", which results in many producers gradually shifting into backgrounding enterprises. The calf crop decreases over time due to low calf prices, first depressing prices further during the cow herd reduction and eventually increasing beef prices as supply decreases. When slaughter prices are high in relation to cost of gains in the feedlots, calf prices rise faster and higher than yearling prices, which is unfavorable to backgrounding. This causes cow herds to expand and feedlots to place younger, lighter cattle on feed and more feed grain is used. Eventually, as beef supplies and calf crops become larger, and feed grain usage increases, beef prices decrease. This also leads to lower calf prices and higher grain price. The industry again shifts to backgrounding. The range-based cow-calf producer has the least amount of flexibility among the various enterprises, and high fixed costs in maintaining a herd of brood cows and owning land.

Production of lambs is much less common in the United States, and is more likely to be carried out from lambing to sale for slaughter under one ownership, though often the base level producer sells weanling "feeder lambs" at two or three months of age to feedlot producers. Most lambs are fed grains during at least the final phase of growth, whether in feedlot or creep, generally for two to three months. They are typically slaughtered at three to six months of age. There is a growing market for early harvest lamb to meet demand for better quality, lighter-weight lambs, and/or lamb sold directly to consumers at the farm gate. There are also farm flock production models that do not use rangelands and rely only on some combination of irrigated pasture, grains, other concentrates, crop aftermath, small grain fields, and hay. According to the National Research Council, during the last 60 years, the number of sheep in the United States has been declining, from a record high of 56 million head in 1942 to 5.7 million head as of January 1, 2009. The U.S. Department of Agriculture reports about 3.7 million goats in the U.S. on January 1, 2009 (USDA-NASS 2009).

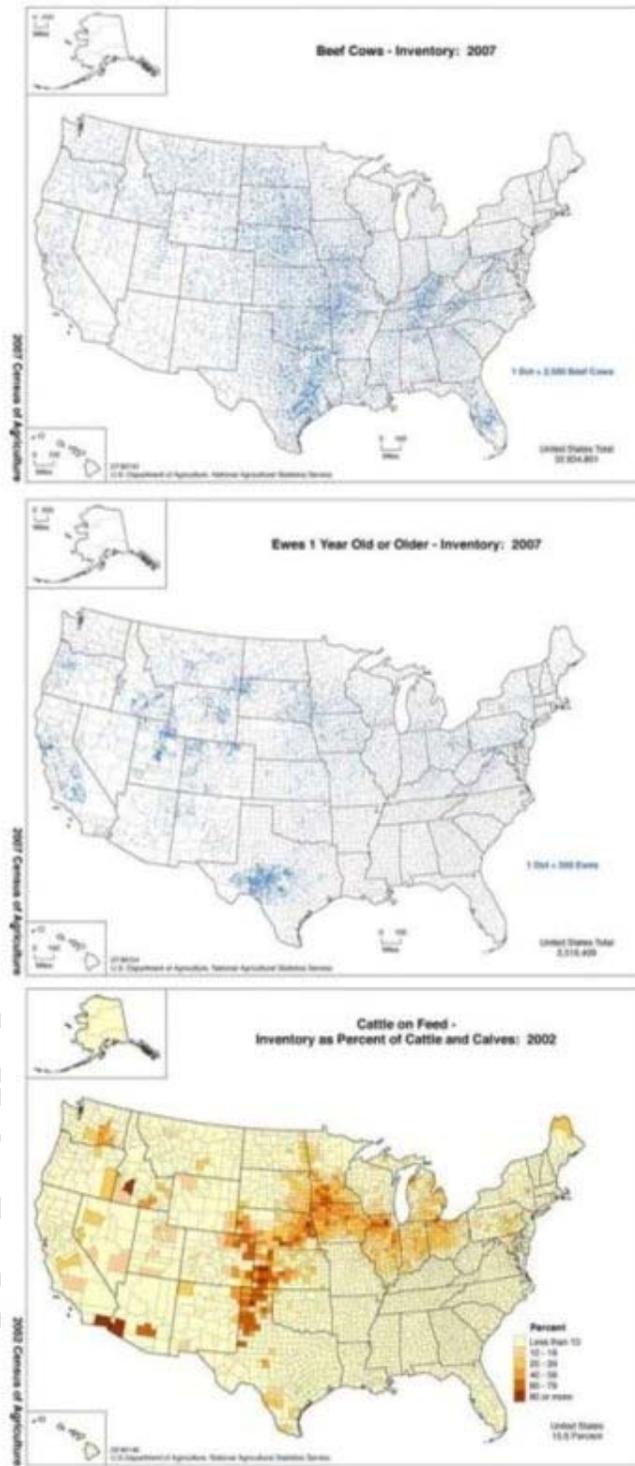


Figure 1. The beef cow inventory shows the relatively low density of cattle in the western regions of North America, however a disproportionate share of the calves come from western rangelands. Cattle on feed are concentrated in areas with high availability of grains and agricultural by-products (from USDA-NASS 2002 and 2007).

A chapter on “grazing practice in commercial ranching” must concentrate on the lamb or calf producer level of livestock ranching as part of a highly developed commercial economy, where grazing on rangeland is a part of the process and a significant source of forage for the herd. Diverse and intermediate production forms of course exist throughout the world and are beyond the scope of this chapter, but many incorporate aspects of the commercial ranching described here, and each includes changes in fundamental aspects of traditional pastoralism: individuation of land tenure, new management institutions and practices, and mass production for the market (see also *Range Livestock Production Systems in the Near East*).

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Bibliography

Briske, D.D., J. D. Derner, J. R. Brown, S. D. Fuhlendorf, W. R. Teague, K. M. Havstad, R. L. Gillen, A. J. Ash, and W. D. Willms. (2008). Rotational grazing on rangelands: reconciliation of perception and experimental evidence. *Rangeland Ecology and Management* 61, 3–17. [The paper reviews the scientific evidence on the benefits of rotational grazing for livestock production and finds it is not compelling].

Brunson, M. W., and L. Huntsinger. (2008). Ranching as a conservation strategy: can old ranchers save the new west? *Rangeland Ecology and Management* 61, 137-147. [A review of the state of knowledge of demographic change in the ranching population, and the implications for conservation].

Gentner, B. J. and J. A. Tanaka. 2002. Classifying federal public land grazing permittees. *Journal of Range Management* 55:2–11[Results of a survey of western public lands permittees].

Gwin, L.E. (2006). "New Pastures, New Food: Building Viable Alternatives to Conventional Beef." PhD Dissertation, Department of Environmental Science, Policy, and Management, University of California, Berkeley. [This dissertation includes a history of the development of the cattle feeding industry and new production forms like grass-fed beef].

Heitschmidt, R.K. and Stuth, J. W. (eds.) (1991). *Grazing: An ecological perspective*. Timber Press, Portland, Oregon. [A comprehensive rangeland management textbook with chapters written by specialists in each area].

Hobbs, N.T., K.A. Galvin, C.J. Stokes, J.M. Lockett, A.J. Ash, R.B. Boone, R.S. Reid, P.K. Thornton. (2008). Fragmentation of rangelands: Implications for humans, animals, and landscapes. *Global Environmental Change* 18: 776–785. [A review of the impacts of fragmentation on rangelands globally].

Huntsinger, L., L.C. Forero, and A. Sulak. (2009). Transhumance and pastoralist resilience in the western United States. *Pastoralism: Research, Policy, and Practice* [An extensive review of ranching in the western U.S. and comparison to more traditional forms].

Huntsinger, L., J. W. Bartolome, and C. D’Antonio. (2007). Grazing management on California’s Mediterranean grasslands. p. 233-253, In: *California grasslands: ecology and management*, edited by M. R. Stromberg, J. D. Corbin, and C. D’Antonio. Berkeley, CA, USA: University of California Press. 400 p. [State of knowledge on grazing management on Mediterranean grasslands].

Huntsinger L., and P. F. Starrs. (2006). Grazing in arid North America: A biogeographical approach. *Sècheresse* 17(1-2), 219-234. [Extensive review of livestock production and rangeland ecosystems in

North America].

Liffmann, R. H., L. Huntsinger, and L. C. Forero. (2000). To ranch or not to ranch: home on the urban range? *Journal of Range Management* 53, 362-370. [Reports results of a survey of ranchers in urban and rural areas in California].

NRC [National Research Council]. (2008). Changes in the sheep industry in the United States. Committee on the Economic Development and Current Status of the Sheep Industry in the United States. Report brief, National Research Council, National Academies Press, Washington, D.C., www.dels.nas.edu/dels/rpt_briefs/SheepFinal.pdf accessed Sept 2008. [National Research Council report on the sheep industry].

Rinschede, G. (1984). *Die Wanderviehwirtschaft im gebirgigen West er der USA und ihre Auswirkungen im Naturraum*. Schriftenreihe der Katholischen Universität Eichstätt. [A remarkable survey of transhumance in diverse settings in the American West].

Sayre, N.F. (2005) *Working Wilderness: The Malpai Borderlands Group and the Future of the Western Range*. Tucson, AZ: Rio Nuevo [Describes the history and actions of a collaborative effort to manage rangelands on the borders of Arizona, New Mexico, and Mexico].

Starrs, P. F. (1998). *Let the cowboy ride: cattle ranching in the American West*. 386 p. Johns Hopkins University Press. [A study of historical differences in grazing in different regions of the American West, with discussion of social dimensions of livestock ranching. History and geography of ranching in five regions in the western United States

Stroupe & Schreiner [photographers]. (1920). Fred Dressler counting sheep on range [photograph]. Special Collections, University of Nevada, Reno, P1984-23-36.jpg; electronic version scanned and archived 2005.

USDA-ERS [United States Department of Agriculture] Economic Research Service. (2010). State certificate data (generally 2001) compiled by Economic Research Service, USDA <http://www.ers.usda.gov/Data/InterstateLivestockMovements/RegionalFlows.htm> [accessed 2010]. [Graphical representation of regional flows of livestock].

USDA-NASS [United States Department of Agriculture National Agricultural Statistics Service]. (2009). Accessed August 24, 2009 at: http://www.nass.usda.gov/QuickStats/indexbysubject.jsp?Text1=&site=NASS_MAIN&select=Select+a+State&Pass_name=Cattle++All&Pass_group=Livestock+%26+Animals&Pass_subgroup=Dairy&list=Cattle++All. [U.S. livestock statistics collected by the National Agricultural Statistics Service].

USDA-NASS [United States Department of Agriculture National Agricultural Statistics Service] Census of Agriculture (2002 and 2007) National, State, and County Tables; Maps. Washington, D.C.: United States Bureau of the Census.# http://www.agcensus.usda.gov/Publications/2002/Ag_Atlas_Maps/Livestock_and_Animals/index.asp and http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Ag_Atlas_Maps/Livestock_and_Animals/index.asp [accessed 2010]# http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Ag_Atlas_Maps/Livestock_and_Animals/index.asp [Maps and data on U.S. Agriculture].

Biographical Sketches

Dr Lynn Huntsinger is a professor of Range management in the Department of Environmental Policy and Management at University of California, Berkeley. Her BA was in Modern Chinese History and the PhD in Range Science from UC Berkeley. She has done comparative work in Spain and China and is author of numerous papers and book chapters. Her work seeks to understand the property and social relations, values, and practices of ranchers that reflect adaptation to the non-equilibrium dynamics of rangelands as part of socio-ecological systems, with the goal of learning how long-term, sustainable management of rangelands can be created, and of contributing to the growing body of literature and theory surrounding the concept of socio-ecological systems. She works with ranch landowners, NGOs, and agencies to conserve working landscapes.

Professor Paul Starrs teaches cultural and historical geography at the University of Nevada, in Reno,

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