LINKING RANGELAND SCIENCE TO WESTERN RANGELAND ISSUES. Kris Havstad, USDA-ARS, Jornada Experimental Range, Box 30003, NMSU, Dept. 3JER, Las Cruces, NM 88003

It would be an understatement to say that management of our nation's rangelands has become an extremely difficult, highly divisive, emotionally charged set of processes. For three decades we have been in a transition from a single use based management to an "affected interest" involvement for multiple uses. This transition has been driven by a series of federal laws, is contentious and is far from over. The current situation is a management environment driven by court decree where the biological rationale is lost within a myriad of legal arguments and competing agendas.

Rangelands are primarily a publicly owned resource in the 11 western states and the inability of the government to dispose of these lands over a 200 year period has not meant that they were not important to a wide spectrum of the public. Actually, for a resource defined as having limitations (climatic, edaphic or physical), relatively low agricultural production (we annually harvest 20g/m2 from our desert grasslands) and generally regarded as wasteland (by the poorly informed) our rangelands invoke strong passions beyond a seemingly logical reason. It can seem difficult for those of us involved in rangeland science to find a link of relevance of our research to some of the social issues debated today that encompass range management. However, at a time when our research is being increasingly scrutinized for relevance it is extremely important that we make these links.

There are four general categories of issues that encompass the management of our rangelands today. In no particular order, these categories are 1) rights, 2) equity, 3) expectations and 4) values. Many of these issues have a long history of debate and a pertinent history of federal policies that shape the current debate. This is particularly true for the issues of rights and equity. None of these general issues are strictly biological. Range management encompasses not only considerations of the biological features of the resources, but also the cultural, political, social and economical features. Thus, debates about rangeland biology are embedded in each of these four general issues.

Rights

Throughout this century the language within federal legislation regarding use of the public domain for grazing has clearly described it as a privilege. Even in the Grazing Act of 1934 it is clearly stated that "the issuance of a permit pursuant to the provisions of this act shall not create any right, title, interest or estate in or to the lands."

It is important, however, to recognize that the implementation of the provisions of the Grazing Act was intentionally oriented to the needs of the ranching community in the west. The Grazing Act was established to address the needs of the lower elevation rangelands that remained in the unappropriated public domain until their final disposal. The responsible agency (initially

just a few federal employees drawn from other agencies including the Treasury Department) did not even have an organizational (organic) act even after it was reorganized as the Bureau of Land Management in 1947. The original grazing districts were established under direction of an advisory committee comprised of cattle and sheep ranchers in each region. The adjudication of land and water rights serving millions of acres of rangelands was accomplished primarily by these users. These actions by the federal government of empowering the permittee in land use decisions has contributed to a perception of permittee "rights" regarding public land grazing. Even more recently, in section 8 of the Rangeland Improvement Act of 1978, the standing of the users has been reaffirmed. Section 8 of this act states that the action of the federal government must give "careful and considered consultation, cooperation and coordination with the lessees, permittees and land owners involved . . ."

Our public land management continues to operate in a transitional state from the grazing emphasis of the 1934 Grazing Act to the environmental impact statement based bureaucracy fostered by the Federal Land Policy and Management Act of 1976 (FLPMA). However, FLPMA was the result of 15 years of development and revision within the political arena. Today, proposed legislation such as the Public Rangelands Management Act is another step in this transition. One factor that will accelerate this transition will be the reduced staffing of federal agencies such as the BLM. It is likely that state and local governments will play a much larger role in mediating the balance of rights and privileges among resource users.

Equity

Grazing fees were first established for Forest Service lands in the early 1900's. Initial challenges to the government's authority to charge fees were denied. By the 1930's it was understood that grazing fees would be charged for use of the public rangelands, but that these fees would be set to cover the cost of administration, and would recognize the value of the industry to rural communities. Fee rates have been routinely studied over the past 50 years, and government policies to raise fees have always met with resistance from the range livestock industry. Today, the federal government sells about 20 million animal unit months (AUM) of forage from the public domain at a price (in 1996) of $1.35 per AUM. The estimates of the administrative cost of this program range from $50 to $200 million per year. Obviously, the approximately $27 million in fees projected for 1996 will be far short of administrative costs, even on the conservative side ($50 million) of the estimate. However, one issue in this debate about subsidized public land ranching and the disparity of fair market values between public and private land is the fact that grazing permits and their associated low cost are a capital asset. These permits have a value to public land based ranches, and changes in the fee structure will impact the value of those capital assets. The ranching industry argues that government policies have created these values, and they can not simply be arbitrarily changed. Fair market value calculations need to consider opportunity costs associated with public land permits. When these type of considerations are included in calculation of the actual costs of grazing on public land the differences between fees on public and private land are greatly diminished.

Expectations

It is commonly assumed that overgrazing is the principal cause of retrogression on rangelands, and removal of livestock will lead to regeneration of climax conditions. Actually, we have probably underappreciated and underestimated the extent of damage to our western rangelands caused by widespread overgrazing in the late 1800's following the passage of the Original Homestead Act in 1862 and the conclusion of the Civil War. Though livestock have been in North America for nearly 500 years, and in the area of the United States for 400 years, their numbers and distribution were limited until widespread availability of transportation and water pumping technologies. In a 20 to 40 year period following the Civil War many areas were over utilized extensively in the west. In many regions, especially the more arid areas, recovery has been slow or even non existent. In spite of fairly intensive use of improvement technologies (triggered by availability of phenoxy herbicides and germplasm), many of these landscapes still show effects of early abuses. In many instances these areas were further negatively impacted by droughts during the 1920's, 1930's and 1950's. A widespread amount of the western US has been classified as desertified, a result of the lingering effects of these disturbances. Continued study of these landscapes however, has lead us to revise our theories about succession and climax. We now think that many of these lands have multiple steady-states of self-perpetuating equilibrium. Simple removal of an agent of retrogression will not regenerate prior vegetative conditions of the 1850's or earlier. The basic assumptions of Clementsian ecology (closed system, balance of habitat factors, single state equilibrium, predictable successional patterns and rare occurrence of disturbance) have been modified with an increasing understanding of the complexity and dynamics of open systems where habitat factors are not viewed as static (especially the biotic component). Expectations for western rangelands vary greatly depending upon ecological perspectives. The earlier Clementsian based expectation has been widely accepted, and many people envision waving seas of tall grass returning to western landscapes. Yet, for many areas the landscape was never (at least the last 10,000 years) a highly productive grassland. Much of the west has always been a low and sporadically productive environment with a prominent shrub component.

Values

Certainly, range management has had at its roots an anthropocentric value system. The cardinal principles of range management found in most basic textbooks are utilitarian. The developing concepts of sustainability of rangelands, including as grazing lands for domestic livestock, are based on a management scale of the pasture, ranch unit or allotment. Evaluations of proper management are centered around concepts of utilization levels of available forage that will allow replenishment of the key forage species. Yet, a biocentric based value system is now emerging. These concepts are rooted in the principle of biodiversity. Under this value system, management principles are based on maximum life processes rather than harvest rates that ensure species renewal. A biocentric value system also changes the management scale from the pasture, or ranch level, to a landscape level. The concepts of ecosystems and biospheres become more relevant to the biocentric-based set of values. From this perspective many of the utilitarian based management practices traditional to western rangelands have been judged to be ineffective, if not out-right failures. The inability of an anthropocentric value system to address effects of

management beyond ranch-level scales has been one point of disagreement between these value systems. In addition, the methods of evaluating resource conditions are almost incompatible. The anthropocentric system typically assesses utilization levels of key forage species as a primary feedback mechanism for adjusting management. A biocentric system would assess a wide array of resource conditions, including biological processes in describing biodiversity of landscapes. Grazing by domestic livestock would have to be judged based on its impacts upon biodiversity at these larger scales. We do not presently have extensive information on grazing effects at this array of scales for effective judgements.

Scientific Issues

Unfortunately, rangeland science will probably not contribute greatly to resolving issues of rights and equity. Though some scientists are conducting credible research on aspects of these issues, these are primarily political, cultural and economic issues with minimal biological components. However, rangeland research can be extremely relevant to questions pertaining to issues of expectations and values. Both of these issues have prominent biological factors that need to be investigated.

Expectations

Research should be identifying technologies for assessing, monitoring and remediating rangelands. These technologies need to be ecologically-based with recognition of the open-system nature of these landscapes. In particular, we need to identify reasonable ecological goals that are not simply based on prior vegetative conditions of the last century. The technologies must be affordable, which will probably dictate that they are extensive rather than intensive, narrowly focused rather than broadly applied, and evaluated for effectiveness on a decadal time scale rather than growing seasons. This will also require an interdisciplinary approach to research. Though this is a commonly stated goal, it can be rare in practice. However, relevant technologies will require a broad biological evaluation. It will also be extremely important that we make the effort to effectively articulate the complexity of these landscapes and their management. False expectations have been partly built on oversimplification of rangeland ecology.

Values

These are numerous differences between a biocentric and an anthropocentric value system. However, there are research questions that should be addressed which would contribute to a greater understanding regardless of value. Of particular importance are questions of scale, both spatial and temporal. Our research should be conducted at multi spatial scales. We have expended considerable scientific energies at small plot, patch and community scales. We should be integrating this research at landscape scales, at least. It is not unreasonable to expect that we understand grazing impacts and management influences beyond the borders of the management unit. Current ecological understanding has reinforced an appreciation for the cascading effects of disturbance at a local scale.

It is also imperative that we plan our research for long-term studies. Much of the present rethinking of rangeland management principles is a result of the long-term research established in the west by agricultural experiment station and USDA scientists in the early part of the century. We should be designing studies that can be continued by the scientists that follow us.

There is an increasing demand by the public that research is relevant to important issues. We are in a situation today where rangeland research, even at its most basic, can be extremely relevant to the public. We have a tremendous opportunity for our science to lead in the development of new technologies for rangeland management and to understand the importance of the resource to society, even on a global scale.