Best Management Practices to Enhance Ecosystem Service Production and Tradeoffs, Current and Future

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Scientists and practitioners have demonstrated the effectiveness of a suite of management practices to enhance many ecosystem services on rangelands. No single practice is effective in all instances, nor simultaneously enhances all desired ecosystem services. For example, the practice of thinning shrub and tree cover in oak savannah has the potential to triple agricultural productivity, but can also reduce infiltration capacities by an order of magnitude. Prescribed grazing practices can restore riparian functions such as filtration of pollutants from surface runoff; however, the required capital investment in fencing and livestock drinking water facilities, as well as increased annual management effort, may increase ranch overhead and reduce already thin profit margins. The simple decision to graze or not graze a site has ramifications. For example, some wildlife species benefit from grazing disturbances, while others clearly do not. Range research and management experience tells us the effectiveness of a practice or management strategy will vary spatially and temporally, and will depend upon the current ecological state of a site. A key future challenge is to identify and verify efficacy of integrated management strategies to achieve multiple ecosystem service goals across different ecological sites. These integrated strategies will need to be implemented in a business efficient, adaptive management framework. Interdisciplinary, ranch-scale research will need to be conducted in collaboration with managers to quantify ecosystem service tradeoffs and identify opportunities to simultaneously optimize for multiple goals.

Following this theme, we are working directly with ranching communities in Wyoming and California to integrate management expertise, new ranch-scale research, and existing research information to identify and extend practical grazing options to optimize interdependent agricultural, economic, and ecological goals. Via multiple mail and on-ranch surveys, we aim to investigate the social-cultural-economic-institutional factors driving management decisions, and understand how managers receive, assess, and use grazing management information to reach their goals. We are also initiating a long-term adaptive management field experiment at the UC Sierra Foothill Research and Extension Center, which will enable active collaboration between researchers and range managers. These project components will be used to develop an online tool that will allow managers to participate in an interactive prescribed grazing – restoration information exchange. Such interdisciplinary, cross-professional work will enable range science and management to move forward toward the sustainability of multiple ecosystem functions and services necessary for the long-term ecological health of the system and the dependent ranch enterprise.