Ruminant Animal Nutrition & Behavior Specialist

Position

This position will develop an applied research and extension program that discovers how to link ruminant animal nutrition and foraging behavior to conserve and enhance the provision of ecosystem services in California's grasslands, shrublands and forested systems including managing fuel loads, biodiversity, soil carbon, invasive plants and sensitive wildlife habitat. This position also will identify how agricultural by-products can be incorporated into land management to optimize how grazing animals can benefit ecosystem function and how livestock producers can incorporate agricultural by-products from California's diverse commodity-base to buffer effects of extensive drought, wildfire and land-use change on the availability of critical forage. The candidate must have a Ph.D. in animal science, grazing ruminant nutrition, or similar disciplines. Expertise using agricultural by-products and other nutritional tools to optimize ruminant performance, animal behavior and distribution to manage ecosystem functions is desirable. This position will be housed at the UC Sierra Foothill Research and Extension Center (SFREC) to leverage the extensive investment UC has made in this over 5,000 acre research facility to catalyze solutions for conserving and enhancing flows of ecosystem services across the largest agricultural systems in California and the West. This position will create essential knowledge and provide urgently needed academic expertise to UCCE livestock and natural resource advisors throughout the state, the beef cattle, sheep and goat industries, as well as the array of conservation groups, land management agencies, fire safe councils, state and national agricultural agency leaders focused on protecting ecosystem function and using ruminants as tools to mitigate ongoing environmental change. As this position is unmatched in the West it will position UC to lead national and global efforts for discovering how links between animal nutrition and grazing behavior can optimize and conserve the flows of ecosystem services on which society critically depends.

Justification

Research by UC over the last two decades has overwhelmingly demonstrated how ecosystem services provided by California's over 50 million acres of grasslands, shrublands and forests positively impacts state and local economies and the well-being of families and communities across the state. However, the ability of these landscapes to maintain this critical supply of goods and services is threatened by a number of complex and interacting ecological, economical and socio-political factors including environmental and land use change, changed fire regimes, and willingness/ability of society to support provision of non-market services. Because of the extensive nature of these landscapes, grazing and browsing animals remain the only practical way that ecosystem goods and services can be effectively managed at any reasonable scale. While the potential to use ruminants to enhance flows of ecosystem services is widely recognized we have only begun to understand the strong and complex links among nutrition, animal grazing behavior and ecosystem service provision. With this position UC has a unique opportunity to lead the discovery of the mechanistic links among these processes and develop scalable and practical approaches that enable ruminants to be used to solve the mounting ecosystem management challenges in California and across the globe. Key lines of research will include:

1. Using grazing animal behavior and supplementation to reduce fuel loads, invasive plant abundance and increase flows of multiple-ecosystem functions and services
2. Integrating traditional and novel supplementation methods and grazing management to improve animal distribution, health and production
3. Using agricultural by-products in rangeland ruminant production systems to buffer effects of low rainfall years and on variable and fluctuating forage markets on ranch profitability

This position is uniquely centered to provide expertise and generate solutions across ANR's strategic initiatives as it will allow agricultural producers to align livestock production markets with emerging ecosystem service markets (integrating Sustainable Food Systems and Sustainable Natural Ecosystems), allow livestock producers to provide profitable and environmentally sustainable tools to manage pests and invasive species across California's working landscapes (Integrating Endemic and Invasive Disease and Pest Management with Competitive and Sustainable Food Systems), as well as allow producers across multiple commodities to leverage application and demand for multiple by-products to enhance Competitive and Sustainable Food Systems across the state.

Extension

Addressing these challenges will require development of new and integrated statewide extension networks and leveraging ANR's investment in the Research and Extension Center System (REC) and Cooperative Extension

(CE). Using the infrastructure and extension capacity of SFREC, this position will develop programs that deliver information on plant and animal nutritional dynamics to conservation groups and public fire and land managers using ruminants to manage habitat, fuel loads, soil carbon and invasive species. Likewise, this position will use SFREC to develop extension and outreach programs that specifically link by-product development and management for key regional and statewide crop producers to nutritional management, storage and supply needs of ruminant livestock producers.

Research

Key research questions include:

1. Understanding how to integrate knowledge of animal grazing behavior and strategic supplementation to improve provision of ecosystem services including wildlife habitat, invasive plant control, soil carbon sequestration and soil nitrogen conservation
2. Identifying how to use traditional supplements and agricultural by-products to optimize ruminant consumption of fuel and invasive plants
3. Discovering how agricultural by-products can buffer economic effects of drought and fluctuating forage markets on livestock production

Demand for this line of discovery is broad with publication outlets including California Agriculture, ANR peer-reviewed 8000 series, Conservation Biology, Journal of Animal Science, and Rangeland Ecology and Management as well as a host of non-technical, popular press and trade outlets.

ANR Network

This position will be uniquely situated to work with multiple campus CE specialists, faculty and CE advisors in cross cutting programmatic areas of ecosystem service provision, fuels and invasive species management, animal welfare and genomics, as well as agricultural economics. This position will report to the SFREC Director and enhance the ability of the REC system to contribute and support County programs across much of the state.

Network External to ANR

This position will collaborate with a broad external network including Animal Science faculty at CSU Chico, Fresno and Cal Poly, Fire Safe Councils, State and local Cattlemen's Association, California Beef Improvement Council, California Wool Growers Association, Farm Bureau, commodity boards, as well as public fire and land managers, conservation groups, land trusts, and targeted grazing operators.

Support

ANR will provide startup funds as well as annual program support funds. SFREC will provide office space, lab space, human resources and business office services as well as internet phone and website service.

Oth**er support**

This line of discovery is amendable to a host of internal and external funding source including the ANR competitive grants program, Russell L. Rustici Rangeland and Cattle Endowment, Joint Fire Sciences Program, Commodity Research Boards, as well as numerous applied research programs through NIFA and Western SARE as well as regional utility and public land management agencies that use ruminants to meet management goals.

Location

The position is located at SFREC which includes over 5,000 acre of rangeland, irrigated pasture as well as cattle feeding and working facilities, providing an exceptional experimental infrastructure to support this line of practical research and outreach. These facilities are designed to support operational scale research in a controlled setting. Geographically SFREC is well positioned, close to numerous diverse agricultural operations in the Sacramento Valley and Sierra Foothills and close to a host of stakeholders already interested in using grazing animals to enhance provision of ecosystem services. SFREC also has substantial capacity to support large outreach and extension programs including conference facilities and working facilities for hands on learning.

Developed and proposed by

The Placer/Nevada County Director, in cooperation with the UC SFREC Director and multiple livestock and natural resource advisors, proposed the foundation for this position. The academic focus of the proposal was developed based on input by livestock and natural resource advisors through the state as well as campus departments including UC Davis Animal Science and Plant Sciences and UC Berkeley ESPM.