Office of Environmental Farming and Innovation
California Department of Food and Agriculture
1220 N Street
Sacramento, CA 95814

December 15, 2017

Re: Prescribed Grazing Practice Proposal for Healthy Soils Program

Dear OEFI Staff,

We write to propose Prescribed Grazing (NRCS CPS 528), also sometimes referred to as Managed Grazing, be added as an eligible incentive and demonstration project practice to the Healthy Soils Program. Prescribed grazing is defined by NRCS as "Managing the harvest of vegetation with grazing and/or browsing animals with the intent to achieve specific ecological, economic, and management objectives." This proposal follows our letter submitted in December 2016 (Appendix 1) recommending the practice be added to the program, which was signed by 11 researchers and cooperative extension agents, 18 ranchers, and 8 representatives of agricultural and conservation NGOs.

Rangelands cover more than half of California's total land area, approximately 34 million acres of which is actively grazed.[1] This extensive acreage suggests the potential for even small increases in terrestrial carbon capture on a per-acre basis to result in significant contributions to GHG reduction at the state scale. Grazing represents the most common and most cost-effective tool available for managing rangeland systems for both increased carbon capture and reduced carbon losses through wildfire.[2] While the current list of eligible Healthy Soils practices contains a few that are relevant to rangeland restoration, none of the practices directly address the management of the grazing animals. Proper livestock management prevents degradation of grazed ecosystems and can enhance or restore the economic output and ecosystem services of rangelands, including carbon sequestration. NRCS analysis has found that prescribed grazing improves: desired species composition; quantity and quality of forage; water quality and quantity; watershed function; soil erosion control; quantity, quality, and connectivity of habitat for wildlife; and most importantly for this program, soil health.[3] Prescribed grazing can also protect the unique hydrology and native plant and animal species of vernal pools, whereas too little or no grazing in these systems often leads to their detriment;[4] at mid to low elevations in California, most of these carbon sequestration hotspots lie within rangelands.

While most rangeland has limited potential on a per-acre basis for carbon sequestration, the potential over its vast acreage is significant.[5,6,7,8] The May 2016 *USDA Building Blocks for Climate Smart Agriculture Report* suggests that proper management of grazing lands can be expected to sequester around 0.14 Mg CO_2e/acre/year in arid areas (less than 20 inches of average annual rainfall) and around 0.2 Mg CO_2e/acre/year in more mesic areas (20-35 inches of average annual rainfall).[9] COMET-Planner estimates that prescribed grazing applied to grasslands that were previously degraded by heavy grazing sequesters an average of 0.19 Mg CO_2e/acre/year, with a range of 0.11-0.33 Mg CO_2e/acre/year.[10] Eve et al. (2014) write, "Potentially high rates of soil organic carbon accumulation are predicted in newly established pastures and restoration of degraded rangelands, while improper management and drought can result in significant carbon releases."[11] Franzluebbers (2010) found that soil organic carbon is enhanced with moderate stocking rates compared with both no grazing and continuous overgrazing.[12] Finally, CDFA's own Healthy Soils Action Plan (2016) includes managed grazing as an example of the practices that can build, retain, or store soil carbon.[13]

A Healthy Soils Program incentive for prescribed grazing could also be an important tool to help ranchers remain economically viable and thus reduce the risk of them selling or converting their rangeland to more GHG-intensive land uses. The risk of increased emissions from rangeland conversion is high in California, as the state's rangelands are being converted at an alarming rate.[14] Between 1984 and 2008, nearly half a million acres of rangeland were converted, averaging a loss of 20,000 acres per year.[15] Roughly half of that acreage was converted to residential or commercial use, while another two-fifths was converted to cropland, mostly orchards and vineyards.[16]

Such high conversion rates have treacherous impacts on the climate. "As much as half of the carbon in the soil is lost to the atmosphere when grasslands and oak woodlands are converted to things like vineyards," stated Dick Cameron, one of the authors of the study assessing the state's rangeland conversion.[17] Haden et al. (2013) found that conversion from rangeland to urban uses may increase annual GHG emissions up to 100 times depending on how the rangeland is managed, while conversion to irrigated agriculture may increase annual GHG emissions up to 2.5 times.[18] Fragmentation of rangeland into smaller properties – even if they're maintained as rangeland – is also likely to lead to reduced sequestration potential and other ecosystem services. Through a survey of California landowners, Ferranto et al. (2012) found that owners of smaller properties with forest or grassland were significantly less likely than owners of larger properties to carry out or be interested in environmental improvements, such as improving wildlife habitat, removing exotic plants, having their soil tested, developing a written management plan, or building erosion control structures.[19] While the carbon sequestration impact of prescribed grazing may be small on a per-acre basis and variable depending on local environmental factors, it is certainly more climate-beneficial to implement improved grazing practices than to convert grazed rangelands into smaller properties and to more GHG-intensive land use.

What's driving this loss of rangeland? Ranchers, particularly small and medium scale ranchers, are operating on thin margins, with 70% making less than $10,000 profit annually.[20] Slim profits, plus a rapidly aging rancher population, challenges to intergenerational land-based wealth transfer, and a loss of critical processing facilities, have led many to sell their land to developers or to convert to more profitable but resource-intensive cropping systems.[21]

Given the magnitude of the challenge of rangeland conversion, both in total land area and the scope of the environmental impact, better rangeland management and rangeland preservation are clearly in the state's interest and in need of policy intervention. Cameron et al. (2014) write this in their conclusion: "The numerous ecological and social benefits provided by rangeland ecosystems in the Western United States can only be sustained if economic incentives are promoted to maintain ecologically sustainable grazing operations across large land ownerships."[22]

With its incentives-based approach, the Healthy Soils Program could be an important policy tool to help ranchers restore the soil and overall ecological health of rangelands, as well as lessen the risk of them selling or converting their land to more GHG intensive use. Offering a practice focused on the strategic management of the grazed ecosystem's keystone species – grazing livestock – will also more fully engage the ranching community in this important initiative and program.

Section 569 of the California Food and Agriculture Code reads: "The [Healthy Soils] program shall seek to *optimize climate benefits while supporting the economic viability* of California agriculture by providing incentives… to farmers whose management practices *contribute to healthy soils* and result in net long-term on-farm greenhouse gas benefits."[23] Adding prescribed grazing to the Healthy Soils program will "contribute to

healthy soils," "support the economic viability" of California ranchers, and help restore and enhance rangelands, which we think is highly likely to "optimize climate benefits" of our rangelands by sequestering carbon and avoiding further rangeland conversion.

Sincerely,

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[23] California Food and Agriculture Code, Section 569. Emphasis added.

Appendix 1

December 14, 2016

Deputy Secretary Jenny Lester Moffitt
Dr. Amrith Gunasakera
Dr. Geetika Joshi
California Department of Food and Agriculture
1220 N Street
Sacramento, CA 95814

Matt Botill
Bonnie Soriano
California Air Resources Board
1001 I St.
Sacramento, CA 95814

Re: Recommendation to include grazing management in the Healthy Soils Program framework

Dear Deputy Secretary Moffit, Drs. Gunasakera and Joshi, Mr. Botill and Ms. Soriano,

We write in response to the framework for the Healthy Soils Program released by CDFA on August 26, 2016 that includes a list of potential on-farm management practices under consideration for inclusion in the program. We note the absence of prescribed grazing on pasture and rangeland (sometimes also referred to as managed grazing). We offer the following information in support of its inclusion for demonstration project funding, and for rancher incentives in less arid regions of California.

Properly managed livestock grazing can maintain and sometimes increase soil carbon while also improving water cycling, reducing soil erosion, increasing forage quality and enhancing wildlife habitat and native plant populations. In addition, most wetlands and riparian areas at mid to low elevations in California lie within our rangelands. These vernal pools, wetlands, and riparian ecosystems are key hotspots of carbon sequestration and water storage. Grazing management can protect and restore these carbon sequestration hotspots, but mismanaged grazing can also lead to substantial soil erosion and increase the risk of carbon loss.

Efforts to restore degraded grasslands by managing native perennial grasses and plantings of woody species can be enhanced with prescribed grazing, thereby improving soil health, retaining water, sequestering carbon, and limiting soil erosion. There is some evidence that moderate grazing in riparian areas provides increased benefits over native species planting alone,[1] indicating that combinations of management practices are likely to be more effective for building healthy soils on grasslands than using single practices.

Perhaps most importantly, providing financial support to ranchers for enhancing soil health on rangelands will help keep their ranches economically viable, thereby avoiding increases in greenhouse gas emissions that would result from the conversion to more intensive land uses, whether agricultural or from development.[2]

Rangelands cover over half of California's total land area and approximately 34 million acres are actively grazed.[3] The conservation and management of both grazed and ungrazed rangeland can be critical for addressing climate change because, while most rangeland has limited potential on

a per-acre basis for carbon sequestration in soils and woodlands, over this vast acreage the combined potential for sequestering atmospheric carbon is significant.[4, 5] While there is great variability in the soil carbon storage potential across California's diverse rangelands and climate conditions, management practices can improve carbon storage and reduce risk of loss during drought,[6, 7, 8, 9] particularly in the wetter areas of California.[10]

In the CDFA Healthy Soils Action Plan, prescribed grazing is included as an example of the practices on rangelands that can improve soil organic matter and achieve soil carbon sequestration benefits. Prescribed grazing is also included in the May 2016 *USDA Building Blocks for Climate Smart Agriculture and Forestry Implementation Plan and Progress Report,*[11] and NRCS conservation practice standard #528 provides more detail on the purpose, criteria and considerations associated with prescribed grazing.[12]

The *Building Blocks* report states the following: "Proper management of grazing lands can sequester carbon in the soil, particularly when rainfall is near normal. In arid areas (<20" average annual rainfall), grazing lands can be expected to sequester around 0.14 Mg CO_2e/acre/year, while more mesic areas (20-35" average annual rainfall) can sequester around 0.2 Mg CO_2e/acre/year." There are large regions of California's pasture and rangelands that receive more than 20 inches of rainfall annually, and even those with less rainfall have the potential to sequester more modest amounts over cumulatively sizeable acreages.

In a vision document produced recently by the White House, entitled *United States Mid-Century Strategy for Deep Decarbonization,*[13] this statement is made: "On drier rangelands, rotational grazing may be less effective due to precipitation constraints. However, reducing stocking rates (i.e., reducing the number of animals) on overgrazed rangeland, avoiding grazing during drought conditions, and improving the timing and frequency of grazing can increase rangeland soil carbon sequestration."

Finally, incentivizing optimal stocking rates on pastures and rangelands could reverse the harmful impacts of overgrazing and lack of grazing on soil health and other environmental indicators such as biodiversity. The USDA's literature review *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry*[14] indicates that soil organic carbon is enhanced with moderate stocking rates compared with both no grazing and continuous overgrazing. The report also notes that more research is needed to improve the understanding of the impacts of grazing management on both carbon sequestration and N_2O emissions.

In conclusion, we believe that the omission of grazing management in the Healthy Soils Program could significantly limit the programs' impact in the livestock grazing community and miss the opportunity to achieve greenhouse gas reductions and other environmental co-benefits on California's vast acreages of rangeland.

We recommend including prescribed grazing as described by the USDA's practice standard #528 as an eligible practice for Healthy Soils demonstration project funding to enhance our understanding of California-based rangeland systems and their ability to provide climate benefits. We also recommend that CDFA establish rancher incentives for prescribed grazing management, targeting coastal and other rangeland areas where wetter conditions support improved carbon

storage in rangeland. Should CDFA establish technical advisory committees on rangeland management practices to help inform Healthy Soils Program implementation, we would be happy to contribute where we can.

Thank you for your consideration of this input.

Sincerely,

The Undersigned

Researchers and Cooperative Extension Agents:

Beth Reynolds, Small Ruminant Specialist/Targeted Grazer, California Polytechnic State University, San Luis Obispo
Cynthia Daley, Professor Agricultural Sciences/Rancher, College of Agriculture, California State University Chico
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Emilio Laca, Professor, University of California, Davis
Louise Jackson, Emerita Professor/CE Specialist, University of California, Davis
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Valerie Eviner Associate Professor, University of California, Davis

Ranchers:

Aaron Gilliam, Monkey Ranch (Marin County)
Ariel Greenwood, Holistic Ag at Pepperwood Preserve (Sonoma County)
Aurora Flynn, Sweetgrass Grazing (Sonoma County)
Avery Hellman, Five Springs Farm (Sonoma County)
Bill Burrows, BRI Ranch and Coordinator, SCRMP, Sunflower Coordinated Resource Management (Tehama County)
Carrie Caillouette, Half Hitch Goods (Sonoma County)
Frank Dawley, Big Bluff Ranch (Tehama County)
George Work, Work Ranch LLC (Monterey County)
Guido Frosini, True Grass Farms (Marin and Sonoma counties)
Jaime Irwin, Sheep Industry (Lake County)
Johanna Greenberg, Fibershed, AVMA, Holistic Management International (Sonoma County)
Julie Morris, Morris Grassfed (San Benito County)
Kelly Mulville, Paicines Ranch (San Benito County)
Marie Hoff, Chanslor Ranch (Sonoma County)

Michelle Katuna, Morris Grassfed, T.O. Cattle Company (Sonoma County)
Scott Stone, Yolo Land & Cattle Co., California Rangeland Trust, California Cattlemen's Association (Yolo County)
Steve Dorrance, Dorrance Ranches, L.P. (Monterey County)
Wendy Millet, TomKat Ranch (San Mateo County)

Organizations:

Britton Caillouette, Director, Farm League
Dan York, Associate Director, The Wildlands Conservancy, Landowner with grazing property in Kern, Sonoma, Mendocino and Humboldt counties
Eric Rubenstahl, Stewardship Project Manager, Marin Agricultural Land Trust
Evan Wiig, Director, The Farmers Guild
Jeff Wilcox, Managing Ecologist, Sonoma Mountain Ranch Preservation Foundation
Michael Gillogly, Pepperwood Preserve Manager, Pepperwood Foundation
Walter Moore, President, Peninsula Open Space Trust
Wendell Gilgert, Director, Working Landscapes Program, Point Blue Conservation Science

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