

Position Title: Restoration Ecology and Weed Science Area Advisor

Position: This position will provide regional leadership in ecological restoration and weed management in fallowed/retired/abandoned agricultural lands and natural areas. A M.S. in Restoration Ecology, Weed Science or a closely related field and applied research experience will be required. The Advisor's research and extension program will focus on land being removed from production either temporarily or permanently. Invasive weeds are commonly either a cause or symptom of degraded landscapes and this position will require an extensive understanding of weed science principles and weed management strategies. Weed Science expertise for field and permanent crops is lacking in the southern San Joaquin Valley, and will be an additional area of focus for the position.

Justification: There are around 5 million acres of irrigated land in the San Joaquin Valley. Irrigation water is supplied from a variety of sources, both local and imported surface water and ground water. Factors affecting water availability and quality are changing, including the amount and timing of water moved through the State Water Project and the Sustainable Groundwater Management Act (SGMA). Estimates range from 500,000 to 1,000,000 acres may be removed from production because of SGMA alone. Additionally, changes in cropping practices have affected irrigation water demands. Field crop acreage has decreased by 18% where fruit and nut crop acreage has increased 133%. Generally, permanent crops require significantly more water (up to 14 inches/acre/year) and cannot go unirrigated when water supply drops. These changes will cause vast acreages of current crop ground to be fallowed. If left unmanaged they will be overtaken by invasive weeds, and there is an urgent need to repurpose these lands to desirable plant communities. These unmanaged areas also contribute to problematic insect populations. Maintaining sustainable natural and agricultural systems and preventing or restoring degraded and highly invaded ecosystems and landscapes are crucial to providing the goods and ecosystem services emphasized in the ANR Strategic Vision. †This need has also been identified as a priority by the CA Natural Resource Agency. Additionally weed management within the cropping systems of the southern San Joaquin valley is an area of programmatic focus not currently being addressed. Weeds are one of the main pest pressures facing producers of agronomic and permanent crops, who must deal with increased regulation on pesticides, as well as lack of effective weed control practices due to the development of herbicide resistance. This position is a critical network link with AES faculty and CE Specialists with research and extension programs focused both on invasive weed management and restoration ecology.

Extension: Research and education emphasis will be on development and implementation of sustainable and innovative weed management and restoration practices across California's Southern San Joaquin Valley to protect and improve multiple ecosystem services. The key clientele groups to interact with include federal, state and local agencies, land managers, non-governmental organizations, local landowners and PCAs. The appointee will cooperate with CE Advisors and Specialists will develop an innovative regional outreach program linking landscape restoration, invasive weed management, and corresponding ecosystem services. The candidate will extend results through demonstration, outreach, networking and communication activities.

Research: The major research activities of this Advisor will focus on the intersection of invasive weed management and the conservation and restoration of fallow land into rangelands and natural areas. Because weeds are both a symptom and cause of degraded landscapes, successful

conservation and restoration of these landscapes requires a multidisciplinary understanding of both the weedy and desired species, as well as the management practices and goals of the land managers. Specific research could focus on the biology, ecology, and management of weeds and on the restoration practices, materials or site-specific management options that lead to success or failure in restoration efforts. Secondly, weed management continues to be a significant challenge for agricultural producers in the southern San Joaquin Valley. Research on weed management in active cropping systems will complement the work in fallow lands. Weeds left unmanaged in either system serve as a seed source and threaten the productivity and success of either agricultural production or restoration of lands previously in production. The Advisor's research program will be coordinated with both campus-based faculty and county-based CE Advisors. Publication outlets for this type of research include UC ANR online and print publications, and scientific journals focused on invasive plants or ecological restoration.

ANR Network: This position would primarily address the goals of the *Sustainable Natural Ecosystems*, *Sustainable Food Systems* and the *Endemic and Invasive Pests and Diseases* initiatives outlined by UC ANR. This position would also contribute directly and significantly to UC ANR's public values for securing safe and healthy environments for protecting California's natural resources and building climate-resilient ecosystems, while also promoting economic prosperity. Whether from the perspective of agricultural productivity, ecosystem sustainability, response to a changing climate, or another UCANR core competency, this position is central to the programs of many of the Advisors, Specialists, and stakeholder groups focused on managing working landscapes throughout the state. In addition to UCCE livestock, natural resource, weed science, and crop advisors and specialists, this position would provide a key linkage to AES faculty engaged in research on the ecology of invasive plants and ecological restoration.

Network External to ANR: The external stakeholder network is diverse and includes a variety of state, county and federal agencies, environmental groups, and policy makers including USDA-NRCS, CDFA, CA Resource Conservation Districts, CA Dept. of Water Resources, CA Natural Resource Agency, ††NIFA funded project through UCSD, UCSB & CSUSD in Kern County, regional land management agencies, non-government organizations and commodity boards.

Support: Office space, lab facilities and research farm, transportation and office support.

Other support: Research funding would be expected from a variety of local and state sources, federal and state land management agencies and research collaborations directly with the related industries. Because of the large interest in landscape restoration and sustainable ecosystems, research and outreach programs led by this advisor could also be competitive for grant funds from USDA-NIFA and other national-level programs.

Headquarters and Coverage Area: Kern County, also serving southern San Joaquin Valley.

Developed and proposed by: Kern County Director, San Joaquin Valley County & REC Director cohort, USDA-NRCS, North West Kern RCD, Kern County Ag Commissioner, Kern County Farm Bureau and Weeds Work Group.

† Natural and Working Lands Climate Smart Strategy; Priority Nature-based Solutions – Croplands

†† Sustainable Agroecosystems: Harnessing policy-driven land use change for the sustainability, productivity and vitality of agroecosystems