UC Cooperative Extension Specialist in Forest Health

Position Title: This Cooperative Extension (CE) Specialist will apply the principles of insect/disease ecology, restoration ecology, and forest management to address the critical forest/woodland health issues confronting California.

Position: (1) Insects and microorganisms are important components in forested ecosystems. Insects and diseases are also an important part of the food chain for wildlife and in nutrient cycling processes. Episodic population increases of insects and diseases can create annual economic losses of millions of dollars from mortality, reductions in tree growth and quality, loss of amenity value, increased fuel loads and fire intensity, and accompanying soil erosion. With the public's concern for sustainable forest/woodland ecosystems there is a tremendous need for applied research and extension to address the multiple forest health issues in different forest regions of the state. (2) The Forest Health Specialist requires a Ph.D. degree in entomology, pathology, restoration ecology, or other relevant discipline and relevant experience in tree entomology and pest/pathogen interactions. (3) The position would work with people from Berkeley Forests; the California Fire Science Consortium; the UC Research and Extension Centers; and the UC Natural Reserve System. All of these UC efforts depend on understanding the science and management of forest health.

Justification: Over 20 million acres of California's forest are in poor health and vulnerable to catastrophic losses from insects and pathogens, especially during periods of climatic extremes. For example, the final toll from the epic 2012-2016 drought was 148 million tree deaths. Major pine species in the southern Sierra Nevada (e.g., ponderosa pine and sugar pine) were particularly hard hit by the drought-induced outbreak of bark beetles. Populations of sugar pine were further reduced by the synergistic attack of a native bark beetle (mountain pine beetle) and an invasive pathogen (white pine blister rust). The famous "big-tree" forests of California (including the north coast) are in peril that contribute to CO_2 mitigation, wildlife habitat, water, and other values. Climate change will make work in this area even more important as we enter an era of novel conditions that insects/pathogens will exploit. At the same time, exurban developments have expanded into forested areas. These new developments often include the widespread planting of ornamental trees. These urban landscapes along with the importation of wood products create pathways for the introduction of invasive pests (e.g., goldspotted oak borer) and pathogens (e.g., sudden oak death). The spread of these invasive organisms is a pressing threat to California's vast forests. Finally, projected climate changes may predispose forests to novel impacts from both native and invasive pests and pathogens. The complexity of the ecological interaction between host and pest/pathogen makes it difficult to predict the potential consequences to forest health. Given the extent of the challenges in forest health, UC Cooperative Extension collectively lacks sufficient expertise to identify these risks and to develop strategies to the health of the forest and the communities that depend on them.

Extension: There is a large clientele base that would be served by this position. In the public sector, the US Forest Service (USFS), Bureau of Land Management, National Park Service, California Department of Forestry and Fire Protection (CalFire), California Department of Food and Agriculture, California State Parks, Resource Conservation Districts, and various local government agencies are examples of groups who would look to the Forest Health Specialist for leadership. Specific interagency groups, including the Forest Pest Council and the Forest Vegetation Management Conference would also provide excellent opportunities for collaboration and input on priority issues. Forest products companies, non-industrial forest landowners, land trusts, conservation groups, consulting foresters and arborists, and the horticulture and nursery industry would also look to the Specialist for advice on forest health issues. Some specific examples are:

1) Develop research findings and transfer information for use by public and private sectors concerned with wildland or urban forest health.

2) Coordinate extension activities with other forest pest and disease management personnel. Extend information on concerns and problems of public and private sectors to appropriate University, USFS, CalFire, and Tribal personnel.
3) Contribute to UC's commitment to increase diversity, equity, and inclusion by working to co-develop knowledge and programs regarding forest health with a broad array of stakeholders including Tribes.

Research:
1) Document the impact of climate change on the host-pest/pathogen relationship and the likely impact on forest health. Test methods to reduce the vulnerability of ecosystems to catastrophic change.
2) Deploy pheromone trapping to monitor bark beetles and their natural enemies to assist in forest management decisions. Participation with U.S. Forest Service personnel on *Ips*, *Dendroctonus,* and *Scolytus* spp. problem.
3) Design monitoring techniques for forest defoliators and development of prediction methods such as for Douglas-fir tussock moth in cooperation with U.S. Forest Service and selected U.C. Farm Advisors.
4) Development of integrated pest management strategies and monitoring methods for insects and diseases in large urban forest areas. Examples are: urban tree aphids, Eugenia psyllid, blue gum psyllid and elm leaf beetle, California oakmoths, various bark beetles, root diseases, and parasitic plants (mistletoes).
5) Provide leadership in emerging issues from the goldspotted oak borer in oak woodlands.

ANR Network: This position would support the UC ANR Fire Adviser thematic cluster since extensive mortality from insects/pathogens has dramatically impacted fuel loads and combustibility over millions of acres and this will expand with climate change. ANR Advisers that believe this is a critical position for their clientele across the state: Lenya Quinn-Davidson, Susie Kocher, Mike Jones, Yana Valachovic, Ryan Tompkins, Ricky Satomi. ESPM UCCE Specialists that agree this is a critical position: Dan Sanchez, Rob York, Bill Stewart, Van Butsic, Matteo Garbelotto. ESPM faculty in support: John Battles, Ben Blonder, Brandon Collins, Kip Will, Trevor Keenan, Matt Potts, Richard Dodd, Maggi Kelly, Scott Stephens. Ongoing projects in forest restoration in the Sierra Nevada, southern Cascades, North Coast Range, and southern California forests/woodlands would be immediate areas where this new specialist could work.

Network External to ANR. Center for Invasive Species Research (UC Riverside); Integrated Pest Management Program (ANR Program housed at UC Davis); Forest Ecology and Communities Workgroup, Fire Workgroup, and the Oak Conservation Workgroup (ANR Workgroups).

Support: The position would be housed in facilities provided by the Rausser College of Natural Resources in ESPM. The Specialist would have a campus office and lab in a Department with other CE and AES colleagues working in forest and woodland ecosystems. General administrative support, supplies, travel, telephone and Internet access would be provided by general support dollars provided by ANR.

Other support: There is currently an annual $3M Forest Health Research Program sponsored by California. In the latest request for proposal, a priority objective of the program was: "Restore forest health and disaster resilience to California's forests".

Headquarters and Coverage Area: This position would be housed at the Berkeley Campus because of its leadership in forestry within ANR. Since Berkeley is the only UC campus with a program in forestry, there are tremendous opportunities for leadership and statewide cooperation in forest health.

Developed and proposed by: ANR Forestry Workgroup is in support. The California Forest Pest Council supports this position and CalFire has been actively encouraging UC to build its research and outreach in forest resilience.