

Position Title: Conservation Genomics and Stewardship Advisor

Developed and Proposed By: Biodiversity Conservation and Stewardship Program Team (Greg Ira and Brian Todd), Region 3 Area 9 UCCE Central Sierra Area Director (Ariel Rivers) and staff (Scott Oneto and Brian Allen), and the UC Environmental Stewards Statewide Program (Greg Ira, Sarah-Mae Nelson, Ali Stefancich).

Headquarters Location and Coverage Area: Headquartered in the El Dorado County office of the UCCE Central Sierra Multi County Partnership (MCP). Coverage will include the four counties of the MCP (El Dorado, Amador, Calaveras, and Tuolumne) and neighboring Alpine County. This region includes extensive public, private, and nonprofit lands; high wildfire risk; and opportunities to increase scientific literacy and stewardship. The advisor will partner with federal and state agencies, tribes and tribal communities (where invited), local governments, Resource Conservation Districts, land trusts, private forest landowners, other conservation and land management organizations.

Position Overview: The Conservation Genomics and Stewardship Advisor will develop an applied research and extension program to help Central Sierra land managers, agency scientists, policymakers, stewardship educators, and community partners use genomic and eDNA information to improve decision making and monitoring for conservation, restoration, and climate resilience efforts. Serving as a bridge between advancing genomic science and on-the-ground stewardship, the advisor will help partners define management questions, develop sampling strategies, conduct genomic analyses, and translate findings into practical recommendations. This position will apply population genomics, landscape genomics, and eDNA techniques to assess genetic diversity, adaptive capacity, population structure, disease resistance, and biodiversity patterns. These tools have seen growth in their ability to inform seed sourcing, reforestation, restoration planning, threatened and endangered (T&E) species conservation, and community-based monitoring. By engaging trained volunteers, students, landowners, and partner organizations in high quality sample and data collection, the advisor will expand local genomic literacy, workforce capacity, and scale applied conservation efforts across ownership boundaries, while also prioritizing the needs of local land managers.

Justification

- **Needs:** California's forests and natural ecosystems face increasing stress from climate change, drought, severe wildfire, fragmentation, invasive pests, and existing and emerging diseases. In the Central Sierra, each of these issues threaten biodiversity, ecosystem services, rural economies, cultural resources, water supplies, and the state's climate mitigation goals. Genomic tools widely used in medicine and agriculture have direct applications to address conservation challenges like disease resistance, climate adaptation, seed sourcing, and restoration planning, yet remain underutilized in applied settings. UC ANR is perfectly positioned to fill this application and translational gap by connecting campus-based research,

agency partners such as the USFS Institute of Forest Genetics positioned within the Central Sierra, local land managers, and community science networks. These tools do not replace the expertise of foresters, biologists, tribal natural resource staff, or other land stewards. Rather, they leverage this local expertise to obtain genomic and eDNA information that would otherwise be difficult to generate, interpret, or apply at management-relevant scales. As California invests billions of dollars in forest health, wildfire recovery, climate-smart restoration, and biodiversity conservation, failing to use genomic information leaves important value on the table.

- **Outcomes/Impacts:** This position will support ANR condition changes by increasing ecosystem resilience to climate change and other stressors. Impacts are potentially numerous, not limited to improving outcomes related to biodiversity, conservation, restoration, seed sourcing, and reforestation; supporting land stewardship; expanding community and partner engagement; and contributing to workforce capacity in conservation genomics, eDNA monitoring, and stewardship.
- **Connection to UC ANR's Strategic Vision 2040:** This position aligns with ANR priorities of “Natural Ecosystems and Working Landscapes” and “Thriving People and Communities,” and the overarching challenges of “Climate Change” and “Innovations” in information technology fueled by artificial intelligence (AI). By connecting genomic and eDNA methods already integrated elsewhere in the UC system with local stewardship networks and management decisions, this advisor would strengthen ANR’s ability to deliver underutilized, yet practical, science-based solutions to land management needs.

Research: The advisor will conduct applied research and translate genomic and eDNA information into conservation and restoration support in the form of guidance, decision-support tools, management recommendations, and peer-reviewed or extension publications that help partners apply genomic information to local needs. Research topics may include:

- **eDNA and Community Science for Stewardship.** Evaluate eDNA and community science approaches for monitoring local biodiversity, detecting T&E species, and supporting watershed and stewardship priorities.
- **Practical Application of Genomics for Conservation.** Use population and landscape genomics to assess genetic diversity, population structure, adaptive capacity, local adaptation to current and future climate projections, and disease screening for qualitative and quantitative resistance.
- **New Genomic Tools for Applied Conservation.** Collaborating with agency staff, campus-based researchers, and sequencing vendors to develop reference genomes of priority species, genotyping panels, and marker development for genetic testing.

Extension: Extension will build genomic and eDNA literacy, support adoption of genomic based practices, and accelerate science-based practice adoption across California's natural resource workforce, by extending research outcomes via publications, decision-support resources, and workshops for key land management clientele and community science partners. Examples:

- **UC Environmental Stewards.** Support the expansion of this adult education and service program that extends UC research on the environment and natural resources through six network members operating in the Central Sierra. Assist with the new two-year, \$250,000 grant from the US EPA to combine eDNA, community water quality monitoring, and AI to advance watershed stewardship.
- **Workshops.** Conduct workshops on utilizing eDNA monitoring techniques for community groups, tribes, and private landowners.
- **Partner Events.** Coordinate with organizers of community science projects and events to provide outreach, e.g., via Amador RCD's annual habitat conservation fair.
- **Online Resources.** Create and promote new and existing digital analytical tools such as eDNA Explorer; publicize the use and value of these tools via popular press.

UC ANR Network: This first of its kind Advisor position will connect campus-based genomic and eDNA resources to local clientele through ANR Program Teams, statewide programs, and UCCE advisors. Key internal partners will include the Biodiversity Conservation and Stewardship and Forest and Upper Watershed Systems Program Teams to develop integrated educational materials, UC Environmental Stewards, the UC Davis Genome Center, the proposed UCCE Specialist in Conservation Genomics and Community Science, and UCCE Forestry and Woody Biomass Advisors in the Central Sierra to align monitoring efforts with regional forest management plans.

Network External to UC ANR: External partners may include the UCSC CALeDNA program, the UC Environmental Stewards network, USFS Institute of Forest Genetics, CAL FIRE (grant programs), California Department of Fish and Wildlife Service (grant programs for T&E species), National and State Parks Service, Bureau of Land Management, 30x30 California Biodiversity Network, California Academy of Science, tribal partners (where invited), private landowners, Resource Conservation Districts, and local non-profit conservation organizations.

Support: Transportation or mileage reimbursement for travel across the five-county region; office space in the Central Sierra UCCE office hub (El Dorado County); standard computing equipment and GIS software; field sampling equipment for eDNA and tissue samples; support for laboratory analysis of eDNA samples; and other administrative support for workshop coordination and volunteer management.

Educational and Professional Background Requirement: A Master's degree (or equivalent experience) in Forestry, Natural Resource Management, Environmental Science, Social Science (with a focus on human dimensions of nature), or Genomics is required. Candidates must demonstrate experience in community engagement, citizen science, or environmental education, and an understanding of California ecosystems.