

## **Ecosystem Services Interpretative Trails and Curriculum- Interpreting the Value of Working Landscapes to the Public and Policy Makers**

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**Short Summary:** This project, “Ecosystem Services Interpretative Trails and Curriculum” seeks to increase awareness and knowledge of park visitors, managers and decision makers of working rangelands and the ecosystem services. Bay Area open space lands provide an unprecedented opportunity to educate the public and policy makers. The bay area has over 1 million acres of “protected land” much of it managed as a working landscape. In fact over 25 different public entities in San Francisco bay area manage their open space lands with livestock grazing. Many of these public entities also have public access for recreation and “nature” interpretation; these lands host over 3 million visitors per year. The future of both private and public working rangelands and the ecosystem services they provide in the San Francisco bay area and throughout the state will depend on public policies that allow ranching to be viable. As recognized by UC ANR’s strategic initiative for sustainable conservation of natural ecosystems, there is a growing need and interest in telling the story of the working landscape, its conservation and its benefits to society.

**Project Summary:** This project will be a collaborative effort between UC ANR, the California Rangeland Conservation Coalition and three park districts (East Bay Regional Park District, Mid-Peninsula Regional Open Space District, and Sonoma County Regional Park District). This collaborative effort will generate and extend unique educational information about what ecosystem services are and how they relate to California’s rangelands. UC ANR research on the management and value of working rangelands will provide the basis for the educational information. Both PIs Sheila Barry and Stephanie Larson have extensive history with UC ANR in conducting an applied research and extension program on working rangelands to benefit California’s landscapes and communities. Through their collaborative efforts with the park interpretative staff, who have extensive experience in developing material for park users, information developed from this project should be on target, accurate and effective in educating and engaging the public.

Outreach efforts will be primarily focused on park users through pilot “sustainable conservation” interpretative trails and curriculum. Interpretative trails will include signage with links to the educational curriculum. The trail and curriculum will educate users on the extent and value of ecosystem services provided by these landscapes. Outreach materials will be developed so they can be adapted and implemented at other open space districts, land trusts, federal, state, regional and county parks that have public access and provide interpretive trails. Outreach materials will be extended to decision makers and open space managers through board presentations and presentations to the Bay Area Open Space Council and the California Rangeland Conservation Coalition.

## **I. Objectives**

### *Short-Term*

*Objective 1:* Increase awareness and knowledge of park visitors, managers and decision makers of working rangelands and the ecosystem services they provide.

*Objective 2:* Increase the knowledge and appreciation of the public and decision makers of the role of UCANR in developing and extending information on sustaining California’s natural ecosystems.

### *Long-Term*

*Objective 3:* Promote science-based public policies in the San Francisco Bay Area and throughout California that support landscape management that provides for numerous ecosystem services.

## **II. Background**

Working rangelands, in private and public ownership cover millions of acres throughout California. Although many Californians are familiar with the economic values that rangelands provide, i.e. grazing opportunities for livestock, they do not realize that working rangelands provide a myriad of ecosystem services. Ecosystem services are the processes by which the environment produces resources such as clean water, carbon sequestration, habitat, food and more. The identification and valuation of ecosystem services is a relatively new field of study on rangelands; however UC ANR through its Sustainable Natural Ecosystems Initiative has recognized ecosystem services as an important concept to promote sustainable conservation of many of California’s natural ecosystems. Technically, ecosystem services are “the benefits of nature to households, communities, and economies (Boyd and Banzhaf 2006).”

For rangeland owners and managers ecosystem services may provide opportunities to

increase revenues by marketing ecosystem services off rangelands. Market-based approaches are increasingly being advocated as tools for achieving conservation (Kroeger and Casey 2007). In order for ecosystem services to be effective as a conservation tool, public policies need to support the continuation of working rangelands and markets for ecosystems services need to be developed. The development of effective public policies and markets will require public support which begins with awareness and understanding of working landscapes and associated ecosystem services.

This project seeks to educate a large segment of the public and decision makers about ecosystems services provided by working rangelands. Specifically, this project targets San Francisco Bay Area open space (park) users, managers and policy makers. Each of the ten counties in the San Francisco Bay Area have parks, which include working rangelands, except San Francisco. These parks host over 3 million visitors per year. As on privately owned rangelands, working rangelands in public parks not only provide economic return but also produce a myriad of ecosystem services. A recent project conducted by Barry (unpublished) reviewed over 1000 photos and comments from park visitors to grazed parks and concluded that the public was interested in learning more about the working landscapes including animal behavior and husbandry.

PI Larson and others are currently conducting a statewide project to document opportunities and success stories of ecosystem services from California rangelands. Information from this statewide project and from other recent projects including Kroeger et al. (2009) will be used to develop interpretative material and curriculum to inform park users, managers and decision makers.

### **III. Design and Methods**

Through our collaborative efforts with three park districts (East Bay Regional Park District, Mid-Peninsula Regional Open Space District, and Sonoma County Regional Park District) this project will generate and extend interpretative information about working rangelands and the ecosystem services to the park users, decision makers, open space landowners and managers, and rangeland management professionals. In the first stages of this project, the project team, UCCE extension advisors (Larson, Barry) and AES faculty (Huntsinger) will work with Park district managers and interpretative staff to develop a project framework. The framework will describe a process to implement the project, keeping each park districts individual objectives in mind. Currently, interpretative staff from East Bay Regional Park District are interested in the development of a trail and associated interpretative program highlighting the working landscapes, whereas Sonoma County Regional Park District has expressed interest in developing school-age appropriate curriculum on ecosystem services. Mid-Peninsula

Regional Open Space District has a very limited interpretative program but has recently reintroduced grazing to park land and would like to tell the story of working rangelands and environmental benefit.

In developing the framework, the project team will also have the opportunity to share information with park interpretative staff regarding elements of working rangelands and types of ecosystems services. The matrix of rangeland ecosystems services, being developed by PI Larson and others will be an important outreach piece to share. In addition to a process, the framework will also narrow the focus of our project. Ideally, two to three ecosystem services and two to three elements of a working rangeland will be identified for curricula development with the goal of highlighting ecosystems services and aspects of a working landscapes that will resonate with the public, specifically park users.

Curricula generated on the key ecosystems services and working rangeland elements will be extended through three main avenues:

1. Interpretative trails
2. Interpretative programs
3. Project outcome/products outreach

Interpretative Trails. Bay area open space parks managed with grazing have well over 3 million park visits per year. Interpretative trails have repeated use by a variety of park users including organized groups. Currently, interpretative trails within participating park districts could be described as “nature trails.” Through this project “sustainable conservation” trails will be established (one within each park district) that present information on working rangelands and ecosystems services. Sign content and placement would be relevant to the surroundings and will help the park user connect the working landscape with ecology and ecosystems on rangeland with explorations into local food chains. Providing information leading to sustainable conservation “in context” i.e. on a trail through a working rangeland, should provide an effective and engaging way to inform the public.

Information will be presented through simple signage, interpretive guides, and QR codes. QR codes associated with each sign will allow trail users via their smart phones to access web-based curriculum that has been developed for the interpretative programs (see below). This curriculum may include high quality graphics, interactive visuals, photos, and/or video. It will also provide a way to evaluate the effectiveness of the program through a link to web-based pre-and-post- test. Project PIs will work with the 3 pilot parks to provide incentives for users to take the pre-and-post- test during the

length of the project. Much like a “living document” which can be revisited and updated over time, including the QR codes on the signage will allow information to be updated.

Interpretative Program. Through collaboration with the project team, UCCE advisors (Larson, Barry, Murdock) and AES staff (Huntsinger) and park interpretative staff will develop curriculum on the key ecosystem services and working rangeland elements to be presented through interpretative programs at participating parks. The curriculum will be geared to the middle/high school level. Park interpreters will be trained in the use of the curriculum and in training of docents. As noted above, the curriculum may include high quality graphics, photos, interactive visuals and/or video. It will be developed so it can be presented in a classroom or in a digital format. The digital format will be integrated with the interpretative trails through QR codes for use by trail users via their smart phones.

Project Outcome/Products Outreach. This project pilots at three highly used parks in the San Francisco bay area and could be easily adapted to other parks throughout California and the western US. Its novel approach (integrating technology with a “nature trail”) will enable UCANR to attract publicity and engage public officials, especially in the opening of the new trails. The project team will extend information about this project to open space land managers and decision makers through presentations to participating park boards, the California Rangeland Conservation Coalition and the Bay Area Open Space Council. The project team will also submit all outreach materials to the rangeland outreach database being developed by Rangelands West and the Society for Range Management.

#### **IV. Addressing Proposal Criteria**

**1. *Clearly define the strategic initiative addressed.***

This project addresses a critical issue identified under the Strategic Initiatives: Sustainable Natural Ecosystems - *Promote the understanding and importance of ecosystem services provided by California’s working landscapes* and Sustainable Healthy Families and Communities- *Youth Science Literacy- Impacts of participation in community-based youth development programs on science knowledge*. Since ecosystem services can demonstrate benefits of land conservation and management that are relevant to a broad population, they are an innovative avenue for UCANR to develop educational information on working landscapes and their interaction with all users and promote science literacy.

**2. *Opportunity to maximize ANR’s strengths.***

This project not only builds on and promotes UC ANR’s extensive history of working with private and public land owners and managers to sustain California’ rangeland resource, but also uses our skills in delivering effective community education and

working with community leaders.

**3. *Provide well coordinated outcomes for multidisciplinary projects.***

To successfully promote an understanding of ecosystem services provided by working rangelands will require a multidisciplinary approach. We will draw on our team's knowledge and experience of animal science, rangeland science, social science, wildlife biology, rangeland economics, vegetation management, and curriculum development to successfully interpret the value of working landscapes to park users and decision makers.

**4. *Ability to leverage additional funding.***

This project will be initiated with three park districts, which will provide and/or access funding to implement the project. We will develop the outreach material so it can also be used within other parks. We will be in a strong position to leverage additional funds for wider implementation.

**5. *Build on the research continuum with science that will benefit California.***

In addition, to extending UC ANR's extensive and on-going research with land owners and managers to sustainably manage rangeland resources, this project will extend information developed by at least two current research projects "Identifying Stewardship Values Provided by Ranchers on Public Lands" and the current RREA project, "Develop and document opportunities and success stories for ecosystem services on California rangelands."

**6. *Support science-based decision making and delivery of useful findings to support policy and outreach efforts.***

The focus of this project is to provide an opportunity for park users and decision makers to learn about ecosystem services provided by working landscape. The learning opportunity will be based on showcasing UC's research on working landscapes in the context of a working landscape. This exciting educational opportunity is a first step in working towards public policies that support sustainable conservation efforts in California.

**7. *Use an integrative approach to collaborate with other strategic initiatives.***

As noted above the concept of promoting ecosystem services requires a multidisciplinary approach. Through our curriculum development we will also be promoting increasing science literacy in natural resources and agriculture, providing for healthy communities, and enhancing competitive and sustainable food systems. Our project team will help to integrate our efforts to address these other strategic initiatives as appropriate.