Cal Poly Humboldt
Schatz Energy Research Center

CA Forest Practice Rules Effectiveness Monitoring Grant

Initial Concept Proposal

Date Submitted: May 18, 2026
Project Title: Remote Sensing Assessment of Coastal Prairie Encroachment to Inform California Forest Practice Rule Implementation on the North Coast
Project #
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Name(s) and Affiliation(s) of Collaborator(s): Potential collaborators may include UC ANR, Registered Professional Foresters, Tribal representatives, CAL FIRE staff, conservation organizations, and researchers with expertise in grassland ecology, remote sensing, and forest policy.

Project Description:

Coastal prairies and native grasslands on the North Coast of California provide important wildlife habitat, support biodiversity and landscape heterogeneity, and hold cultural significance for Indigenous communities. Many of these habitats are experiencing progressive conifer encroachment associated with fire suppression, altered disturbance regimes, and changing land management practices. As open habitats transition to dense shrubland and closed-canopy forest, habitat availability and ecological function decline for grassland- and savanna-associated species, including culturally important and special-status plants, birds, small mammals, pollinators, ungulates, as well as several sensitive or listed species. Conversion from grassland to forest, also alters landscape hydrology and may impact water availability in critical aquatic habitats. Loss of open grassland early-seral habitat limits species and habitat diversity and broader ecosystem resilience under changing climate conditions.

California Forest Practice Rules (FPRs) and associated regulations contain several potential pathways for restoring noncommercial vegetation communities, including the “Aspen, Meadows, and Wet Area Restoration” Special Prescription (14 CCR § 913.3(e)) and the White and Black Oak Woodland Management exemption (14 CCR § 913.4 (f)). However, practitioners on the North Coast (in the Coast District) report uncertainty regarding whether upland grasslands, dry meadows, and coastal prairie lacking oak species are included within these restoration pathways. Existing applications of these prescriptions appear concentrated in other regions of

California despite widespread encroachment into native grasslands and coastal prairies on the North Coast. Ambiguity in terminology within the FPRs—including references to “meadows,” “grasslands,” “savannas,” and “noncommercial vegetation”—may contribute to inconsistent implementation and limit restoration activities on private timberlands. Alternative CEQA review pathways and permitting processes for non-FPR restoration projects are often lengthy and cost-prohibitive for activities that are already expensive to implement.

This project proposes to use historical imagery, remote sensing and geospatial analysis to quantify changes in native grassland and savanna extent across the North Coast landscapes and evaluate implications for implementation of California FPRs and associated restoration regulations. To assess recent encroachment trends, we will compile and analyze multi-decadal datasets including Landsat imagery, Sentinel imagery, aerial imagery where available, and digital elevation models (DEMs/DTMs). Terrain variables such as slope, aspect, and topographic position will be used alongside vegetation classification and change-detection methods to delineate grassland and savanna habitats, identify conifer expansion into open habitats, and quantify changes in habitat patch size, fragmentation, and connectivity over time. Analyses will likely be conducted at approximately 5- or 10-year intervals spanning from the 1980s to present.

A second component of the project would extend the temporal scope of the analysis through the use of historical aerial imagery and image segmentation techniques to improve delineation of prairie and savanna habitats prior to the satellite era. Historical aerial photographs available from archives may provide insight into vegetation structure and open-habitat extent dating back to the mid-20th century, closer to the onset of widespread fire suppression and associated changes in disturbance regimes. The project would evaluate the feasibility of applying pixel-by-pixel or object-based image segmentation and classification methods to historical imagery in order to distinguish open prairie, savanna, shrub, and forested conditions through time. Incorporating these datasets would help characterize longer-term trends in conifer encroachment and habitat fragmentation beyond the approximately 30–40 year window available from consistent satellite imagery alone. Historical imagery analysis would provide additional temporal context to better understand the trajectory, pace, and spatial patterns of encroachment across North Coast landscapes.

The project is not intended to reconstruct uncertain pre-colonial habitat conditions or define a single historical baseline. Rather, it will focus on observable vegetation changes over approximately the past 75 years to evaluate whether culturally and ecologically important open habitats are being reduced and fragmented. Through this project, we will also review and analyze relevant reported forest management activities, restoration prescriptions, and permitting pathways to evaluate whether current implementation adequately supports restoration and maintenance of non-commercial vegetation communities. Where feasible, consultation with regulatory staff, foresters, Tribal representatives, ecologists, and land managers will help contextualize findings and incorporate perspectives regarding cultural habitats, restoration opportunities, and implementation barriers.

The proposed work directly addresses components of Effectiveness Monitoring Committee's Research Themes related to cumulative impacts, wildlife habitat and early-seral wildlife habitat conditions (Themes 8 and 9) as well as maintenance of climate-resilient early-seral wildlife habitats (Theme 12). Specifically, the project evaluates whether current implementation of the FPRs and associated regulations are effective in:

- maintaining or recruiting adequate amounts of early- and mid-seral habitats (8c)
- protecting wildlife habitat and associated ecological processes (9a)
- protecting rare, threatened, or endangered plants (9c)
- maintaining or recruiting adequate amounts of early- and mid-seral wildlife habitats which are well adapted to future climate (12d)

This project will evaluate the extent of coastal prairie and native grassland loss, as well as current regulatory pathways and implementation barriers associated with restoration and protection of these habitats in the Coast District. By quantifying long-term conifer encroachment and changes in open-habitat extent, the project will help assess whether existing regulations are effectively maintaining habitat diversity, early-seral habitat conditions, wildlife communities and maintaining climate-resilient vegetation mosaics associated with coastal prairie and grassland ecosystems. The project is anticipated to provide benefits primarily within Humboldt, Del Norte, Mendocino, and Sonoma Counties, though methods and findings may be applicable to other regions of California experiencing similar conifer encroachment into noncommercial vegetation communities. Deliverables are expected to include spatial datasets and maps documenting coastal prairie and grassland change through time and analyses of habitat impacts and encroachment trends. We will identify regulatory barriers to restoration and develop recommendations for clarifying relevant FPRs or potential amendments or additions to exemptions or special prescriptions that could improve and streamline pathways for coastal prairie restoration.

Requested Funding

Estimated total funding request: $150,000

Estimated expenditures:

FY 2026–27, December 2026 - June 2027: $45,845
FY 2027–28, July 2027 - May 2028: $104,155

The period of performance for the proposed project is 18 months, commencing in December 2026 and concluding in May 2028. Funding would support personnel time for remote sensing analysis, GIS processing, ecological interpretation, engagement with professionals and land managers, project management and administration, and reporting. Additional costs may include computing resources, student researcher assistance, technical advisor consultation, and field verification of remotely sensed prairie delineation. Existing institutional GIS infrastructure and publicly available datasets are expected to reduce project costs and improve feasibility.