Impacts of Regenerative Management at Jalama Canyon Ranch

Assessing the Role of Remote Sensing in the Accreditation Process for Regenerative Agriculture Certifications

Elijah Baker | Thomas King | Sophia Leiker | Patrick Pelegri-O'Day | Sarah-Anne Rohlfing | Eva Wilson
Faculty Advisor: Bruce Kendall – March 2023

Environmental Problem

In April 2021, the White Buffalo Land Trust (WBLT) — a non-profit that practices and promotes regenerative agriculture — acquired a 1,000 acre property named Jalama Canyon Ranch (JCR) near Point Conception in Lompoc, California. Previous owners had managed JCR with conventional grazing techniques, allowing cattle to graze continuously between five pastures bounded by fencing. These practices caused a succession toward annual grass-dominated systems across JCR, which decreased biodiversity and water holding capacity, eroded soils, and lowered forage capacity.

In January 2022, WBLT divided these five pastures into smaller paddocks and began adaptive multi-paddock (AMP) grazing, a form of high stock density, short-duration grazing with longer rest periods to facilitate vegetation recovery. By rotating their cattle between paddocks, WBLT aims to improve long-term productivity and ecological health of their grasslands. This transition also enables WBLT to earn recognition for their regenerative practices via certifications, including the Regenerative Organic Certification, Savory Institute's Ecological Outcome Verification, Regen Network's CarbonPlus Grasslands, and Soil Carbon Initiative's Farm Level Commitment Program. These certifications signal to consumers that the products purchased from WBLT are restoring ecosystem functions at the ranch.

In this study, Regeneration Station advanced regenerative agriculture programming for WBLT in three ways; first, we quantified the ecological impacts of AMP grazing by analyzing data from remote sensing technologies at JCR. Second, we simplified the process for reporting ecological indicators necessary for certification. And third, we identified potential barriers to regenerative adoption amongst the larger agricultural community.

Objectives

(1) Measure changes in evapotranspiration and soil moisture over time and space in JCR via remote sensing data and analyze their correlation with cattle management practices.

(2) Compare four certifications for regenerative management to determine the feasibility of integrating remote sensing in accreditation and reduce barriers to adoption.

(3) Conduct focus groups with land stewards interested in adopting regenerative practices to better understand rancher priorities and barriers to adoption, as well as their perspective on pursuing certifications.

Findings

(1) Mean evapotranspiration and soil moisture differed across habitats and soil types. While the seasonal patterns were broadly similar across the property, the highest evapotranspiration occurred in the oak woodlands and the lowest in the sage scrub and vineyard. The highest soil moisture occurred in the grasslands and the lowest in the sage scrub and vineyard (Figure 1).

Findings

Across soil types, sandy loam is correlated with substantially lower soil moisture than the other three soil types, which are not significantly different from each other. Grazing had a detectable effect on both soil moisture and evapotranspiration, with soil moisture being highest in actively grazed pastures and evapotranspiration lowest in recently grazed pastures. Additional research can be done to further refine these models to pair with in-situ observations for grazing management plans.

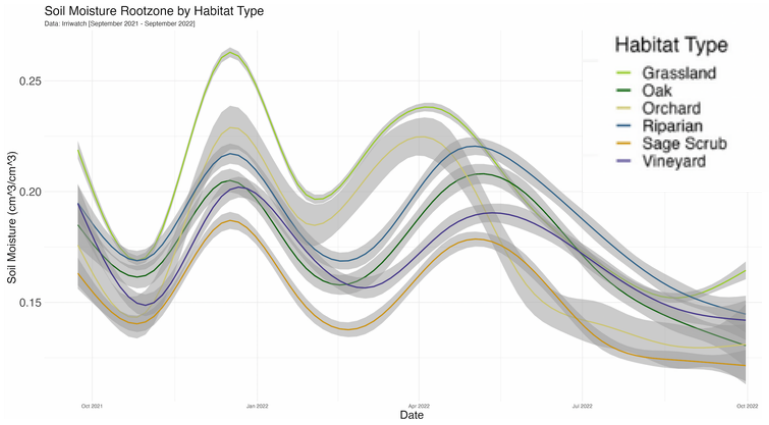

Figure 1. Soil moisture root zone (cm3/cm3) by habitat type at JCR (n=6)

(2) We analyzed four certifications to assess overlap in ecological indicators and sampling methodology, but found minimal overlap. This makes it challenging for stewards to pursue more than one certification, while also creating uncertainty about best management practices. We created a certification comparison tool to fill this gap. By using our tool, land stewards can more readily evaluate which certification may be best for their land management goals. In addition, the remote sensing data products we evaluated in this study were not useful for the purpose of meeting regenerative agriculture certification requirements.

(3) Our focus group participants were separated into two groups, more experienced land stewards who are most concerned with improving the ecological health of their land and novice land stewards who are primarily motivated by broad sustainability concerns. Opinions stated by both groups indicated that the adoption of both certifications and regenerative management practices are currently limited by costs, access to machinery and labor, and lack of supportive community.

Recommendations

Our results demonstrate that remote sensing can be used to track changes in evapotranspiration and soil moisture at JCR, and therefore more broadly support holistic management goals. The code scripts generated in this project can help WBLT to make informed decisions regarding rotational grazing timing. For instance, they can determine when specific pastures have undergone enough regrowth to accommodate grazers. WBLT should also continue to work directly with regenerative certification bodies to provide optimal communication tools to interested land stewards, and provide feedback from land stewards to certification bodies in turn.

Impact

In the spirit of continuous improvement, WBLT can use our data to demonstrate the ecological benefits of regenerative management to other stewards in the industry. WBLT can also share their own experience pursuing regenerative management certifications with other land stewards to enhance their network and increase industry-wide adoption. Currently, there is high potential to facilitate industry-wide adoption of regenerative certifications if certification agencies streamline and harmonize their standards in alignment with land steward needs.