



## Measuring Soil Carbon Stocks on California Rangelands

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Soil organic carbon (hereafter ‘soil carbon’) helps to store water, make nutrients available to plants, and minimize erosion. Protecting and, where appropriate, increasing soil carbon across agricultural lands, like rangelands, can play a key role in mitigating climate change and promoting ecosystem services like forage production.

In order to appropriately and effectively protect and rebuild soil carbon, it is first necessary to understand how soil carbon varies across space, and to identify how that variability relates to factors such as climate, soil texture, and topography.

We leveraged Point Blue’s Rangeland Monitoring Network, a voluntary ecological monitoring program consisting of working ranches across California, to explore how soil carbon varies with geography, climate, vegetation, soil type, and topography within and across California’s Central Valley and Central Coast regions.

We found that there was large variability in soil carbon across the state. The Central Coast region stored more soil carbon than the San Joaquin and Sacramento Valleys, with local climate being the strongest predictor of soil carbon across regions. This suggests that the maximal levels of soil carbon obtainable at a given site will likely vary by region, with the Central Coast’s mild climate and generally finer-textured soils allowing for the greatest storage.

Within each region, we found considerable variability in soil carbon, with much of the variation unexplained by the predictor variables included. While some differences in soil carbon likely result from unaccounted variables such as soil mineralogy, it is likely that some of the variation is also due to differences in past and current land use—indicating that there is potential to rebuild SOC through management.

### Main Points

California’s rangelands store a considerable amount of carbon in their soil.

Soil carbon stocks vary a lot across California’s rangelands, with the Central Coast storing on average more soil carbon than either the San Joaquin or Sacramento Valleys.

Much of the variability in soil carbon within a given region, like the Sacramento Valley, cannot be explained by factors such as topography, climate, soil type, and vegetation.

Voluntary, standardized monitoring networks offer a way to establish baseline information on soil carbon that can be used to explore soil carbon stocks at state and regional scales.

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