

## Rancher wisdom can be improved with science

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When California was part of the Wild West, it took a certain amount of guesswork to move cattle from their home range to summer pastures while making sure sufficient forage was left behind to hold the cattle over till fall rainfall spurred new growth.

“Ranchers eyeballed it,” said [Theresa Becchetti](#), UC Cooperative Extension livestock and natural resources advisor. “In time, second-, third-, and fourth-generation ranchers got pretty good at deciding, but UC Cooperative Extension introduced a more scientific approach.”

In the spring of 1936, the USDA Forest Services began measuring ungrazed forage at the San Joaquin Experimental Range in Madera County. The project continues today as a joint effort of UC Cooperative Extension and the USDA Natural Resources Conservation Service.

Sixteen years later, just after the [UC Hopland Research and Extension Center](#) was established on Mendocino County rangeland in 1951, another study began; and in the early 1980s, scientists at the [UC Sierra Foothills Research and Extension Center](#) in Browns Valley commenced a similar long-term study.

As scientists learned of the multiple factors impacting forage production across the Coast Range and Sierra Nevada foothills, some 70 research sites were identified – most on private land - and consistently monitored. The results show that there is much more to understanding forage growth than looking at a rain gauge.



Above, watch a full season of rangeland forage growth in one minute. UC Cooperative Extension rangeland and natural resources advisor Royce Larsen set up a camera to capture images of the daily grass growth on Pozo Peak in San Luis Obispo County.

While high annual rainfall usually results in high forage production and low annual rainfall generally results in low annual production, there are exceptions. It all depends on the timing of the rainfall.

During the devastating drought of 2011-2016, Becchetti noticed forage production didn't mirror the drought damage to state water resources and mountain forests.

“It was interesting,” said Becchetti. “In a lot of my plots, forage would be close to normal. We got rain when the soil was warming up. If we get rain in the late fall or winter, there is no grass production because it's too cool. If rains come when the temperatures warmed up, the grass takes off.”

The expected variation from climate change is another factor that encourages UCCE scientists to conduct routine forage monitoring.

“When I started 11 years ago, we had some good production years; we had poor years, a couple of normal years,” Becchetti said. “Monitoring is giving us a better snapshot that all of us can use to see the impact of climate change on forage production.”



UC Cooperative Extension scientists monitor rangeland forage growth by clipping and measuring one square foot of area, and then calculating the data by acre. (Photo: Royce Larsen)



To develop an accurate picture of forage growth, the research locations are fenced or caged to keep out grazing animals. Grass and forbs within one square foot of the enclosure is clipped to the ground. The vegetation is dried, weighed and the figures logged in a database.

Long-term production data are particularly valuable for the three research stations because daily weather data that are also collected there can be used to determine the effects of rainfall and temperature on annual forage productivity.

Year-to-year variability at the Hopland research site ranged from 900 pounds of forage per acre in the poorest year, up to a 3,500 pounds per acre bounty when conditions were just right. Average annual production at Hopland is 2,399 pounds per acre. At the Sierra Foothill Research and Extension Center, annual forage ranged from a low of 1,071 per acre up to 4,696 pounds per acre. The average annual production there is 2,971 per acre.

“There is no way we could represent the exact forage production across the state, but this does allow us to come up with a percent either below or above normal for a particular area,” Becchetti said.

The monitoring research conducted by UCCE scientists are important to provide guidance to county agricultural commissioners and local Farm Service Agencies.

“If you think about it, so many of our ag commodities are based on weight or volume,” said [Scott Oneto](#), UCCE rangeland and natural resources advisor in El Dorado, Tuolumne, Calaveras and Amador counties, where annual monitoring has been conducted for 25 years. “But annual rangelands are so different when it comes to figuring out whether a given year is average, above average or below average. And when crop insurance is involved, it makes it very difficult for ag commissioners to declare a loss if they don’t know what the loss is or if there even was one.”

Becchetti, along with 14 current and former UCCE colleagues, wrote a 12-page review of UCCE's ongoing range forage production study, which includes average production for many of the study sites. ANR Publication 8018 is available for free download from the [UC ANR publication catalog](#).

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