

University of California
Agriculture and Natural Resources
Making a Difference for California

Summer 2022

Livestock, Range, & Watershed

San Luis Obispo, Santa Barbara and Monterey Counties

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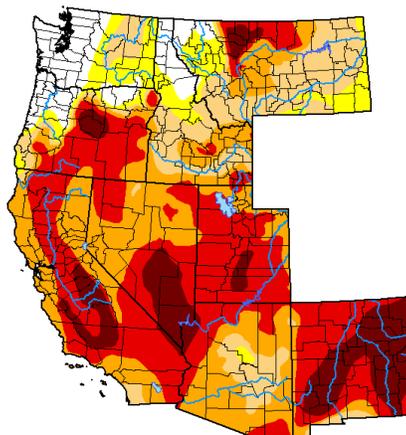
Fire, Flood, Mud and Drought – Is Our Climate Changing?

Royce Larsen

Phyllis Diller once stated that “We Californians are constantly accused of not having seasons, but we do. We have fire, flood, mud, and drought”. Currently we are in another drought. It is not just California though, the entire western US is once again enduring a major drought, with many areas experiencing either severe, extreme, or exceptional drought impacts, Figure 1. More information about the US Drought Monitor can be found at: <https://droughtmonitor.unl.edu/>

U.S. Drought Monitor
West

June 7, 2022
(Released Thursday, Jun. 9, 2022)
Valid 8 a.m. EDT



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

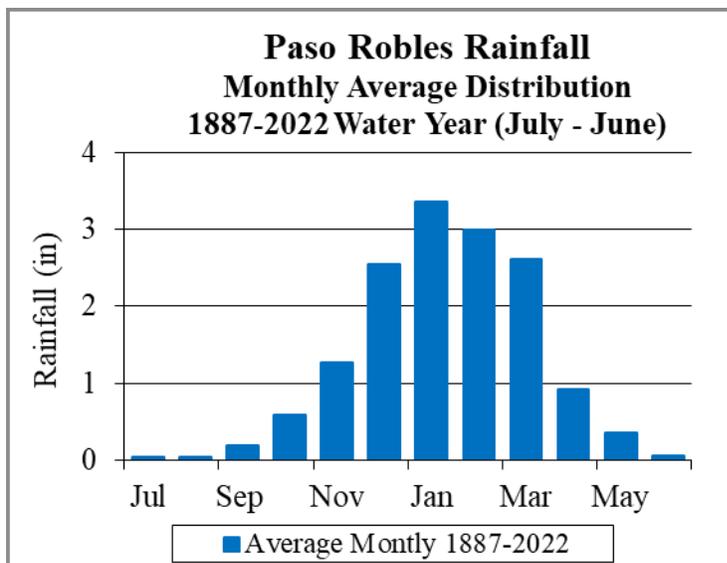
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

Figure 1. US Drought Monitor., June 7, 2022.

On the Central Coast, we have been experiencing some big changes in our weather pattern since the mid 1950's. The City of Paso Robles has recorded rainfall since 1887. Rainfall was recorded for the "water year", which is July-June. This corresponds nicely with our growing season on rangelands, where germination of annuals normally occurs in the fall, which is followed by a slow growing phase through the winter, ending with a rapid growth phase in the spring. After the annuals have set seed, they die and turn golden brown, which is one reason California is referred to the "Golden State". Figure 2 shows the long term monthly average rainfall for Paso Robles. Most of the rainfall comes in December, January, February, and March, e.g., the winter months, which corresponds to the slow growth phase of annual plants. Other locations in the county may have different amounts of rainfall, but the pattern is similar.



The average rainfall for Paso Robles since 1887 is 14.96 inches per year. The average does not tell the whole story though, as forage production on rangelands responds to variations in yearly and monthly rainfall amounts. Less than average rainfall may produce high forage production if the rainfall comes during the fast-growing phase. However, above average rainfall may not necessarily produce high forage production if the rain comes at the wrong time for the plants to take advantage of the moisture.

Figure 2. Average monthly rainfall

We rarely get the "average" amount of precipitation. If the rainfall is close to the average, it may be adequate for

a good forage production year. Prior to 1955 rainfall was consistent each year, but after 1956, it was much more variable. For this article, I refer to a wet year as one that is 25 inches or higher, and dry year as 10 inches or less. These values are arbitrary, but based on observations, the wet years have increased risks of flooding, and dry years have meant low forage production. Looking at the 135-year Paso Robles record, some important changes have taken place when comparing the first period (1887-1955) with the second period (1956-2022). During 1887-1955 the annual average rainfall was 15.29 inches, while the average from 1956-2022 was 14.62 inches. But more importantly, there has been a big change in the number of dry and wet years. From 1887-1955 there were 4 wet years, and 7 dry years, but from 1956-2022 there were 8 wet years (twice as many), and 21 dry years (three times as many), Figure 3.

Perhaps some remember the flooding that occurred in 1969 (31.25 in), 1995 (31.03 in) and 1998 (27.07 in) where these wetter years wreaked havoc on bridges, roads and even some homes and caused erosion. On the other hand, droughts have been an increasing problem, especially during the last 20 years. The droughts we have experienced, like 2012-2016 and 2021-2022 have been the worst recorded for over 1200 years. In addition to droughts, our temperatures have been increasing, with some harsh heat waves during the last several years. Currently in San Luis Obispo County there are many oak trees that have died, crops have been devastated, and rangeland forage production has been low. Irrigation is becoming more difficult because reservoirs are low and ground water basin water levels have been dropping.

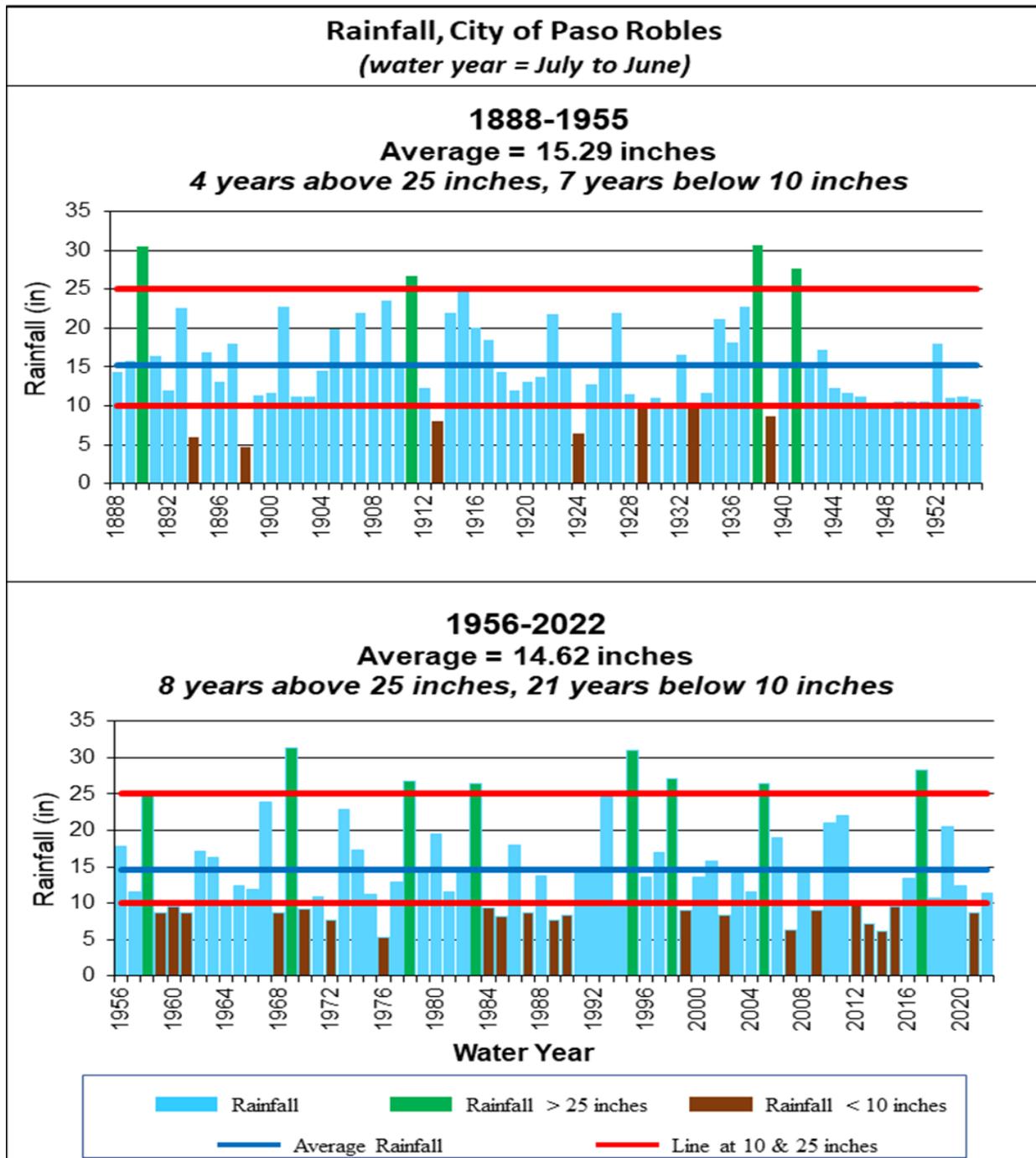


Figure 3. Long term monthly rainfall distribution (1887-2021). For 2021, there was a wet January, but all other months were below normal rainfall. *Data from Paso Robles.*

Fires are raging in many areas of the state, and in surrounding western states. In some places, such as Yellowstone National Park, flooding has been severe this year, causing the National Park to close. Perhaps Phyllis Diller’s comment describes quite well what our weather has been like lately, fire, flood, mud, and drought. What will the future bring?

Forage Production 2022

Royce Larsen

Forage production has been monitored since 2001 in San Luis Obispo County. Each year's production is different as it follows both the amount and timing of rainfall, Figure 1. The lowest forage production on the Central Coast was during 2014 with a 95% available forage loss county wide. The livestock industry has struggled through all these years, but especially during the last 10 years. Not only are there more dry years now than in the past, but the last 10 years has seen 2-3 years in a row that were below average rainfall and available forage production, (see Figure1).

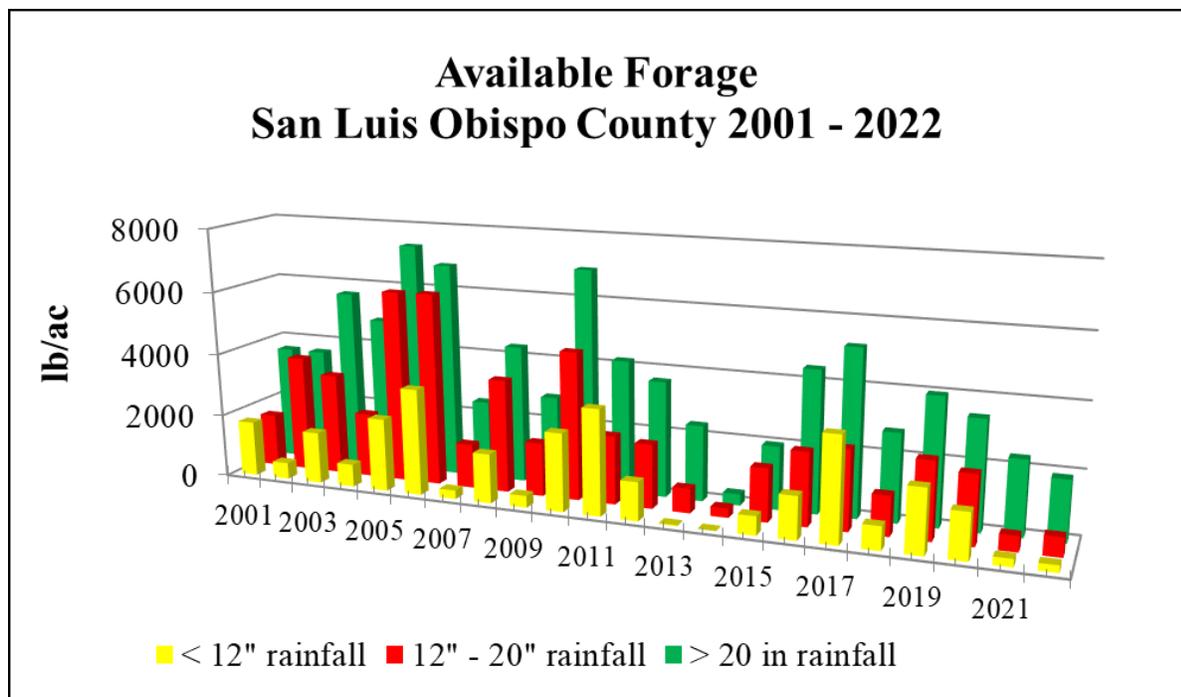


Figure 1. Available forage production for different rainfall zones in San Luis Obispo County.

San Luis Obispo County, like most of California, has a Mediterranean climate which consists of cool wet winters, and dry hot summers. Because our rangelands consist mostly of annual grasses and forbs, and that rainfall amounts and timing are highly variable, there is lots of variation in forage productivity from year to year. There are 31 sites where forage production was monitored each year. These sites represent three different rainfall zones, coastal which is > 18 in rainfall, Central which is between 12-20 in rainfall, and Eastern which is <12 in rainfall (see figure 1). Though the monitoring sites are distributed across the county and provide a good summary of forage production; some areas may not be represented by monitoring due to differences in environmental factors such as soil type, slope, aspect, plant species, temperature, rainfall timing and amount, mountain ranges and elevation effects, etc.

This year's forage losses ranged 12% to 100%. The 100% loss does not necessarily mean that nothing grew at all. Since it is recommended that some of the current forage growth should be left to meet the Residual Dry Matter (RDM) needs for protecting the soil and new seedlings once the rainy season begins the next fall, it is not available for livestock consumption.

There are recommended amounts of new forage growth that should be left at each site, and thus it is not considered available for livestock use. During severe droughts there simply may not be enough new growth in the spring to have the proper level of RDM for the next fall, therefore it is considered a 100% forage loss for livestock use.

Rainfall this year was about 75% of normal, but most of it (85%) came during December, then it was very dry for January and February. This year had the driest January and February on record, Figure 2. Then there was a little more rainfall in March, Figure 2, which seemed to help the coastal areas the most. This rainfall pattern for the year resulted in losses of: Coastal Zone = 48%, Central Zone = 78%, and Eastern Zone = 91%, Figure 3.

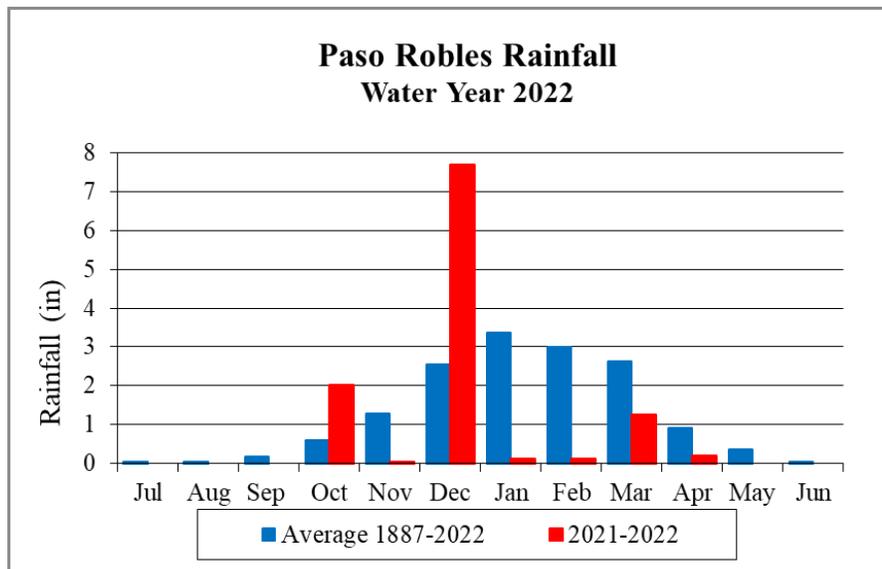


Figure 2. Monthly rainfall for Paso Robles, water year 2022.

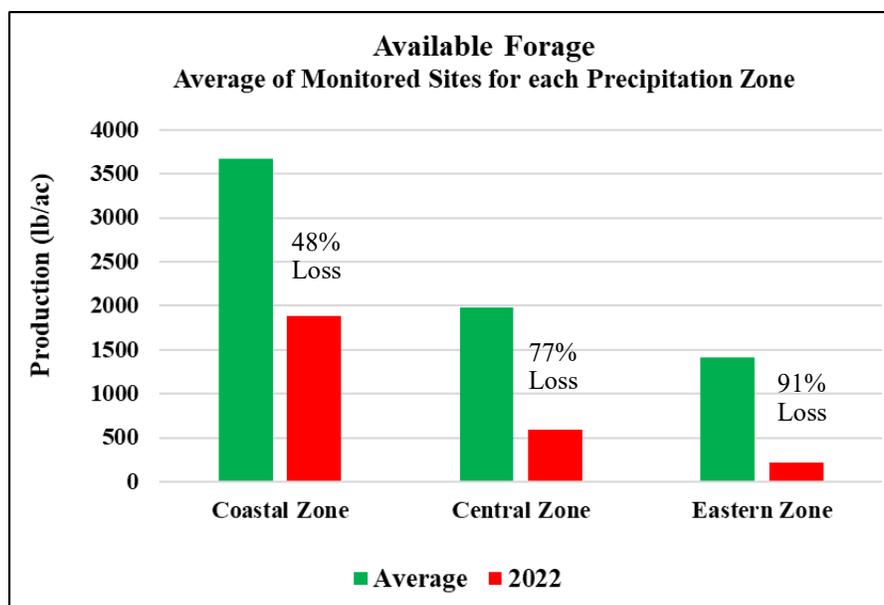


Figure 3. Average available forage production and 2022 losses for each rainfall zone in San Luis Obispo County.

California Ground Squirrel Study

Royce Larsen

It seems like there are a lot of ground squirrels this year. It is always a concern for livestock producers and for horses. There is a potential of livestock getting injured by stepping in squirrel burrows, though that does not seem to happen very often. Another concern though, is the amount of economic loss because of the amount of forage they consume, directly competing with livestock. If there are only a few squirrels, that may not be an issue. But at some point, you may consider if ground squirrel control is economical. A study looking at this concern was recently published. The title of this publication is "Estimating Reduction in Standing Crop Biomass from California Ground Squirrels in Central California Rangelands". The authors were Roger A. Baldwin, Theresa A. Becchetti, Josh S. Davy, Royce E. Larsen, Fadzayi E. Mashiri, Ryan Meinerz, Rebecca K. Ozeran, Devii Rao

Abstract: California ground squirrels (*Otospermophilus* spp.) cause more economic damage to California rangelands than any other rodent. Damage comes in many forms, although forage loss is typically the greatest concern. These losses are believed to be significant for ranchers, particularly given the economically marginal environment in which they exist, yet our understanding of these economic losses is limited. Furthermore, current public opinion is often not supportive toward ground squirrel control on many public grazing lands. Information on the damage that ground squirrels cause to rangelands may be needed to justify management actions in the future. Therefore, we evaluated the amount of standing crop removed by California ground squirrels across 16 sites at four different ground squirrel density categories in central California rangelands from 2019 through 2020. We also included precipitation and livestock grazing intensity to help account for their potential effect on forage production. We found that ground squirrel abundance negatively affected standing crop biomass, with available forage reduced by 27.2 kg ha⁻¹ (24 pounds per acre) per individual ground squirrel at the end of the growing season. Likewise, precipitation influenced standing crop, with each cm (0.4 in) of precipitation yielding a 16.6 kg ha⁻¹ (14.8 pounds per acre) increase in available forage. We did not observe any effect of livestock grazing intensity, an interaction between livestock grazing intensity and ground squirrel abundance, or an interaction between precipitation and ground squirrel abundance on residual standing crop. Collectively, this information will be useful to ranchers to help determine when control efforts may be needed for California ground squirrels given relative abundance of ground squirrels on their rangeland properties.

The full article can be found in: *Rangeland Ecology & Management*, Volume 83, July 2022, Pages 50-58.

2022 HOW TO CONTROL CALIFORNIA GROUND SQUIRRELS" workshop on **July 26, 2022, @8:30-10:30am**

See the announcement and information for registration at: https://cesanluisobispo.ucanr.edu/Custom_Program355/Newsletter_810/

Register at: <http://ucanr.edu/groundsquirrels2022>

Or call Mary at 805-781-5940





The 8th Oak Symposium is Coming to San Luis Obispo this Fall

The 8th in a series of California Oak symposia will be held during Oct. 31- Nov. 3, 2022, in San Luis Obispo, California. The theme of the symposium is “Sustaining California Oak Woodlands Under Current and Future Conditions”. Beginning in 1979, there have been a series of seven symposia held every 5 to 7 years. Each symposium addressed the state of our knowledge about the science, policy, and management of California’s oak woodlands. Given the risks associated with climate change, conservation of this diverse ecosystem is an especially critical management and policy priority today. The 8th symposium will have plenary sessions that feature presentations on the science of climate change, management of oak woodland under changing environmental conditions, and the maintenance of working landscapes and the essential services they provide to society. In addition, a session with invited speakers will describe California oak programs for schools, citizen scientists, and underrepresented groups. Another will feature recent technologies used to increase our understanding of the oak woodland ecosystem and the application of this information. These two sessions and the three plenary sessions are interspersed with contributed paper presentations on wildlife ecology, oak restoration, oak pests and diseases, fire ecology, and woodland conservation management planning, among others. As with previous symposia, the 8th will bring together oak scientists, managers, policy makers, and interest groups from throughout the state, and will provide opportunities for field trips to local spots that are expressive of central coast oak management and conservation. You can submit an abstract at the following website:

<https://ucanr.edu/sites/oaksymposium/>





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