LIVESTOCK & RANGE NEWS

SERVING VENTURA AND SANTA BARBARA COUNTIES

We recognize as this newsletter goes to press, that we are living through strange and unprecedented times. As you know, the State of California has issued an order to shelter-in-place to help reduced the spread of COVID-19, and all UCCE academics and staff are now working remotely. Despite that, we are still here to answer your questions and address your needs during this time. Matthew can be reached at mwkshapero@ucanr.edu and 805-645-1475.

In this Issue…

The cow size of the future

Weather Outlook - Spring 2020
By Royce Larsen

Coronaviruses in humans and animal health
By Gaby Maier

Research notes and other announcements

The cow size of the future

This past January and February were bleak. While we had a strong start to the rain year (in Los Alamos, for example, rainfall for November and December was 158% of normal), our historically two wettest months (Jan & Feb) were the second driest in the 110 years since records have been taken. It was hard not to begin to fear the worst—and there was drought on the mind. In mid-February, after six nearly rainless weeks, I was at a talk in Denver at the annual meeting for the Society for Range Management. The subject was how cow-calf producers could and would need to adjust their operations in the future, to respond to seasonal weather patterns becoming increasingly more extreme and variable. There was talk of re-thinking range cow size, and reference was made to research out of Wyoming that examined how cows of different size classes performed during different rain years. While March brought some good storms here locally and washed away for most the threat of catastrophic drought, the Wyoming paper still holds some valuable lessons for the future that I think are worth summarizing here.

The authors of the 2015 study begin by acknowledging that while it has always been generally recognized as important to select cows that match their production environment, that the trend in genetic selection for maximum calf growth has led to gradual increases in the size of beef mother cows. An unrelated but simultaneous trend in recent decades, they explain, has been an increase in temperature, drought severity, and drought frequency. Their study, then, had three objectives: 1) to quantify the effect of drought on weaning weight regardless of cow size (i.e. are calves at weaning smaller during drought); 2) to compare how cow size influenced weaning weights of calves relative to drought (i.e. what size cow produces the heavist calf in years with different forage conditions); and 3) to determine how efficiency was influenced by cow size and drought (i.e. which cows produce the heaviest calf relative to her body weight and consume the least when forage conditions are limited).

The project ran from 2011 to 2014 at two rangeland sites that belong to the University of Wyoming Agricultural Experiment Station Beef Unit near Laramie. Both sites are high elevation and precipitation averages 13.5 inches. During the four years of the study, 2012 was the driest on record (7.91 inches) and 2014 was the fourth wettest (16.73 inches), so the research spanned a large variation in rainfall.

The study tracked 80 Angus-cross spring-calving cows, all of whom had been in the herd for at least four years. The cows were stratified into 5 100-lb weight classes: 1000 lbs (9 cows), 1100 lbs (22 cows), 1200 lbs (29 cows), 1300 lbs

(10 cows), and 1400 lbs (10 cows). Cows were artificially inseminated in order to control for sire-influenced growth genetics. And because birth dates, birth weights, and weaning dates varied, all calf results were adjusted to a standardized 210-day Weaning Weight (WW) for comparison.

So what were the results?

- **Weaning weights.** Regardless of cow size, the driest year of the study (2012) produced the lightest calf WW. The wettest year (2014) produced the heaviest calf WW.
- **Influence of cow size.** Cow size did influence calf WW, but the influence depended on precipitation: in the driest year (2012), as cow size increased, WW increased; oppositely, in the wettest year (2014), the smallest cows weaned the heaviest calves. Smaller cows had the greatest variation in calf size as rainfall varied. [see Table 1]
- **Efficiency.** Cow efficiency was measured as the total product (calf WW) per female relative to the dam's body size, essentially measured as the percent of the cow's body weight weaned. Regardless of the study year or the precipitation amount, the two smallest cow sizes always had significantly higher efficiency ratios than the two largest cow sizes.
- **Forage consumption.** Given increased nutritional requirements as cows increase in size, over the course of a 210-d birth-to-weaning period, the largest cows required an additional 1,064 lbs of forage compared to the smallest cows. Accordingly, large cows required 25% more forage than small cows for every for every pound of calf weaned.
- **Herd size.** Because a ranch can run a greater number of small cows than they can large cows, in both drought and wet years smaller cows raise significantly more pounds of calf per ranch or per unit area.

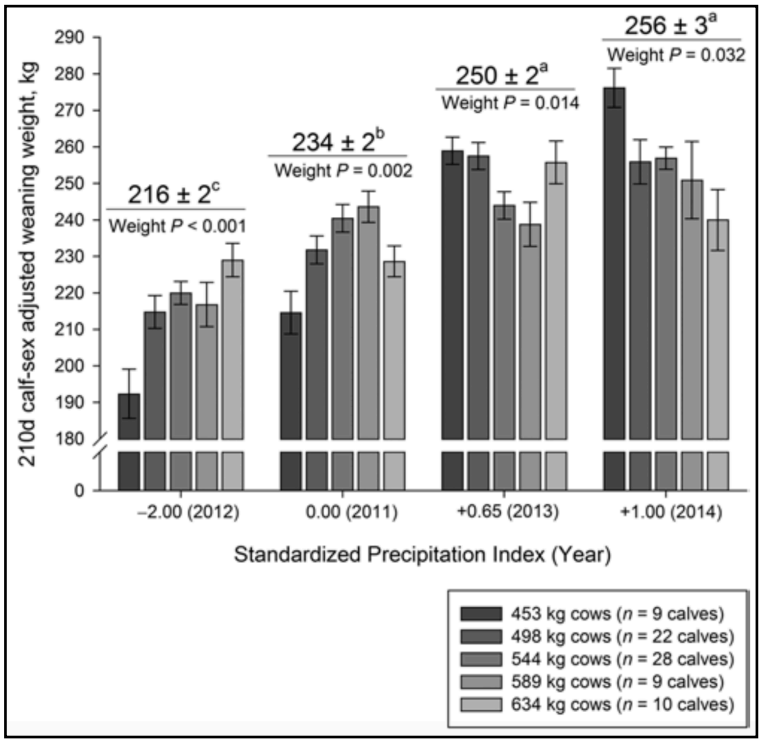


Table 1. Effect of drought and cow size from research publication. All results expressed in kilograms (multiply by 2.2 for US lbs). Different years are along x (horizontal) axis. Calf WW are along y (vertical) axis. Small cows showed the greatest variation in their calf WW between dry and wet years. Their efficiency and productivity on a per acre basis, however, was greater than other classes of cow size.

So what are the takeaways from this study then? Results indicate that small- to moderately-sized cows performed better on a per acre basis in all years of the study—across both drought and wet years. Yes, large cows produced heavier calves during the drought year of 2012 (the authors speculated this had something to do with potential advantages of balancing optimal rumen capacity and dry matter intake), but their efficiency was lower than that of small calves. In short, whatever advantages larger cows provide in drought years weaning heavier calves, is outweighed by the fact that smaller cows raise more calves per acre on less forage. This study demonstrates a real, measured economic benefit in all years—wet or dry—to run smaller rather than larger cows. In conclusion, the authors warn again against the inclination to focus too much on selecting sires that increase the weaning weight of calves in a herd. Likely, this effort will introduce sire genetics that ultimately—albeit maybe inadvertently—increase a herd's cow size.

Of course the climatic and production variables in Wyoming are quite different than ours are in California, but the work to me indicates a promising direction for cow-calf producers to move that would both have immediate economic benefits and longer-term advantages in responding to a more variable climate. If you begin to reduce cow size, however, be sure to revisit your stocking rate calculations regularly, as decreasing cow size will only be an advantage if you concurrently increase your total number of cows.

If you wish to read the original research article, please contact me directly for a copy.

Citation

Scasta, J. D., Henderson, L., & Smith, T. (2015). Drought effect on weaning weight and efficiency relative to cow size in semiarid rangeland. *Journal of animal science*, *93*(12), 5829-5839.

Weather outlook - Spring 2020

by Royce Larsen, UCCE Natural Resource/Watershed Advisor

As we have watched forage growth struggling this year, some may have looked back at the dry years we have recently endured and wondered if this year will be a drought? Paso Robles has kept rainfall records since 1887, with an average annual rainfall of 15.1 inches. Normally, most of the rainfall comes between December and March, with January and February being the wettest months. But as you know, averages don't tell the whole story. This year Paso Robles had a very wet December, about 2 times the average, Figure 1. But since then it has been very dry, there was 0.66" in January, and 0.0" in February. In Paso Robles there have been three years with no recorded rainfall for January, and 5 years for February. However, looking at January and February combined, there has only been one year, 1983-1984 (0.44"), where there was less rainfall than this year (0.66").

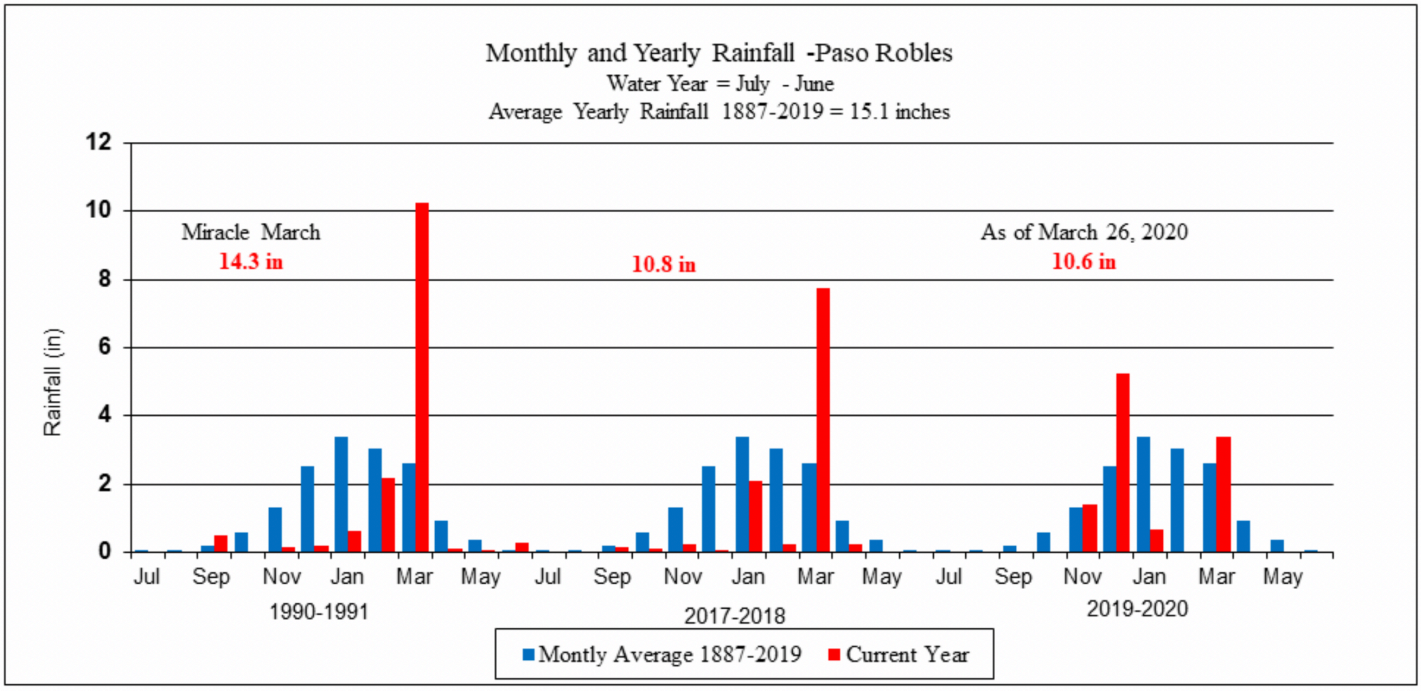


Figure 1. Comparison of monthly rainfall for Paso Robles, 1990-1991, 2017-2018 and 2019-2020.

Many refer to the miracle March of 1991 (Fig. 1) as a very important year that saved the livestock industry. That was an incredible year, with more than 10 of the 14.3 inches of rain coming in March. But 2017-2018 was somewhat similar, with over 7 of the 10.8 inches coming in March (Fig. 1). This year, we have had 3 ½ of the 10.6 inches coming in March (Fig 1). The Forecast suggests we may still get more rainfall in April.

Not only is it important to consider how much rain comes each year, but also when it comes. In addition to every year having a different total, each month is also different. March is a critical month for forage growth. December through February is usually too cold for much growth, but as temperature begins warming in March, the rapid growth phase begins. If moisture is available, you can almost see daily growth spurts later in March and into April. There is "very little growth" when temperatures are less than 50 degrees F, but the rapid growth phase begins when the temperature reaches about 70 degrees F. Hence, rainfall in March can be very effective at increasing forage

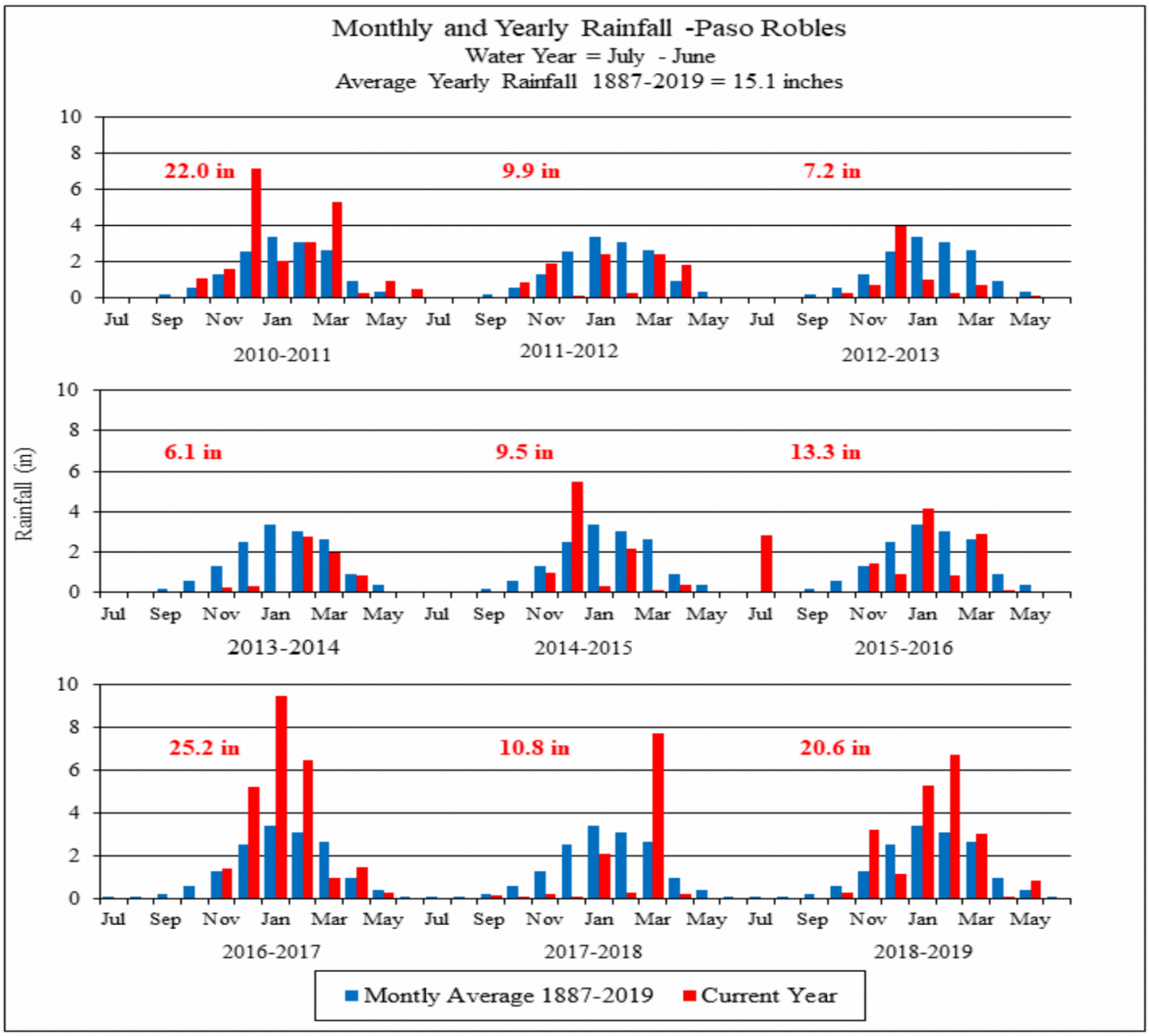


Figure 2. Comparison of 9 years of monthly and yearly rainfall, 2010 – 2019, at Paso Robles.

production. Annual plants evolved with seed production being a priority. If there is plenty of moisture, the plants will first put their energy into "growing foliage", e.g., producing more feed for livestock. But, if moisture is lacking, the plants tend to focus on "seed production", with little foliage growth.

A look back at the last 9 years, Figure 2 shows just how much the yearly and monthly rainfall can change. The drought we experienced during 2012-2016 may have been the worst during the last 500 years. There was a combination of lower rainfall and warmer temperatures which not only lead to low forage production, but also put a lot of stress on vegetation causing high mortality in our oak trees and shrubs (see information on oak mortality in this newsletter). To see more about forage production on the Central Coast please take a look at the forage production reports: http://cesanluisobispo.ucanr.edu/Custom_Program355/Forage_Production_Report/.

Coronaviruses in human and animal health

by Gaby Maier, UC Cooperative Extension Specialist for Beef Cattle Herd Health and Production

Now that we are in the midst of the Covid19 outbreak, you might wonder about how this virus is different from coronaviruses that infect livestock and other animals. Let's try and answer some questions you might have with regards to this topic.

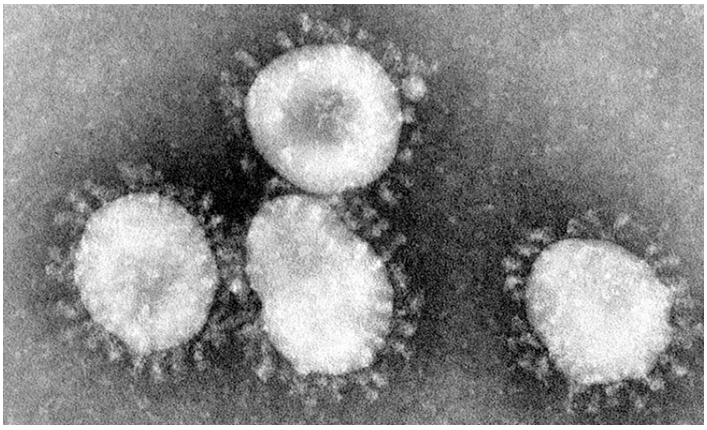


Figure 3. Coronavirus particles that infect humans seen under an electron microscope. Source: https://hoards.com/article-27439-can-i-catch-coronavirus-from-my-cows.html

How widespread are coronaviruses?

Disease from coronaviruses is very common in humans and animals. Many species have their own version of coronavirus. In fact, one of the causes of the common cold in people is a coronavirus. What's important to understand is that in general, these viruses stick with a species based on how their surface proteins fit receptors on the cells of their target species, in a lock and key fashion. The reason this novel corononavirus is such a threat is because it is new to our species, there is no immunity to it in the population, it spreads easily, and it can cause severe disease.

What is the source of the novel coronavirus?

SARS-CoV-2, the official name of the new coronavirus, is thought to have jumped from animals to humans. The exact source is still unknown, but, at the moment, the most likely explanation is that it came from bats. You probably remember the SARS outbreak from 2003, which was caused by a similar coronavirus. Bats were found to be the likely source of the virus in the 2003 SARS outbreak, and probably passed it on to other animals that were sold in markets in China, such as the palm civet, a cat-like animal. Along the way the virus underwent mutations and finally was able to infect a new host – humans. Most importantly, it was able to spread from person to person. A similar mechanism was likely at play for this new coronavirus outbreak but with new information coming forward, this idea may change.

How is the novel coronavirus different from coronavirus in cattle?

The good news is that the bovine coronavirus we have in the US belongs to a **different strain** of coronaviruses than the SARS-CoVs that have jumped to humans during the 2003 SARS and the current Covid19 outbreaks. Bovine coronavirus is a cause of calf diarrhea, winter dysentery in adult cattle and is thought to cause respiratory disease, for example as part of the shipping fever complex. There is no expectation that the novel coronavirus can

infect cattle or that the bovine coronavirus that is endemic in the US causes disease in people. There is also **no evidence** that imported animals or animal products pose a risk for spreading Covid19, according to the CDC. Overall, there is no connection between coronavirus in cattle and SARS-CoV-2.

What about coronaviruses in other animals?

Epidemiologists are often worried about pigs as a mixing vessel for viruses that affect people and animals, e.g. for influenza viruses. Pigs have their own versions of coronaviruses that are the cause of Porcine Epidemic Diarrhea (PED) and Transmissible Gastroenteritis (TGE). However, just like in cattle, the coronaviruses in pigs are different and there is no evidence that pigs can get infected with SARS-CoV-2 or that they can transmit and spread it.

Should I worry about my pets?

At this time, there are also no reports that pets can get infected with or transmit SARS-CoV-2. However, the CDC cautions to restrict contact with pets while you are sick from Covid19 because there is still a lot we don't know about this new virus.

Would the coronavirus vaccine we have for cattle work in people?

Unfortunately, the corona virus vaccine for cattle would not work for people in the current pandemic because of the difference in strains. In fact, intentional or unintentional injections of animal vaccines in people can have adverse effects such as toxic inflammation or allergic reactions and must be avoided.

Additional resources

It is hard to escape information about Covid19 during this time. While there is a lot of information out there, not everything may be accurate. A reliable and up to date source is the CDC webpage including a page about animals:
https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/animals.html
As time goes by, we may find out more about the source of the virus and other important facts, so check back occasionally for the latest information and recommendations.

Research updates and other announcements

Compiled by Royce Larsen

Soil Organic Carbon

Currently, the application of compost is being promoted throughout California to improve soil health and increase carbon storage. On the Central Coast, many research studies are starting to examine the benefits of this practice to carbon sequestration and soil health. A new paper, "**Terrain attributes and forage productivity predict catchment-scale soil organic carbon stocks,"** sheds light on the underlying soil organic carbon (SOC) stocks of rangelands on the Central Coast. Rangelands cover 54% of California, representing a large natural stock of SOC, but existing SOC estimates are rough. Accurate assessments of SOC stocks are needed at multiple scales given their importance to understanding both local soil health and global C cycles. This study was undertaken to improve our measurement of fine-resolution SOC stocks in complex terrain. In summary, lower hillslope positions, concave landforms, and enhanced wet-year greenness were associated with more SOC, and explained 11%, 24%, and 31% of variability in 0–30 cm SOC stocks, respectively. See the whole paper for results, which can be found at:
https://www.sciencedirect.com/science/article/pii/S0016706119318427?via%3Dihub

Announcing a new UC ANR publication: "Natural History of the Central Coast Bioregion"

(adapted from Gregory Ira's announcement: https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=31003)

The publication's lead author, Bill Tietje (Environmental Science, Policy, and Management, University of California, Berkeley), with co-authors William Preston (Geographer Emeritus, Cal Poly, San Luis Obispo) and Anne Polyakov (University of California, Berkeley; currently a Masters Student, University of Washington), created a highly readable and engaging description of the Central Coast Bioregion. "We strived to write in everyday English

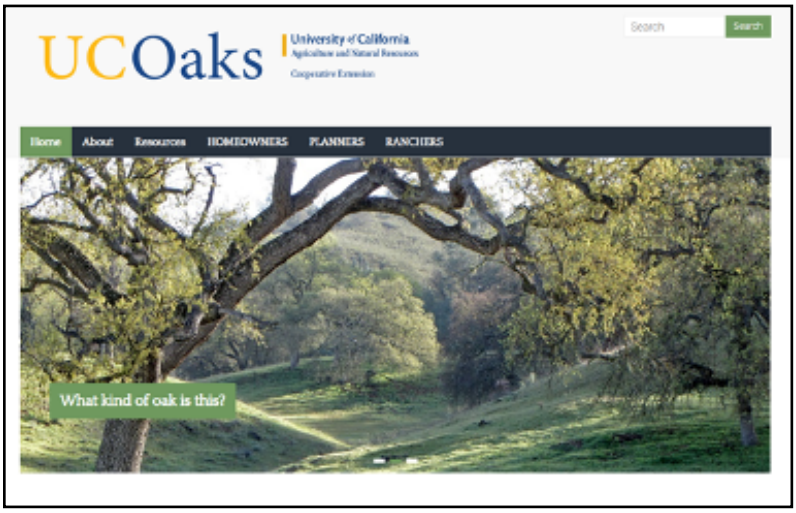
and create a scientifically accurate and engaging presentation." The authors succeeded on both counts by use of plain language, common plant and animal names, and short paragraphs supported with over 65 high-quality photographs, four maps, two diagrams, ten vignettes, and 70 references for further reading.

The Central Coast Bioregion, an area between the Pacific Ocean and the San Joaquin Valley, and extending from Monterrey south to Santa Barbara, is home to wildly popular and lesser known destinations. Well known areas include the Big Sur Coast, the estuaries at Elkhorn Slough and Morro Bay, and Monterrey Bay Aquarium. Some of the hidden gems are Pinnacles National Park, Santa Barbara Botanic Garden, and the Gardens of the La Purisima Mission. Together, the authors describe the origins and present composition of the region's environments: "Across the region's 15,000 square miles, physical, and biological processes, combined with time and human actions, have resulted in a broad range of ecosystems, each harboring distinct assemblages of plants and animals." The publication uses engaging vignettes to highlight local conservationists, regional wildlife, historical and contemporary restoration efforts, and interesting places to explore. It begins with a brief history of the region, providing context to descriptions of subsequent environmental and land-use changes, a reminder to readers that while the future of the central coast is uncertain it will be shaped by our actions. You can find the publication at: http://calnat.ucanr.edu/Resources/calnat_pubs/

Sharing Oak Woodland Research through a Popular Website

(Devii Rao, Bill Tietje, Luke Macaulay, Judi Young)

Since its creation in 1995, the University of California Oak Woodland Management website has been a valuable educational resource. Based on Google Analytics data from 2011 to 2017, the website receives an average of 45,000 users annually. It is a repository of nearly 30 years of research and outreach data on the ecology, management, and conservation of California's 8 million acres of oak woodlands.



Recent staff retirements and changes in website standards created a need for an update and redesign. To accomplish this, the University of California Cooperative Extension received a Renewable Resources Extension Act Capacity Grant that allowed us to reformat the website for mobile devices; make the website more functional and visually appealing; add some of the latest research; and promote the website to groups who have not historically used it, in particular, the ranching community.

To increase user friendliness, we developed links at the top of the home page for the three primary target audiences: homeowners, land-use planners, and ranchers. On the home page, we also highlighted five topics that receive the most hits: species identification and ecology; oak regeneration and restoration; economic and ecological values of woodland stands; threats to oak woodlands; and woodland wildlife.

The new website, now called **UC Oaks**, went live in June of 2020. The new flexible website design will allow us to continuously meet the needs of our clientele. With its new look and expanded reach, we hope that the website will be a one-stop-shop for everything people need to know about oak woodland conservation and management. https://oaks.cnr.berkeley.edu/

Sincerely,

Matthew Shapero
Livestock and Range Advisor
UCCE Ventura and Santa Barbara Counties
669 County Square Drive Suite 100
Ventura, CA 93003-9028
Phone: 805-645-1475

Livestock and Range News is a newsletter published by the UCCE Livestock & Range advisor serving Ventura and Santa Barbara Counties. The newsletter contains research, news, information, and meeting notices related to the areas of livestock production, rangelands, and natural resource management.

In this Issue…

- The cow size of the future
- Weather Outlook - Spring 2020
- Coronaviruses in humans and animal health
- Research notes and other announcements

IMPORTANT AND URGENT…

Our office will not be able to send *Livestock and Range News* by hard mail for much longer. It is critical, if you would like to continue receiving the newsletter regularly, please visit our website and enter your email address to receive it electronically in the future.

Please Visit: http://ceventura.ucanr.edu/Live_Stock_-_Range_Programs/

University of California
Agriculture and Natural Resources

University of California Cooperative Extension
Ventura and Santa Barbara Counties
669 County Square Drive Ste. 100
Ventura, California 93003