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Videos from the 2023 Rangeland Summit are on YouTube! Scan the QR code below to start watching!

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Grasses vs Trees – Which is a Better Long-Term Carbon Sink in California?

We are all familiar by now with the different initiatives California, the US, and the world have created as goals to bring the earth's temperatures closer to pre-industrial levels. The Paris Climate Agreement started the push and was agreed upon in 2015 by 196 "Parties at the United Nations." The goal is to limit the temperature increase to 2°C above pre-industrial levels and try to limit it to no more than 1.5°C. Whatever your thoughts are on "global warming," this is the reality we now have, where businesses have been mandated to reduce carbon emissions to meet the Paris Climate Agreement. Cap and Trade has been an easy, early option for many businesses to utilize while new technology has come online and will probably remain an option for many in the future. I remember early discussions about Cap and Trade and the hope that rangelands would potentially be part of the market, providing another income stream for ranches. But most of the carbon markets have focused on trees, overlooking rangelands as an option for carbon markets. Trees store more carbon above ground than grasses, making them an easier option for businesses to get more bang for their buck. However, our climate has been changing and we are seeing changes in our vegetation in California that might make someone question which is a better option for long-term carbon storage.

I recently stumbled across a research paper from 2018 where the authors compared the ability of grasses to trees as a carbon sink, focused on California. They ran models based on different future climate predictions: aggressive global greenhouse reduction over and above the Paris Agreement (RCP2.6), business as usual (RCP8.5), periodic drought on roughly a 10-year cycle (Cycl Drt), and persistent drought or mega-droughts (Perm Drt). To make the modeling cleaner, they created a "grass-only" or "tree-only" vegetation for the state as well as an "actual" with obtaining the vegetation mix of grasses and trees from large-scale land classifications. The only model where trees outperformed grasses for storing carbon long-term, was the aggressive global greenhouse reduction (RCP2.6) (see the figure from the paper). In all other models, trees eventually became a source of carbon instead of a sink. The only time grasses became a source was under

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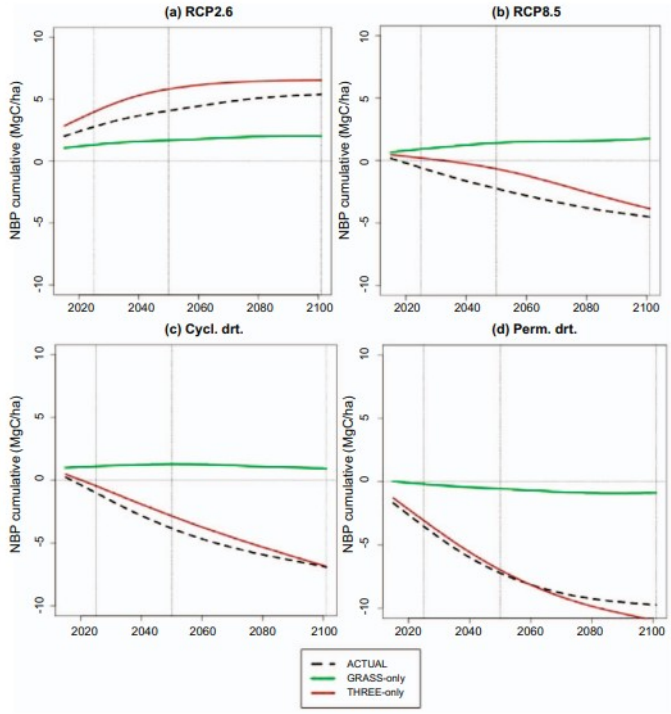

persistent drought. Why do trees become a source of carbon with predicted dryer climate models? Many reasons – trees are not able to adapt to drought conditions, and in a state of stress they become more susceptible to diseases and pests and are less likely to survive wildfires compared to grasses. If you have traveled anywhere in the Sierras, you have seen this happening over the years. California rangelands are a mix of annual grasses all adapted to a Mediterranean climate and can adapt their growth cycles, somewhat, based on drought to produce a seed bank for future years in all but the worst droughts. You will see in the graphs, grasses continue to sequester the same amount of carbon until we look at a mega-drought. Grasses store most of their carbon below ground through roots which gives grasses another advantage over trees to sequester carbon long term. Grasses have advantages over trees when it comes to wildfires as well. When a wildfire happens, the above-ground storage of carbon in trees is released into the atmosphere, a source. Whereas the grasses have stored more carbon below ground, they still release some carbon into the atmosphere, but it is a drop in the bucket in comparison. Most of our wildfires also happen after the annual grasses have dropped their seeds, ensuring the following year will see annual grass growth again. When you factor in that we actively graze our rangelands in most of the state, we are also removing some of the above-ground carbon to create food and fiber.

In a paper my colleagues and I have submitted for publication, we used the SCU Fire from 2020 as a case study to determine if grazing reduced the carbon released into the atmosphere during a wildfire. My colleague in the Bay Area and I reached out to ranchers in the SCU footprint to determine the animal unit months in the footprint before the fire. This is calculated based on the number of animals we were told grazed that year and the number of acres available for grazing. Working backward since we know the requirement of pounds per day of forage for cattle, we were able to calculate the pounds per acre of forage removed before the fire – you could also consider the forage as the amount of fuel removed. We estimated a total of 10,602 tons of forage (fuel) was removed from the 56,382 acres of grasslands in the footprint. We also calculated the carbon emissions from grazing (due to enteric fermentation – burping, not farting) to be an estimated 239 metric tons of methane or 0.008 MMT (million metric tons) of CO2 equivalent. Knowing this information, we were then able to model how much carbon would be released if the almost 11,000 tons of forage had burned in the wildfire. Not surprisingly, an estimated 0.0051 MMT more CO2 equivalent, with the majority being "black carbon" would have been released in the SCU Fire if there had been no grazing that year, even with accounting for the methane produced through fermentation. Grazing (removal of fuels) did not have a huge reduction in carbon emissions from wildfire, but there is another benefit of grazing rangelands. In the Coast Range in particular, if grazing was not occurring, the area would convert to brush, which releases more carbon into the atmosphere compared to grasses. We estimated this using models that if the area had been brush, there would have been upwards of 0.99 million tons more CO2 equivalent released.

With these two research projects, it is clear that keeping as much of our state as a grazed grassland as possible is the best scenario for sequestering carbon long-term, minimizing the impact of wildfires. The authors of the first paper do not expect the state to become a complete grassland and realize their

modeling simplicity of tree only and grass only gives trends in carbon sequestration. In semi-arid environments such as California, they do suggest looking at long-term carbon sequestrations associated with grasslands and rangelands as more reliable sinks. They also realized most of California's rangelands are working lands – which increases biodiversity and can increase carbon sequestration. These research projects highlight the role grazing rangelands can play in meeting carbon or greenhouse gas goals without discussion of any additional practices to attempt to increase carbon sequestration. Again, regardless of your thoughts on global warming, there is science showing grazed rangelands can play a role in meeting California's climate goals and potentially provide another income source for the ranch.

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Vesicular Stomatitis Virus: An Unwelcome Guest in Livestock's Mouth

Dr. Gabriele Maier, Professor of Extension, Beef Cattle Herd Health and Production, UC Davis and Dr. Roselle Busch, Professor of Extension, Sheep and Goat Herd Health and Production, UC Davis. July 2023

On May 18, 2023, Vesicular Stomatitis Virus was detected in a horse premises in San Diego County. Since then, several more counties in the southern half of California have reported positive cases of vesicular stomatitis, mainly in horses. Two cattle premises and a rhino in a wildlife park were also confirmed positive for the virus. A current map of affected counties with quarantined premises can be accessed through the California Department of Food and Agriculture (CDFA) at this link. The CDFA also offers a number of informational materials related to Vesicular Stomatitis Virus on this dedicated webpage.

What is Vesicular Stomatitis Virus (VSV)?

Vesicular Stomatitis (VS) is a contagious viral disease that often affects horses, but can also lead to clinical signs in cattle, swine, wild ruminants, small ruminants, and llamas and alpacas, causing painful sores and blisters in their mouths and on their hooves. Though not typically fatal, VS can have significant economic and welfare impacts on affected animals. In rare cases, people can also become infected and develop flu-like symptoms. Understanding VS during the current outbreak is crucial for producers, veterinarians, and anyone involved in the livestock industry.

Transmission and Spread

VSV primarily spreads through direct contact with infected animals. The virus can also be transmitted through contaminated equipment, feed, or water sources. Certain insects, such as, midges, sandflies, and black flies, can carry and spread the virus from one animal to another. However, there are still some uncertainties about how the virus spreads between animals and between premises.

Midge

Black Fly

Clinical Signs

Once animals are infected with VSV, it takes about 2 to 8 days for the first clinical signs to appear. Common signs include the formation of painful blisters and sores in the mouth, on the tongue, and around the lips which causes the excessive drooling and reluctance to eat. The virus may also cause similar painful lesions on the hooves and teats. In severe cases, the animals may experience lameness due to hoof lesions further contributing to decreased feed and water intake. Severely affected animals may be dehydrated with metabolic and acid-base derangements (especially ruminants as they produce a large amount of saliva which is critical for buffering the rumen). Animals may lose condition due to the painful lesions.

Impact on Cattle and Livestock Industry

VSV is classified as a "reportable disease," which means it must be reported to the local authorities upon detection. The reason for this classification is the potential for VSV to mimic the signs of other more dangerous diseases, such as foot-and-mouth disease (FMD). Once VSV is suspected, a quarantine will be issued so animals may not leave from the premises until cases have resolved. Timely reporting and temporary movement restrictions for affected premises is the best way to reduce the spread of VS. Call your local veterinarian or your CDFA Animal Health Branch if you suspect a case of VS in your livestock. There is no “punishment” for having the disease in your livestock, other than being under temporary quarantine. Affected animals won’t be eliminated as is the case for other livestock diseases such as bovine tuberculosis or Newcastle disease in poultry. If everyone stays vigilant and reports cases of VS, spread of the disease will be minimized.

Plan ahead for interstate livestock movements

When shipping cattle or other livestock interstate, there may now be additional restrictions for the certificate of veterinary inspection required by the importing state. Make sure you plan ahead and discuss with your veterinarian when to schedule visits for health certificates for interstate movement. The same may be true when taking animals to a livestock fair.

Prevention and Control

Preventing VSV outbreaks requires a combination of biosecurity measures and vigilant monitoring. Livestock owners should:

1. Implement strict biosecurity protocols to limit contact between healthy and potentially infected animals.
2. Regularly inspect animals for any signs of the disease, such as blisters, sores, or lameness. Wear gloves when examining mouths to avoid exposure to the virus.
3. Isolate and quarantine suspected cases immediately to prevent further spread.
4. Practice proper sanitation and hygiene when handling livestock and equipment. The virus is susceptible to disinfection with various products including diluted bleach, iodine, quaternary ammonium, and phenolic compounds.
5. Minimize exposure to potential insect vectors by using repellents or insecticides. Check the VetPestX website for information on available products to kill or repel the most important vectors.

Unfortunately, there is no vaccine available for VSV, so biosecurity, hygiene, and vector control are the best ways to prevent the disease.

It's important to note that there is no specific treatment for VSV, and supportive care is the mainstay for affected animals. Veterinarians may recommend pain relief, hydration support, and providing soft and easily consumable feed.

Ranchette Pasture Management 101 – September 17th

There will be a workshop for owners of small ranchettes to gain hands-on information. We will be in the field, at two small ranchettes in the Lockeford/Clements/Acampo Area. One has dry annual rangelands and the other is working on establishing irrigated pastures . This will give you a chance to learn and ask questions about your pastures and goals! This is a free workshop, but you do need to register to find out the location. Please be aware, we will be walking pastures at both locations; this is not a slide presentation type of meeting. Please bring a camp chair if you would like a spot to sit in the field and be prepared for field conditions. Please feel free to call at least three days in advance if you need any accommodations. See included flyer for more information.

FREE!

UC CE

PASTURE MANAGEMENT 101

Join us for a morning all about managing your small acreage!

LEARN ABOUT

- ✔ Weed management
- ✔ Planting a pasture
- ✔ Proper stocking rates
- ✔ Fencing requirements
- ✔ Irrigation
- ✔ Feeding and Nutrition

September 17, 2023
1:00pm - 4:00pm

209-525-6800

Acampo, CA (address sent after registering)

https://ucanr.edu/smallacreage2023