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California Pacific Section

SRM High School Youth Forum

Harnessing the Power of the Sun to Survive the California Drought

The duration and severity of the California drought has had a huge impact on the California beef industry and the range land the cattle graze. Between the months of January and April of 2014, up to 100,000 head of cattle had left the state due to the drought (Reuters). The current California drought is believed to be the worst drought in 1,200 years (AGU Publications). The drought's impact has been more than the obvious reduction of rain: it has also caused a severe shortage of livestock drinking, water which directly impacts the rangeland and its wildlife.

My family runs 400 commercial cows plus replacements on 10,000 acres in the middle of the San Francisco Bay Area. Nearly all of the 10,000 acres are owned by the East Bay Regional Park District(EBRPD). The EBRPD owns and manages over 110,000 acres in Alameda and Contra Costa counties, all of which are open to the public. The number of visitors to our grazed parks reaches tens of thousands annually: they come to enjoy multiple activities including hiking, biking, and camping. Given our urban environment, the vast majority of the park users have no connection to agriculture or ranching which makes operating on the parks a bit more difficult. This has proved to be particularly challenging during the drought due to the aesthetic impacts that were occurring on the park’s rangelands.

Grazing is an important tool the park district utilizes in order to maintain the productivity and diversity of their annual grasslands. The EBRPD has very specific rangeland management goals and objectives to which we are required to adhere, these include: “1) encouraging and enhancing native grassland communities 2) controlling and managing invasive weedy vegetation 3) enhancing wildlife habitat, 4) protecting and enhancing riparian and wetlands 5) the amount of residual dry matter on the ground at the end of the grazing season shall be approximately 1000 lbs./acre on all slopes. These standards generally translate to 6-8 inches of standing vegetation at the end of the grazing season.” These requirements became difficult to meet as the drought continued and the water supplies diminished.

The drought's effect during the fall of 2013 and winter of 2013-2014 not only impacted the rangeland, but also had financial impacts on my family just as it did with every other California cattle rancher. In December of 2013 we began to cull our older cows. By January 2014, we had culled close to 20% of our herd. In previous years, we might have gone through 1 load of hay, but in 2014 we went through 4 loads. Our liquid supplement costs doubled and we spent countless hours hauling water. It wasn’t just our family business that was impacted, but the rangeland as well.

The biggest impact on our rangelands was not the loss of feed produced, but the extreme shortage of drinking water from our stock ponds and developed springs. In our region, we rely entirely on surface runoff to fill our ponds, all of which are man-made. By the summer of 2013, all but a few had completely dried out. Only 3 of the 19 ponds had water at the beginning of 2014. There were only a few water sources left to sustain the remaining cattle and the native wildlife. To make matters more difficult, the remaining water sources were in close proximity to the areas of the park that are frequented heavily by the public. There were too many cattle congregating in areas with high public use, which put stress on the cattle, the wildlife and the public. We knew that the areas around our last water sources were falling well below our minimum Residual Dry Matter (RDM) levels, all of which could be a reason for the EBRPD to question their support of our grazing program.

Our cattle performance began to suffer as well due to the poor quality of their drinking water and the distance they had to travel. Our calves suffered from more cases of pinkeye and scours and our cows dropped down into the 2-3 range in their Body Conditioning Scores when normally at that time of the year they should be closer to 4 or 5. In addition, we preg checked our cows in the spring of 2014 and our conception rates dropped from a historical average of 90- 93% to 83%.

There were also potential concerns for a threatened species in the remaining ponds. The California Red Legged Frog thrives during years with adequate rainfall, however in extended times of drought they may disappear from an area (US Interior). The drought put the threatened California Red Legged Frog population and their potential habitat at risk. Ponds that typically last well into fall went dry in early spring, and ponds that had always held water year round went dry in the summer and fall. The number of cattle drinking out of the ponds quickened their drying pace.

In 2013, we knew that if we didn't get big rains during the winter our ponds and springs would not be re-charged and they wouldn’t be able to make it through the summer. In early 2014, we realized that the livestock distribution issues and lack of water was going to force us to liquidate our cow herd. We had enough feed in the remote regions of our lease to hold us over, but the cattle weren't utilizing these areas due to their distance from water. We had to come up with a solution.

My Dad and EBRPD discovered an old abandoned well on the very north end of our lease that was in an area where there wasn’t any water for miles. If the well could be used to get water in the area around the well and also push and distribute water another 4-5 miles over some very steep terrain, it may solve our water problem. Unfortunately, there wasn’t any power nearby to power a pump. My Dad thought it could be done with solar power but the scope and resulting costs were high. We were going to need both design and financial assistance if we were going to implement a water distribution system of the scale necessary. My Dad reached out to our local Natural Resource Conservation Service (NRCS) office along with the EBRPD for help. The EBRPD committed to offering some financial assistance and after meeting with the NRCS they agreed to help bridge the financial and engineering gap. The NRCS’s contribution towards the project would be funded by two different programs, the first phase was funded through the USDA’s 2014 Drought Initiative for Grazing Lands Program while the second phase was funded by an Environmental Quality Incentives Program (EQIP) grant.

My Dad, with technical support from the NRCS and input and approval from the East Bay Regional Park District’s Stewardship department, designed an extensive water distribution and storage plan.

To complete the project, we needed to install a solar panel array of eight 255 Watt REC solar panels, 3’ by 5’ for each panel and the entire array measuring 10’x12’ and providing 2,040 watts of energy to power a 2.5 horsepower Grundfos 6SQF3 pump to push the water through 4 miles of underground pipeline. For the pipeline we planned to install 1 ¼ inch HDPE (high density polyethylene) pipe as opposed to PVC (polyvinyl chloride) pipe. The HDPE would come in 3,000 foot lengths which would help with installation efficiencies. We planned to install into the ground using a D6 dozer and a modified ripper shank plow which provided to be helpful from a regulatory standpoint. The plan called for 3 poly water tanks totaling 12,500 gallons, 7 new 350-500-gallon water troughs and an additional 5 existing troughs whose water supply had failed. The NRCS engineer determined we’d be dealing with some extreme pressures, approaching 250 PSI in portions of the system where the elevation was high. As a result, we needed to use a heavier walled version of the HDPE pipe. We needed to install DR 7 pipe (Dimension Ratio 7), which can withstand pressures of nearly 300 PSI for the portions with higher pressure and DR 9 pipe (Dimension Ratio 9) which is used for 200 PSI, for the rest of the project. Although these changes drove up costs, it was necessary.

In the late summer of 2014 we were ready to get under way and were waiting for final permits/approvals when we hit a bit of a road block. Per the biologist’s opinion performed on our project, it was determined that the threatened Alameda County Whip Snake (ACWS) was of concern and could be negatively impacted by our project. Concerns included the snakes being run over by equipment, falling into open trenches and then being buried during the backfill process. Seasonal Whip Snake peak activity during the spring and fall mandated that all ground disturbances must occur between June 15th and October 31st.

Our pipe installation method eliminated the open trench concerns and with cooperation from both the NRCS and EBRPD, it was agreed that a biologist monitor would be on site during construction hours. By the time we were given the green light, it was already early October.

The first phase of the project was completed in mid October of 2014 and the second phase was completed in late October of 2015. This project instantly brought water to two fields that previously only had water available to them seasonally and to one field that previously had no water available to it at all. The livestock were able to spread out over the rangeland and were no longer concentrated in the one to two miles around the last two water sources. Cattle began to forage on parts of the rangeland where they had not been for years due to lack of water sources in those areas. The 5 ponds that went dry by late spring and early summer in 2014 held water until the fall of 2015 due to the cattle drinking from the new troughs instead of the ponds. The additional water in the ponds is also benefiting the wildlife and threatened species in the area.

The NRCS and EBRPD helped to get our family's cattle operation through the drought, while preserving and enhancing our rangeland. After the completion, the impact of the water development and distribution were immediate.

Works Cited

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