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Center Pivot Irrigation

By John Miller, Delta Conservation District

When Brett Barker and Heidi Berger first purchased their place on Rogers Mesa (near Hotchkiss) in the fall of 2013 it was in serious need of some TLC. There was a gated pipe system for irrigation, but much of it was broken or plugged. Prairie dogs seemed to be running rampant, and Brett, a recognized teamster, needed facilities for housing his family of spotted draft horses.

Today, the draft horses eat contentedly in their new paddock, the remaining prairie dogs better sleep with one eye open, and cars stop along the road to check out the new high tech irrigation

system. There are still a few sticks of gated pipe on the property, but the majority of his hay ground is irrigated by the two new center pivots that were installed in the fall of 2015. Center pivots are large wheeled sprinklers that are connected to a fixed center point in the field. When running, these machines spin around that fixed center point like a hand on a clock. They typically make circular patterns that are a common appearance when flying over areas where this type of system is predominant.

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When asked about his conversion to the sprinklers Brett has all positive things to say. "The pivots allow you to get to your first cutting faster because you can get across the field and get everything wet much faster. This year we cut the first week of June, which is the earliest we have cut." Brett has also seen an increase in his hay production under the pivots but he is most impressed with his irrigation turnaround times. "The first two seasons here, I was fighting to get water across the field after the first cut. The fields are burning up and you take forever to get across with gated pipe. With a pivot I'm across in four days. With the gated pipe that same scenario would have taken four weeks. Now you immediately see growth in alfalfa, the entire health of the stand is better. We are positioned for a second cut earlier than we have ever been. The fact that we might get a third cut is a real bonus. "

If operated correctly center pivot sprinklers can be

upwards to 80% efficient compared to a 50% efficiency factor for gated pipe. This means more water gets taken up into the plant to be used for growth and production, and less water is lost to runoff and deep percolation below the plant's root zone. The sprinklers also apply water much more uniformly on bumpy or hilly ground, whereas furrow irrigators may have to fight to keep bumps and hills wet. With a pivot system you are able to apply much less water to the field each irrigation but get the water to the plants more frequently. This allows the farmer to even out the extreme wetting and drying factors that are inherent with furrow irrigation and gated pipe. Generally plants respond better to smaller/more frequent watering and this leads to a bump in hay quality and production amounts.

That increase in production and quality is especially important to Brett, who has some large mouths to feed. "About 22 years ago I began a project to raise

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and train a six up of spotted draft mares. And so as part of that for many years Heidi and I had a western entertainment cookout and chuck wagon business in Scottsdale Arizona.” Due to age, many of the mares are now retired, but Heidi and Brett still enjoy taking them on wagon rides and occasionally farming with them (Brett uses them to cut a few acres of his hay with antique farm equipment).

“Time spent with my draft horses in harness is precious and it is a great way to communicate with people, young and old.” says Brett who has taken his team to the Cherry Day’s parade a number of times. “We are committed to having a team of heavy horses and there will always be a team of horses at this farm.”

Since the center pivots make circular patterns, they don’t fit perfectly on a square field. To fill in the corners Brett has installed big gun sprinklers on riser posts where the pivots don’t reach. “The fixed big guns cover a lot of area each. The droplets of water are not too large due to exceptional engineering so we are not beating down the grass stand. It used to take us six weeks to get across this entire property with gated pipe. With the pivots and the big guns together it takes us six days. And you’re filling in the corners in a very efficient manner. What a fantastic way to water,” he says.

At first this system may seem like a typical sprinkler project, but a closer look reveals some important details. The sprinklers are all manufactured by Reinke and were installed by Andy Pavlisick and his crew from High Country Equipment (HCE) in Hotchkiss. HCE also connected the hardware to an intricate network of sensors and a satellite modem which allows Brett to monitor and control the system remotely via an app on his phone. Even in another state he can open the app and check the location of the pivots and make sure everything is running right. “I’ve had times when I’m out of town for business. The automation allows me to see where the pivots are and what they are doing, what the daily water consumption is, all those parts and pieces. The automation significantly increases

your opportunity for time leverage. Instead of looking out the window all night checking for a light to make sure everything is running, I can check my phone.” He is even able to set notifications so he instantly knows if a pivot gets stuck or runs dry. “The other day one of these pivots got in trouble and stopped moving. I got a text to notify me. I was able to take corrective action in minutes.”

Another interesting feature of this irrigation network is the ability to monitor soil moisture. The Reinke system seamlessly integrates with an Irrometer monitoring system that was funded via a grant from the Colorado Water Conservation Board. This allows Brett to access soil moisture probes set in the field at different depths and in different locations to see how dry or wet the ground is. “Soil moisture monitoring is great, because now we get to correlate how much water we are applying to how the soil is reacting at different depths. There is a certain turnaround time that you need to adhere to in order to have a healthier crop and healthy soil.”

“The best part about this project was the partnership with our team members.” Brett says. “Our team consisted of the land owners (Heidi and I), the manufacturer (Reinke), the local contractor (HCE), Delta NRCS office staff, Delta Conservation District, and Colorado Water Conservation Board. The collaborative effort that went into this means better ideas, it means a better system on the ground and it means we all benefit and grow together. We never would have taken on this project if we had been forced to rely completely on ourselves and our own resources. The team is what made this work.”



Pork Production for New or Small Pig Farmers

By Chad Franke, Board member, CO Pork Producers Council

We live at the epicenter of the local foods movement. More and more people want to know where their food comes from. Some of us are taking action and buying a few pigs to feed. If you are looking to feed a few pigs (or have some already), this article is for you.

There are some basics that you need in order to raise pigs. These include a place to put the pigs, a way to water them, feed, some basic knowledge about pigs, where and when to take them to the butcher, and of course, the pigs themselves. I'll try to quickly hit on these in this article.

Where do you put them? A pen, preferably a strong pen. You don't want your neighbor to call you about a pig eating his lawn. After a pig gets out



Phot credit: Morgan Smith

once, they will make it their mission to do it again. They need shelter, in summer they need shade, and a breeze to keep cool. Raising pigs in winter will require a better shelter to allow them to get warm or snuggle into bedding.

Water is absolutely vital to pigs, especially in summer. Don't expect to give them water in a water bowl morning and night and be ok. Provide plenty of water all day long, like a drinker tank or a barrel with a nipple waterer. Yes, they will spill some and make a mud puddle, that's one of the ways they cool off since they can't sweat.

Can you feed pigs the scraps off your table? Well, you can, but it's illegal and not a good idea. Any "kitchen waste" by statute must be boiled first for meat safety reasons. It is also not nutritionally good for the pigs. It's a much better idea to contact your local feed mill or feed store and get a good, balanced ration. The pigs will grow quicker and be healthier with good feed. A good quality feed will pay for itself over cheap feed. Extra veggies and weeds you might pull from the garden are a great treat, but not a main diet.

Unless you are prepared to butcher your own, you need to know where to take the pigs for butchering. And know in advance! If you need an appointment in August or September, make it in April or May, or you may have a 350-400-pound pig when you finally get to take them in November. There are not a lot of butchers in our area for the demand, so plan ahead. Plan on 6-7 months old being ready to butcher at 250-300 pounds. If you plan to sell packages of meat, you must legally use a USDA-inspected plant. If you are putting it all in your freezer or selling a whole or half to a friend, you can use a custom butcher (they are inspected, just not to the same level).

Where to find pigs? Colorado is a state with lots of pigs, and yet it can be tough to find weaner pigs in the spring. There is always Craigslist and Facebook. There you will be shopping with everyone else, and

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the price reflects that. You may do research and find the USDA report says weaner price is \$45. Unless you want to drive to the Midwest and buy a load of pigs, you won't pay that. In Colorado, expect to pay around \$100 for a weaner pig in the spring, more some years, less in others. It's best to find a farmer who farrows pigs and buy in one place, year after year. Pigs can have health issues if you buy from multiple sources and mix them.

You may have noticed I skipped over one topic. Knowledge. I saved it for the end so I hope it sticks with you. If you are going to raise pigs, you owe it to them to know the basics. What do you do if one gets sick? The best answer? Have a relationship with a vet who knows pigs BEFORE they are sick. What is sick? Pigs will cough, they get colds, they will fight each other and get scrapes, know what needs treated, and a basic idea of how. Know that a sunburn can be deadly for a pig (especially a white pig). Know that if pigs run out of water, you cannot give them full access to water or they could die of salt toxicity. Know that if a pig isn't eating, something is wrong. Find a trusted mentor you can bounce ideas off of, have a good working relationship with a pig vet, and read everything you can and see what applies here in our great state. Colorado is a great environment for producing pork, but it has its challenges and differences from where most pork in the U.S. is produced.

Pigs are a great, easy, and very tasty way to raise your own meat. But as soon as you buy a pig to raise for pork, you have the same obligations and responsibilities all pork producers have to take care of your animals and produce safe meat. With a little planning and work, you will have a freezer full of delicious pork for the winter.

The Colorado Pork Producers Council is here for you, the small pork producer just as much as it is for the big producers. Please spend the few dollars to join and participate in our events and learn all you can!

What Can The Past Tell Us About Range Management?

Part I: Pleistocene to pre-contact

By Don Schoderbek, CSU Extension Range Management Specialist

Authors note: This is part 1 of a 3 part series on Eastern Colorado's rangelands. Part I will cover pre-history to Spanish contact. Part II will cover the Spanish/French/Mexican periods. Part III will cover the American period and development of the cattle industry. Each of these periods shows us a different way of understanding the land, as well as its human dimensions.

I was recently meeting with a group of stockmen at their county business meeting and we were discussing the merits of various grazing systems. A punchy old rancher spoke up. He said, "Sounds like you just want us to run our cows like bison. That's what the plants evolved for... right?" While succinct, this is a very good explanation. Grasses are physically designed to be grazed multiple times throughout the year. This is important because the plant community of Eastern Colorado evolved in the presence of grazing animals, primarily bison.

Following the Ice Age, bison were an evolutionary oddity. Large, strange animals such as giant camels, giant sloths, mammoths, dire wolves, saber-toothed tigers, short-faced bears, and American lion dominated life on the Great Plains. These animals, called Pleistocene megafauna, were mostly extinct by 10000 BCE. The ancestors of bison were also much bigger than current species. Modern bison are a dwarf species with a high reproductive ability and low nutrient requirements, filling several niches of extinct megafauna. Bison were rapidly being left alone at the top of the evolutionary heap by a changing climate and the introduction of a cunning, vicious new predator – humans.

The bison population was also somewhat unstable.

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The earliest settlers of Eastern Colorado were the nomadic hunter-gatherers of the Clovis, Folsom, and Plano periods. All of what we know about this time is from the archaeological record, and is often confined to sources of water, caves, or sites of significance. A key local site is the Dent site, located near the South Platte in Weld County. Discovered in 1932, it was the first archaeological site in the world to show conclusive evidence linking humans and mammoths. The mammoth bones from 12850 BCE showed signs of flaying and cracking – clear evidence of tool use, hunting, and processing. The bison die-offs mentioned above also had negative effects on the human population. Much of the Plains was de-populated in the period between

A stable vegetable food source provided an incentive for the nomadic hunter-gatherers to stay in one area for longer periods of time. This had radical effects on the Plains cultures. Rock shelters and caves gave way to dugouts and earthen lodges. Trade became integral to life in this period. Pottery also began to be made for a variety of uses, and institutionalized, large-scale cultural networks began to develop. On the Plains, this period is defined by a development of regional pottery styles, projectiles, and more diversified agriculture. Pottery in Southeastern Colorado is more similar to Ancestral Puebloan pottery, while the rest of the Plains is typified by a rope-like, corded style, similar to that of the Plains Woodland cultures. This speaks to the diverging regional influences in these regions.

A painting of a Native American family in a grassy field. A man and woman are seated on the ground, surrounded by animal skins and antlers. A child is seated between them. A woman stands to the right, holding a child. In the background, a teepee is visible under a blue sky with clouds. A large antlered head is in the foreground.

Photo from www.crystalinks.com/clovis.html

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pressures of their own – the Athapaskan-speaking Apache and Navajo. As the drought years of the 14th century began to recede, Plains culture began to slowly re-emerge. The Pawnee people developed a complex semi-nomadic, agricultural society in the South Platte and Republican basins in Colorado, Nebraska, and Kansas. They lived in rectangular earth lodges during the agricultural season and winter, and tipis during the annual bison hunt. The Caddoan groups of South-eastern Colorado did not recover from the drought, and this country became home to various Apachean groups. The Ancestral Puebloans retreated to the defensibility of the Rio Grande and formed the various Pueblos in New Mexico, and the Navajo moved into the vacated Four Corners region. A variety of other groups existed on the fringes of these areas at the time, notably the Ute in Colorado.

It was into this chaotic and dynamic environment in the 16th century that the Spaniards walked. Major cultural and lifestyle shifts were already occurring within the native groups. Tentative trade networks were also being re-developed. It is likely that nearly everyone on the Plains had already heard strange tales of the bearded, pale men far to the south, their curious trade items, and their fantastic weaponry. A burial from ~ 1530 in Cheyenne County contained various shells of Mediterranean origin, meaning Spanish goods had been traded into Colorado nearly a generation before the Spanish themselves.

What can we take away from this as land managers?

1. Drought is an existential threat. Before we were able to ensure a stable food supply, sustained drought would kill the game or crops, and most of us would then starve over the course of several generations – an apocalypse. Now we are able to (somewhat) mitigate these effects through agricultural practices. But the ‘death threat’ still exists. Planning for drought is critical, because we cannot predict its intensity.

2. Land ethic. The pre-historic settlers of Eastern Colorado viewed land much as we view the air – a limitless, shared, endless resource. These societies were reverential of the inherent power of the land itself – both of its ability to provide, as well as its ability to take life. Respect for the land is integral to good stewardship, as the ranch (or the ground underneath it) will be here long after we’re gone.

3. Sharing knowledge advances society. Later cultures were superior due to knowledge exchange. The environment was relatively similar – the difference was trade. The crop seeds were from Mexico, the pottery techniques were from Missouri, and the hunting methods were from Montana. Adopting techniques different than our own, while challenging or hard, can often have very beneficial results.



Respect for the land is integral to good stewardship, as the ranch (or the ground underneath it) will be here long after we’re gone.

Photo from www.researchgate.net/publication/299852735_Brunswig_2016_The_Dent_Site_A_Late_Ice_Age_Encounter_on_the_South_Platte_River

Winter Watering

By Jason Kosovski

Although most people have turned in-ground sprinkler systems off by this time, there are a number of tools that can be used to ensure optimal watering. One option is a frog type sprinkler which sits above ground and can be moved to different areas around and under trees to make sure that enough water gets to the roots, which are alive even during the winter. Deep root fork and needles are also options – these devices are inserted into the ground and inject water below the surface, getting closer to tree roots. Experts suggest watering about once a month during the fall and winter.

“Winter watering is especially critical for newly planted evergreen and deciduous woody plants, which are the most susceptible to winter drought injury,” said James Klett, a professor in the Department of Horticulture and Landscape Architecture and Extension landscape horticulturist. “You should water only when air and soil temperature are above 40 degrees with no snow cover.”



[Winter Watering Trees and Shrubs—Watch Video!](#)

Winter Pasture Care

By Sharon Bokan, Boulder Extension, Small Acreage Agent

Just a quick reminder that you can graze your pastures if your grasses are dormant. You still need to maintain at least 4" of stubble through the winter. The stubble not only provides energy reserves for the grass plants but it also protects your soil from wind erosion. Remember to keep your animals off the pasture after a snow event until the pasture is not muddy or icy both to protect the grass crowns and keep your animals safe.

If you have bare areas that need reseeding, now is the time to seed. When we have days that the upper ½" of soils are not frozen, you can spread seed and lightly rake it in.

Taking care of your grass the way you take care of your animals will benefit both the grass and the animals.

Winter Livestock Care

By Sharon Bokan, Boulder Extension, Small Acreage Agent

Cold Temperatures and Deep Snow

Helping your livestock survive and thrive in winter weather starts with planning. Key considerations are: feed (livestock have increased nutritional needs in colder weather, and getting feed to the livestock may be challenging), protection, water, and choice of species and breed. Livestock with more hair will stay warmer than those with minimal hair (i.e. beef cattle versus dairy cattle). Consider breeds that originate from colder climates rather than tropical areas. Purchase your animals locally so that they will be adjusted to our climate and elevation. For poultry, choose those that have smaller combs and wattles to prevent freezing. You may also want to insulate their coop and keep a light on for heat on those subzero nights.

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Livestock species are designed to be able to live outside and survive most weather conditions. The Lowest Critical Environmental Temperature (LCT) is the temperature at which animals can maintain their main core body temperature without supplemental energy (feed). For most livestock, if they are dry, the LCT is 20 to 32° F. However, if they get wet, it goes up to 60° F. Both of these temperatures are without a wind chill factor. Another way to think about this is for every 2° F drop in wind chill temperature, livestock energy (feed) requirements go up 1%.

To help your livestock maintain good body condition in adverse weather, you need to do several things.

- Monitor your livestock for excessive shivering, lethargy and weakness. As animals begin to experience hypothermia, they increase their metabolism to generate more heat. Blood flow to the extremities is reduced. Ears and teats may experience frostbite. Rapid warming of the teats is

needed to minimize damage and monitoring for mastitis is required after calving. Some frostbite damage may not be reversible.

- Be sure to provide them plenty of forage to meet their added calorie requirement. Have your hay tested so that you know the nutritional value. Providing good, top quality hay is essential during the winter months. For horses, you can provide them some “comfort” food such as warm bran mash, moistened beet pulp or soaked pelleted feed to increase water intake and provide some warmth. You may need to increase the feed amount and the “nutrient density”. The more nutritionally dense (packed with nutrients) grains may need to be added to the diet.
- Water is critical to all living beings. Livestock daily water requirements range from 3 gal/day for sheep to 14 gal/day or more for cattle. They cannot meet their requirements from either forage or consuming snow or ice. Consuming snow or ice lowers body temperature making them more vulnerable to problems. **Continued on page 10.**



Photo credit : Dennis Lamm

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They need fresh, unfrozen and, if possible, slightly warmed water. They tend to drink less when water is cold so they can become dehydrated. You can use tank heaters to help keep stock tanks clear of ice and water slightly warmed (35 – 40°F). However, you need to check the heaters frequently to prevent fire and electrocution problems. Also have a backup generator in the event power fails.

Young and older animals are especially vulnerable during the cold. Providing them extra bedding, protection, and warm food and water is important. If you are lambing or calving during the cold, make sure that the mothers are in a well-protected building with plenty of bedding for warmth. Make sure that the young get dried off quickly after birth.

Livestock don't need a fully insulated, state-of-the-art, heated barn. In many cases, a three-sided structure (preferably with a roof), hill, clumps of trees, or a solid fence provides enough protection from cold winter winds. Reducing winter wind exposure is a must, so orient the building based on your winter prevailing winds. The structure, or area, must have plenty of dry bedding. Livestock can conserve 20 to 25% heat loss by lying down on dry bedding. The shelter needs to be sized to handle all the livestock that will be using it. Please refer to the Oregon State document link for square footage needed for each species. Wet, muddy, or no bedding can increase their vulnerability to cold temperatures. During a snowstorm or cold spring rain, a structure that provides not only wind protection but a roof to keep them dry is needed.

Remember that the LCT jumps drastically as they get wet. Protection desired will vary by species. Sheep don't mind getting wet but goats do so they will tend to seek shelter rather than graze in the open. Some species have thinner hides and hair and therefore get cold more easily. Dairy cattle will chill quicker than beef cattle since they tend to have less hair to insulate them. The coat condition is critical to providing insulation. The more hair the better as it allows for air space between the hairs to act as insulation. When their hair is wet or muddy, it becomes matted, limiting the insulating air spaces available. Manage mud in your dry lot area and

provide drier areas with bedding so animals can stay dry. Check your livestock going into the fall not only for general health and body condition but also for skin and hair health.

Deep Snow and Drifts

When storing hay, consider how you will get it to your livestock in winter. You don't want to lug 50 - 80 pound bales through one foot or more of snow. You may want to store several days' worth in the stable or barn or wherever your livestock will be kept during major winter storms. Consider how you will get from your house to the barn in case of a large snow fall or snow drifts. Consider a windbreak or fence that will provide you with a path to the livestock. Also consider a fence or windbreak around their shelter and water tanks. If you can, build feedlots, shelters and other buildings on south facing slopes and other protected areas where temperatures are higher and moisture is lower or melts off quicker. If your livestock is a considerable distance from the house, have equipment ready to plow a path to the area and for the livestock to be able to move around. With deep snows, fencing may be covered so that animals can walk over or through it. Keep your fencing in good condition and check for areas that might allow animals to escape.

Livestock can survive several days without feed but must have access to water. When reintroducing feed, provide livestock smaller portions several times a day. There can be some potential for nitrate poisoning if your feed is high in nitrates and your livestock has not been fed for several days. It is always a good idea to have your hay tested but especially for winter feed. Also make sure that they have sufficient salt and mineral blocks.

Resources:

The Effects of Cold Stress on Cattle, WVU Extension, http://anr.ext.wvu.edu/livestock/cattle/cold_stress

Winter Livestock Care, Oregon State University, <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19671/ec1635.pdf>

Management and feeding of Horses in Cold Weather, Ontario, www.omafra.gov.on.ca/english/livestock/horses/facts/info-coldweather-man.htm

Livestock Management in the Mountains, CSU Extension, www.ext.colostate.edu/sam/livestock.pdf

Colorado Small Acreage Services Database

The source for landowners to find contractors, equipment, and services

[http://
sam.ext.colostate.edu](http://sam.ext.colostate.edu)



Need help with weed control?

Have a small pasture seeding project?

Search the site today to find a local contractor!



This is a free service brought to you by USDA-NRCS, CSU Extension, and your local conservation district



For a list of upcoming events in your area visit CSU Extension Small Acreage

Management website

www.ext.colostate.edu/sam/

Do you have a question about managing your small acreage?

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