

Four

Rethinking Our Livestock Focus

For several years after the disaster years, I continued to focus on animal performance in the management of our cattle herd. But as the years went by, I started to realize that some of my livestock management practices could be made more holistic, too. Because I had been focusing on animal performance, the mature size of our cows had grown ridiculously large. By 2007, they averaged over 1,400 pounds! It was costing way too much money to feed those animals. I noticed that the few small mature cows we had left were always in good condition and they always bred back. Observing this led me to an important change in my thinking (which, as I've already pointed out, is more important than the "doing"): The size of our cows no longer matched the environment. They were too big! For twenty-six years I had been raising and selling registered bulls. I touted *numbers*—weaning weights, yearling weights, or EPDs. I came to the realization that those numbers were basically meaningless when it came to determining profitability. What mattered was having cows that could convert forages to meat on my operation. The focus of the production model I was using—on continually increasing pounds—had led us down the wrong path. We needed to focus on *profit per acre*, not pounds of animal produced.

We began to select bulls and replacement heifers born from smaller cows that had been in the herd for at least four years. We started

Thoughts on the Registered Cattle Business

For well over twenty years, I registered my cattle. A registered animal must meet several criteria. These criteria vary a bit from one breed association to another but generally they include:

- The animal must have a permanent tattoo for identification.
- The animal's sire and dam must both be registered.
- Birth weights, weaning weights, and yearling weights must be taken and reported to the appropriate breed association.
- The breed associations collect the data and use them to develop expected progeny differences (EPDs). EPDs are a projection of how an individual and his or her offspring will perform. EPDs are developed for birth weights, weaning weights, yearling weights, calving ease, milking ability, carcass traits, and many other characteristics.

breeding this herd to bulls with smaller frame scores. This helped us bring the frame size down and move our herd toward the type of cattle that could graze longer throughout the year and required less “groceries” to keep them going. Reading Walt Davis's book *How to Not Go Broke Ranching* and Chip Hines's book *How Did We Get It So Wrong* taught me a lot about the fallacies of the traditional beef production model. I just wish I had read their books early in my ranching career.

Along with the downsizing of mature cow size came other changes in management. I have never butchered a beef animal

In college I was taught that in order to “improve” my cattle it was beneficial for me to buy and use only registered bulls. There is no doubt that by registering cattle and studying EPD’s one can focus on improving individual animal traits. The problem is that the livestock industry has focused solely on the traits of individual animal performance. This has led to larger and larger mature cattle size, which, although usually good for feedlots and packers, leads to cow and calf producers having a cowherd whose mature size is too large for their environment. This leads to decreased profitability.

For over twenty years, I followed that mantra: Use only registered bulls. I spent tens of thousands of dollars registering cattle and selling my stock to cow/calf producers. Today, looking back, I realize how foolish I was. I have learned that I wasn’t really improving the bottom line for my customers. Smaller mature cows allow an operator to run more animals on a given acreage, compared to larger cows, which means smaller cows will always give a higher net return per acre.

and found a gizzard inside. So I asked myself, *Why am I feeding these animals grain?* That is not how ruminants evolved. We were already raising some grass-finished beef for our own consumption, due to the health benefits of eating grass-fed meat, so why feed the remainder of our herd grain? This realization led to a major change in our business. Our February 2009 bull sale was our last. Our customers were puzzled when we informed them that we were getting out of the bull business. They did not understand that it did not meet our holistic goals, one of which was farming and ranching in nature’s image.

We also decided to stop using wormers, fly-tags, and the long list of vaccines. These products were Band-aids treating symptoms. They were not solving the real problem, which was a dysfunctional ecosystem. That summer we waited until July to turn out the bulls with the cows, so that the cows would calve in April instead of the extremely cold weather of February and March. Instead of maintaining six separate herds, we reduced to three (each with multiple bulls), and we shortened the breeding season to sixty days. We also started moving the herds more frequently, thanks to our newly built grazing system. This allowed us to run higher stock densities while allowing longer recovery periods.

In 2010, we pushed our breeding season back even further; we waited until the first week of August to turn out the bulls. The cows were exposed to the bulls for only forty-five days. We combined all the animals into one herd, which allowed us to address our resource concerns even further.

When the 2011 calving season arrived, I knew we were finally in sync with nature. We were calving during the time of year when the deer were having their fawns. By changing our calving date, we no longer had to worry about blizzards, mud, ice, sick calves, dirty udders, frozen ears, confinement, stressed cattle, stressed people, bedding corrals, babysitting first-calf heifers, and bragging about how hard we work. The cows calved in a nice, clean environment on a high level of nutrition and the calves were very healthy. Making these changes were some of the best management decisions we have ever made on our ranch.

Allowing a Cow to Be a Cow

Our calving management schedule continues to serve us well. During calving, Paul moves the cows daily. Any newborn bull calves are banded (castrated) at birth, except for bulls born to an old cow who has a good udder, feet, and legs and is easy fleshing. Those calves are

left to mature as bulls for use in our own herd. What better place to find bulls for our operation than from our own operation? We have found this is an excellent way to build an efficient, profitable cowherd.

During the winter months of December, January, and February, we prefer to graze the cow/calf pairs on cover crops. My cover crops of choice for this are: brown mid-rib sorghum/sudangrass, along with hairy vetch (which will still be around 18 percent crude protein in winter), kale, and collards or some other forage brassica. The remaining forage comprises species that address whatever resource concerns I have at the time. Annual ryegrass makes for good late-fall and winter grazing, as does hairy vetch. For more about what I feed the animals, see *Managing with Flexibility* on page 69.

Once the cover crop freezes and winter sets in, we do not move the cow/calf pairs daily. Yes, we would get better utilization if we did, but because I travel to speaking engagements from October through March, there is less on-farm labor available. When managing the ranch on his own, Paul does not have time to move the animals more than every few days. It's not a perfect world! And remember, part of regenerative agriculture is regenerating our own minds and bodies. So don't be afraid to take a break and ease your workload a bit.

I am often asked what type of fencing we use when we graze cropland. We have taken the time and expense to put permanent high-tensile electric fence around the perimeter of all of our owned and rented properties. This allows us the security of a permanent fence and the ability to transfer power to temporary fences used on the cropland.

We have shallow water pipelines buried throughout our ranch, as described in chapter 2. Risers were plumbed in at various locations, allowing easy access to water. We set a rubber tire tank near the riser, hook up a garden hose and a float, and we have water. We prefer to put the risers near the middle of the field, not on the edge, because this allows us to graze first one direction from the tank and then the other.

Starting near a water tank, we string a polywire through tread-in ring top posts across the field, connecting it to the permanent

high-tensile fence. We leave this polywire in place. We set up another temporary fence at an appropriate distance to provide the livestock one days' worth of grazing, allowing them access to the water. Within that temporary fence is the first paddock grazed. After the livestock have grazed to the desired amount, we string another fence to provide one day's worth of grazing, further away from the tank. We then roll up the previous days' fence, allowing access to the new forage. And so it goes, until we reach the end of the field. The cattle must walk back over ground they have previously grazed to reach water. But because we use high stock densities, it is only a matter of days before we finish grazing that half of the field, so there's never a problem of soil being beaten bare by animal traffic to the water tank.

Once we reach the end of the field, we proceed to make paddocks in the opposite direction from the water tank. We set up a back fence so the cattle don't walk back over the half of the field that was previously grazed.

What about rainfall events? Do I take the cattle off the cropland? No, I do not. They have to be kept somewhere, and I would rather have them continue on the diet they are on, rather than moving them to a perennial pasture and changing rations. Does keeping the animals on wet ground cause much damage to the cropland? No, it doesn't on my land. During heavy rainfall events, some pugging may occur, but after a year or two it tends to smooth back out. In heavy clay soils, of course, pugging may be more extensive. My advice is: Whatever happens, don't get discouraged and resort to using a tillage implement. Just relax and observe. Nature will take care of it. In the grand scheme of things, a small amount of pugged acreage is not going to break you.

A More Natural Way of Weaning

One important point about our management is that we do not wean our calves in the fall. The heifer calves need to learn how to become

Epigenetics

Epigenetics is the study of heritable changes in gene function that do not involve changes to the DNA sequence. It is the study of biological mechanisms that will “switch” genes on and off. For instance, what an animal—or a human, for that matter—eats, where it lives, how it is handled, what stresses it encounters in life, and how it ages are all factors that can cause chemical modifications at a cellular level that can, over time, turn genes in those cells on or off.

Hence, many experiences that an animal has during its lifetime may have consequences for future generations. This is one of the reasons why we leave the calves with the cows outdoors on pasture all winter. It is our belief that, by consuming lower-quality forages, those calves will develop the capacity to thrive on lower-quality forages throughout their lives. The fact that our cows are feeding on lower-quality forage while their calves are in utero also contributes to the calves’ ability to adapt. Taking advantage of this epigenetic phenomenon significantly improves the potential for our animals to return us a profit.

cows that can thrive in our environment. As the calves graze alongside their mothers all winter, they learn which plants to eat and which to avoid. They also learn from their mothers how to tell if a storm is approaching and how to trail back to the farmyard for protection. They learn how to use snow as their water source. (We do allow them to access water from a winter water supply in the

farmyard, but most of our cows will not travel for water as long as snow is available.)

In early April, we fence-line wean the calves. This is a simple process of splitting the calves away from their mothers and keeping them apart with an electric fence separating them. The calves can see the cows, they can even touch noses, but the fence prevents them from nursing. The calf is content, the cow is content, life is good. We set up this arrangement in a way that requires the cows to walk a distance away from the fence in order to graze. After one or two trips back to check their calf, they get tired of walking and just stay out grazing. Four or five days later, we move the calves out to a paddock where we stockpiled forage during the previous growing season. The calves are used to grazing this type of forage, and they take right off. We find that the calves stay healthy using this strategy. Weaned calves, the easy way!

The calves graze on perennial pastures and are moved once a day until early August. At that time, we separate the steers from the heifers, and the heifers are exposed to bulls for thirty days. After thirty days, the bulls are pulled, and the steers are put back with the heifers. This allows us to graze at higher stock density and also lessens the workload. People often ask why we don't run all of the cattle—cows, calves, and yearlings—together. From an ecological perspective it would be better to do so, but due to the fact that our land is not contiguous, it would be too time consuming and laborious to load them all up into trailers and move them several times during the growing season.

In early December we determine if the heifers are pregnant through ultrasound. Those that are pregnant are grouped with the mature cows. Those that are not go on to be grass-finished. We do not check the mature cows for pregnancy. What advantage would it serve? Even if some cows were not pregnant, we would not choose to cull them at that time, because then we would have to take care of the weaned calves. Extra work like that is not what we are looking for. Instead, we run all the cows, open or not, with their calves on

them throughout the winter. After weaning time, the cows graze on fresh new grass growth. They flesh up well, and any open cows really get fat. In late June we set up some portable panels in the pasture and pull any cow that does not have a calf nursing on her. She was open or she lost a calf at birth, but either way, it's a sign that we should not keep her in the herd. Those cows are hog fat, and when is the hamburger market booming? Right around the Fourth of July, of course! We save the expense of pregnancy testing, and we have excellent hamburger meat to market at a more lucrative time of the year instead of selling open cows in December when prices are low.

We never give open animals a second chance. They are sold, period. We select for animals that can perform in our environment, which helps to ensure profitability.

We like to keep our cowherd constant at around three hundred head. Yearlings are the variable. I like to think of them as our drought insurance policy. We run more yearlings in good forage years and fewer in years of lower forage production, ensuring that we keep our grasslands healthy. We are also able to maintain our cowherd in years of lower forage production. Because of this, yearling numbers vary between two hundred and four hundred head. In addition, we grass-finish between one hundred fifty and three hundred head per year.

Managing with Flexibility

We practice what is known as Holistic Planned Grazing (HPG). I want to emphasize several key points on HPG grazing:

- It is goal-orientated.
- It is predicated on stock density, not stocking rate.
- It is not a rigid system or prescription.
- It allows the practitioner to adjust to conditions.
- It is dependent on frequency of moves and frequency of rest.

- It allows for complete plant root system recovery between grazings.
- It allows the practitioner to work with nature, not against it.
- It allows livestock to be used as a soil-building tool.
- Observation by the practitioner is critical to its success.

These, along with the five principles of a healthy soil ecosystem (which I discuss in detail in chapter 7), are key to developing healthy grazing lands.

We typically allow the cattle to consume 30–40 percent of the aboveground biomass. Note that if 50 percent of the aboveground biomass is removed, root growth is not affected. However, if 60 percent is removed, root growth is *cut in half!* This is a very important fact that all graziers need to be aware of. The cattle trample some of the remaining sward, but this varies year to year and livestock class to livestock class. On average, we move the three-hundred-head cowherd once a day during growing season and the yearling herd (between two hundred and four hundred head) anywhere from one to seven times a day. This may sound like a lot of work, but as in any situation, the human mind can make it as easy or complex as it wants. We chose the easy way. The majority of our permanent pastures are 15–40 acres in size. Once a day, a portable fence is set up to divide these pastures even further. These temporary paddocks range in size from one acre to several acres to give us the stock density we desire. We vary stock densities from 50,000 pounds per acre to 700,000 pounds per acre. (To see what this looks like in practice, see plate 12 on page 6.) For those times when we want to move the cattle more than once a day, we use solar-powered automatic gate openers, like Neil Dennis does. We preset a time into each of the gate openers, and the cattle move themselves into the next temporary paddock throughout the day. Talk about stress-free for both the cattle and us!

It is important to note that we do not always move the cattle at this frequency. Whenever we want to take a vacation or some time

off, we simply allow them a larger paddock, and we leave them there for a longer time period. This allows us the quality of life we desire.

Most producers allow livestock to graze on cropland only *after* a cash crop has been harvested. I knew that we could advance soil health faster, though, if we made the cover crop our cash crop by harvesting it with livestock *during* the growing season. We do this with different classes of animals at different times of the year, all depending on what our resource concerns are.

I can give you several examples. As I mentioned earlier, I like to grow cereal rye and hairy vetch for their soil-health benefits. They also provide very good forage for livestock early in the spring. Virtually any class or species of livestock will gain weight well while grazing this cover crop. You can also use it to add a thick mat of armor on the soil, which is one of the key principles of soil health. To do so, allow the rye/vetch mix to grow and let the rye mature enough that it starts to produce pollen. Then turn in high stock densities of beef cattle. I prefer to use yearling heifers. The rye is too mature to be high-quality feed, but that is OK. We are not trying to fatten up heifers. They will not relish the rye, but they will eat it and gain a little weight. We allow the heifers to eat only about 25 percent of the aboveground biomass. The remainder is trampled. It usually takes stock densities above 500,000 pounds per acre to get the desired trample effect.

When I use the previously mentioned protocol, I immediately seed another cover crop into that field. I do not use any herbicide when I do this. Usually the allelopathic effect of the rye and the armor it provides are sufficient to inhibit weed growth. On my farm, the two best cover crops for weed prevention in the following crop are cereal rye and sorghum/sudangrass. If there is a nice layer of residue from either of these species on a field, we rarely need to use an herbicide in the subsequent cash crop.

So, what cover crop do I follow the rye and vetch with to graze? That depends, of course, on my resource concern. I need to take into consideration the fact that it will be growing during the hottest time of the year, so the species used must tolerate some heat. Usually, I

seed either a cover crop suitable for grazing grass-finishing animals or a cover crop for winter grazing. If I am grazing finishers, I like a mix that is 60–70 percent brown mid-rib sorghum/sudangrass. This is a highly digestible, high-energy warm-season grass. Livestock will select for energy first unless they are deficient in a particular nutrient.

To this I add pearl millet along with cowpeas, mung beans, or soybeans as legumes, a forage brassica such as kale, and at least one flowering species such as buckwheat. I want seven or eight species at minimum, if possible, to take advantage of the synergies in a diverse planting.

We found these annual warm-season cover crop mixes to be an almost ideal ration for the final stages of grass-finishing beef animals. We allow the sorghum/sudangrass mix to reach a height of at least three feet and then graze at densities of around 100,000 to 200,000 pounds of live weight per acre. That is not very high density, and it allows the animals to be more selective. We want them to put on weight.

We usually move them only once or twice each day, and that is more a labor issue than anything else. We move the animals in the afternoon. Why? When will the plant have the highest energy content? In the afternoon, of course, when it is intercepting the most sunlight. Animals select for energy. The animals will strip the leaves off the stalks of the sorghum/sudangrass mix and then take a few bites off the legumes and brassicas. It is not uncommon for us to average 3–4 pounds per day gain on the finishers, which leads to a large amount of intramuscular fat—good fat: high in omega 3, conjugated linoleic acid, and all of the other nutrients that make grass-finished beef so desirable.

Due to the fact that the finishers consume mainly leaves from each plant, the plants will continue to grow as long as it is prior to a frost. As they grow, more carbon is pumped into the soil. Remember, carbon is the key!

What about turnips and radishes? I plant daikon radish to address compaction concerns and to scavenge nitrogen, but not

for grazing. They just do not offer much. By the way, if you plant daikon radish before the longest day of the year, the young plants will quickly bolt and go to seed. If you plant them as the day length is declining, they will, with adequate conditions, grow the large tubers they are known for. Turnips are slightly better for grazing than radishes are, but not nearly as good as the forage brassicas—kale or collards.

As you'll recall from the beginning of this chapter, I do not use any fertilizer on any of my crops. My soils are healthy enough to cycle the nutrients the crops need. If your soils are used to synthetics, though, you may need to fertilize your cover crops. I strongly encourage you to cut back on the rate, though. Start healing your soils!

Many people ask whether my animals suffer any problems due to nitrates, bloat, and prussic acid. I can honestly say that we have never lost or treated an animal due to any of these. I can't guarantee that your animals will not have problems, though. I feel our excellent soil health and cropping practices are what helps prevent problems. Bloat is not an issue because of the diversity of the crop mix. Nitrates are not an issue because we have not used synthetic fertilizer for a long time.

People often ask me for a precise "recipe" for a cover crop mix. I purposely do not offer such recipes because what works on my operation may not work on yours. I can share the principles I follow, but you must experiment and find out which species work well in your soils and environment. (I cover the principles and practices of cover cropping that I follow in more detail in chapter 8.)

Since we incorporated Holistic Planned Grazing, the flexibility and options that we have in relation to when and where to move the livestock has greatly increased. We rely on this flexibility for fly and parasite control, which is critical since we no longer use insecticides. They aren't necessary, because we break the fly cycle by moving the cattle away from their manure, which, of course, is where flies lay their eggs. We have also seen a large increase in dung beetle and other insect predator populations. It took two years after we stopped

using the insecticides before we saw a dung beetle. Today, Paul has documented seventeen species on our land! Other types of wildlife, such as cowbirds, tree swallows, dragonflies, and a myriad of other predators, keep pests in check. We also run Katahdin/Dorper hair sheep, which act as a dead host for parasites specific to cattle (more about the sheep in *Every Ranch Needs Some Sheep* on page 87). Nature has this figured out; we just have to be smart enough to take advantage of it!

Another of the many benefits of HPG is that it allows us to use the cattle to control noxious weeds. For example, we rented grazing land that had been in the USDA's Conservation Reserve Program for more than twenty years and was primarily composed of smooth brome grass, a small amount of alfalfa, and a large extent of noxious weeds. We weren't worried at all. At higher stock densities, cattle behavior changes, and they will readily consume less desirable species such as Canada thistle. We have been able to greatly reduce the infestations of noxious and exotic weeds while at the same time increase the diversity and health of other grasses and forbs. Along with Canada thistle, our cattle tolerate grazing on absinth wormwood and even leafy spurge.

Putting It All Together

So, what are the results of my management? Am I truly regenerating soils? Where has all of this taken our ranch?

To demonstrate my belief in the power of regenerative agriculture, I decided to try and quantify the differences that regenerative management has made on our ranch. And fortunately, one of the benefits of traveling around the world to give presentations on regenerative agriculture is that I get to meet a lot of scientists and researchers. Through these connections, we put together a demonstration to study the effects of our management practices and compare them to other styles of farm management.

Four farms were selected, of which ours was one. These four farms had the same soil types and were in close proximity (in order to mitigate weather variables). Here is a brief explanation of the management of each farm.

Farm 1: Diverse Cash Grain Operation

This is a diverse cash grain operation that relies on tillage to prepare the soil for seeding and weed control. Tillage is also used during the growing season to cultivate row crops. Spring wheat, barley, oats, flax, soybeans, dry edible beans, and sunflowers are all grown. Cover crops such as sweetclover are grown and then plowed under in order to provide nutrients to the following cash crop. Natural sources of soil amendments are used. No synthetic fertilizers, pesticides, herbicides, or fungicides are used. This producer does not have any livestock.

Farm 2: Minimum Tillage Operation

This producer uses minimum tillage to grow primarily flax and spring wheat. Once in a great while sunflowers are grown. An air seeder with points is used to apply anhydrous ammonia at seeding. No other form of synthetic fertilizer is applied. Herbicides, pesticides, and fungicides are used when needed. No livestock are owned or integrated.

Farm 3: Medium-Diversity, No-Till Operation

This operation has practiced no-till for many years and has medium diversity in their crop rotation, which includes corn, sunflowers, malting barley, soybeans, and spring wheat. Large quantities of synthetic fertilizers, herbicides, pesticides, and fungicides are used to maximize yields. No livestock are owned or integrated.

Farm 4: Brown's Ranch

The fourth operation is mine. The operation is no-till, with high cash crop and cover crop diversity, and no synthetic fertilizer, fungicides, or pesticides are applied. Livestock are integrated onto the cropland.

Soil samples and water infiltration tests were taken on the same day on each farm. Dr. Rick Haney tested the samples at the USDA Agricultural Research Service Grassland Soil and Water Research Laboratory in Temple, Texas. The results of those tests are presented in table 4.1. Water extractable organic carbon (WEOC) is the food that soil biology eats. Think of it this way: Organic matter is the house that biology lives in, and WEOC is the refrigerator in that house.

As you look at the test results, what stands out? The first thing you'll probably notice is that Farm 4 (Brown's Ranch) has higher soil nutrient levels and a more favorable organic matter level, carbon content, and water infiltration rate than the other farms. But it's also significant to notice how little difference in values there are between the other three operations.

Several key points are supported by the results of this demonstration:

- Tillage is detrimental to all aspects of soil health.
- Low diversity is detrimental to soil health.
- High use of synthetics is detrimental to soil health.
- Livestock integration has a positive impact on soil health.

These data show how crucial it is to manage our farms and ranches as ecosystems. This is absolutely key to healing our families, our farms, our communities, and our planet!

Table 4.1. Soil Test Results for Comparative Farm Study

Operation	N (pound)	P (pound)	K (pound)	WEOC (ppm)	OM (percent)	INFIL (inches per hour)
Farm 1	2	156	95	233	1.7	0.5
Farm 2	27	244	136	239	1.7	0.7
Farm 3	37	217	199	262	1.5	0.45
Farm 4	281	1006	1749	1095	6.9	30.0+

N = Nitrogen; P = Phosphorus; K = Potassium; WEOC = Water Extractable Organic Carbon; OM = Organic Matter; INFIL = Infiltration Rate

I learned the importance of this from the late Jerry Brunetti. In his landmark book, *The Farm as Ecosystem*, Jerry eloquently explained the importance of managing one's farm or ranch as an ecosystem. I am forever grateful to him for what he taught me, especially about how to observe nature. Let nature teach you, through plants, animals, and the soil.