

Twodot Land and Livestock—

Pushing Limits on the Northern Plains

I first met Zachary Jones last summer. He was a participant in HMI's Ranch and Rangeland (R&R) Manager Training Program, and we hosted his class's final session up at our summer camp here in the mountains of western Colorado. Just prior to the session, I read about Zachary and his family's ranch, Twodot Land and Livestock, in an article about "mob grazing". That article made Zachary sound awfully smart, and I figured I better meet this guy. Prior to his arrival at our camp, I didn't know he was enrolled in the R&R program, so when he stepped out of his little white car, all smiles and full of energy, and said he was "Zachary Jones from central Montana," I was pleasantly surprised.

We had a great week of training, and I had the chance to begin to get to know Zach, and to pick his brain about their Northern Plains grazing operation. Zach is an ambitious, savvy young rancher in his late 20s. He's married to equally sharp Shannon Agee (now Agee-Jones). They met as track and field student/athletes at Montana State University in Bozeman. Shannon was an All-American pole vaulter and Zach was a conference champion hammer-thrower. Zach grew up on his family's 24,000 acres (9,700 ha) of beautiful rolling prairie, near the little town of Harlowton, and Shannon was raised in the more urban, but still distinctly western town of Helena—Montana's capital.

As part of the R&R program, Zach also had the chance to spend time on Tony and Andrea Malmberg's Twin Creek Ranch, near Lander, WY. Daniela and I and Tony and Andrea formed a management club several years ago. We all appreciated Zachary's enthusiasm, intellect, curiosity, and sense of humor. The management club had been a valuable experience for us and the Malmbergs, and we invited Zach and Shannon to join a meeting to see if we all "fit" together, which we did last October. It was a great experience—hopefully the first of many.

Zach and Shannon are complex, interesting, spiritual souls. Shannon is a yoga teacher, accomplished artist, and student of Kahlil Gibran, the famous Lebanese poet, philosopher, and artist. Zach is a gifted wood and metal worker and welder, and creates beautiful handmade furniture. He also reads prodigiously, and freely quotes Ayn Rand, the Russian-born founder of the Objectivist philosophy, and author of *Atlas Shrugged* and *The Fountainhead*. That might sound like an odd combination, but as manifested in Zach and Shannon, it's the perfect mix.

In January of this year, I made a trip to visit a few of my consulting clients around the West. Two Dot Land and Livestock happened to lie right on my path, so I pulled in to visit with Zach and Shannon for a few days, meet more of the Jones bunch, and to see their amazing property for the first time. We covered lots of country, both literally and figuratively, and even got a little work done. Here's their story.

The Fourth Generation

Zach's great, great grandfather, E.C. Baxter, was from Addison, NY, and in 1893 came west to join his brother, Dr. Portus Baxter, who was a physician at the Crow (Native American tribe) Agency. He and the family eventually moved to the town of Two Dot. Two Dot is now nearly non-existent, but in the early 1900s was the main hub of commerce in this part of Montana. E.C. and some partners ventured into the banking

business, and eventually branched into ranching, pooling small, struggling homesteads into more viable economic units. E.C. eventually bought out his partners and incorporated his holdings under the name of Twodot Land and Livestock. In 1908 the present ranch was purchased, marking this year as the ranch's 100th anniversary.

E.C. Bob Baxter, E.C.'s son, made two attempts to marry and pass on his fortunes, but both fiancés tragically met their ends prior to reaching their wedding days—one to an appendicitis attack and one to a flash flood. E.C.'s neice, Bob's sister Francis, had better luck, and latched onto William Jones, from Harlowton, MT. William and Francis spent many summers on the family's Montana ranch, and their son, Warren "Buck" Jones (Zach's grandfather), grew to love the place. After graduating from Dartmouth, Warren married Mary (also known as Scotty, new little Scotland's namesake), fought in World War II, and moved to the ranch at age 25 in 1945.

Scotty's father, Claude Parsons, was an oilman from Oklahoma. He worked for Howard Hughes in the oil industry, retired early, and moved to Los Angeles to pursue a career in art. Scotty spent two summers bicycling through Europe and graduated from Vassar with a degree in French. In 1945, when she and Warren made the move to the ranch, she was confronted with a tiny house on the immense prairie, heated by a woodstove, with no indoor plumbing. After raising a family, Scotty went back to school, earned a degree in Education, and retired in the 1980s. Zach describes her as an amazing, versatile woman, and at age 87, continues in her role as the wise, adaptable, resilient, cultured matriarch of the Jones Clan.

In addition to running the ranch, Warren served on several boards, was a director of Montana Power Co., and eventually earned a spot on the Minneapolis Federal Reserve Board. He became acquainted with many famous figures of the late 20th century, including Paul Volcker, Sandra Day O'Connor, Bob Bennett, and Lou Gerstner, some of whom were regular visitors to the ranch.

Warren and Scotty brought three new Jones babies into the world, including brothers Bill (Zach's father) and Bob (Zach's uncle), who both grew up on the ranch and made it their livelihoods. Their sister Pamela is an international executive residing in Hong Kong. In 1993, Bill and Bob decided to split the ranch equally, with each receiving roughly 12,000 acres (4,850 ha). This was a management split—not technically an ownership split, and was the structure under which Zach labored throughout his teen years.

Making Way for the Fourth Generation

When Zach and Shannon finished at Montana State in 2002 (Shannon with a degree in English Literature, and Zachary receiving the 2002 Scholar/Athlete of the Year Award despite not completing a degree), they followed their hearts and their heritage and took over the reins of Bill's side of the ranch. They are both passionate about producing healthy, abundant food (I found out they're both highly skilled at cooking it also) in an ecologically regenerative way. Father Bill actually served on one of HMI's first board of directors, and is innovative in his own right—no doubt a big reason Zach turned out like he did.

To Bill's credit, he has stepped back and allowed Zach to make significant changes. He's quit making hay and sold almost all of the ranch's machinery and equipment. Historically, the ranch has been in the cow/calf business, and on Bill's 12,000

acres (4,800 ha), there were always three or four herds (of 200 head each) moving through the ranch's 30 pastures, and a significant portion of the ranch was designated for haymaking (some for their own use, some sold). Zach is properly focused on maximizing solar energy harvest via a low cost production model, and realizes that minimal herd numbers and maximum herd sizes are critical to achieving this aim. To that end, he's stepped up the intensity of grazing management significantly.

Understanding the need for high stock densities, well-distributed grazing and animal impact, maximum graze/trample to recovery ratios, and optimal capture of solar energy, Zach didn't skimp on water development. He priced out a three-inch (76-mm) pipeline at \$1.85/foot (\$6.07/m). This would permit gravity delivery of 55 gallons (about 220 liters) per minute straight to the trough—enough to water a good size herd without the need for massive storage capacity at each water point. But, since the trench had to be dug no matter what, Zach was curious what a four-inch (102-mm) line could do. For \$2.30/foot (\$7.54/m), or another \$.45/foot (\$1.48/m), a four-inch line would deliver 120 gallons/minute (480 liters)! For Zach, that was a no-brainer, and in went the four-inch line. As Zach explains, "The conventional ag community rarely even ponders three-inch lines for livestock. Four-inch lines, for some reason, seemed off limits, in the 'other industries' realm. Ha!!! Four inches is right at home on our range."

In 2006, Zach pastured a fairly conventional four herds—three groups of yearlings (750 head, 440 head, and 500 head), plus a herd of 400 cows. This was a big improvement over the old days, especially since total pasture numbers had now increased to 70 (as a result of adding new pastures, and incorporating previously hayed pastures into the grazing plan) and the herds were larger, greatly increasing stock density and all its associated benefits. But, the water system still hadn't been tested, and last year Zach made a big jump. He combined all the yearlings into one big mob of 1,550. This herd was on Zach's 12,000 acres all summer (mid-May to mid-September), as well as a year round herd of 500 cows. Last year, Zach and his cousin Adam (Bob's son) also began to collaborate on managing the whole ranch together, and a second yearling herd of 1,100 grazed in a cell that incorporated pastures on both sides of the Bill/Bob divide.

The 1,550-head herd of yearlings was "a breeze to manage"—according to Zach, "easier than 200 head." There were no health problems, water problems, or moving problems. The troughs on this four-inch line are 30 feet (9 m) in diameter, and at the peak heat of the day, there were seldom over 20 head watering at a given time, and at no time were the troughs drawn down more than six inches (15 cm). At that point of maximum drawdown, Zach calculated that the water was flowing into the trough at a rate of 90 gallons/minute (360 liters), so even with 1,550 head watering at the same water point, the float valve still didn't get the chance to open up all the way. So, they still haven't really tested the water system.

Dream Big

And, this topic of herd numbers got us to dreaming. What's really possible out there on that prairie? On the current water system, Zach figures that one herd of 3,000 yearlings is highly doable. They were planning to do that this coming summer, but have ended up booking in (on a custom grazing basis) 1,700 steers and 1,400 heifers, which will be managed in two separate herds. The cattle owners are receptive to large herds, but

Zach tested the jump to 3,000 and opted to moderate. Building confidence with the stock owners will allow the herd to grow exponentially.

But Zach wanted to look down the road, beyond the current year, and asked me to facilitate a session developing a “new” land plan. Our assumption was that the ranch—the entire 24,000 acres—would now be managed as one unit, and that we’d limit herd numbers to a grand total of one (as in *One Giant Herd*). Could it be done? Zach and Adam are well on their way to getting the ranch tied back together (with the full support of their fathers and other family members—way to go, guys), so that barrier looks like it’ll be breached.

So, if that’s the scenario, and the ranch’s critters are migrating across the landscape in one big mass of bovines, how big could that herd be? First, we had to come up with how many total stock days (SD) the ranch could produce in a given year. Zach had done his homework and had already laid out a bunch of scenarios, but here’s the crux of what he figured. On Zach’s 12,000 acres, he’s averaging an annual harvest of 36.5 SDA (stock days per acre) or 90 SDH (stock days per hectare). When I visited in January, even after producing and harvesting this volume of forage, there was still a lot of country that looked like it had hardly been touched. This is just 13-inch (330-mm) rainfall country, but the northern plains tend to receive the bulk of their moisture right when they need it, in high spring—April, May, and June. Thirteen inches of rain can grow a lot of grass if it comes right, and in central Montana, it usually does.

On my way up to Two Dot, I drove through Colorado and central Wyoming, then up through Billings, Montana and west along the Yellowstone River, and then a little ways north to Zach and Shannon’s. That’s a long drive, and I saw millions of acres along the way. The best-looking patch of ground I saw—and this is no exaggeration—was the Two Dot pasture I drove through between the highway and the ranch headquarters, and it was teeming with white-tail deer. Again, this was the middle of winter, after the vast majority of cattle had come and gone, and it still looked good. What’s my point?

My point is that 36.5 SDA (90 SDH) is most likely a conservative figure. If we extrapolate that level of harvest across the whole ranch’s surface area (all 24,000 acres, or 9,700 ha), that works out to a total production of 876,000 SD.

So, we now had to look at various livestock production models. This grass can be harvested when it’s at its highest quality, from May to September (in a typical year, the vast majority of the annual feed supply grows during May, June, and July), or it can be very lightly grazed during the growing season and shunted into the winter (which typically stay open and grazeable)—or some combination of these two extremes. For the past few years, the ranch has followed this mixed enterprise approach, maintaining a year round base herd of 800 mother cows, and stocking up with several thousand yearlings in the summer. Concentrating forage harvest over four months means lots more critters and a much bigger herd than grazing year round. So before we could go any farther with our land planning (which all hinges around maximum possible herd size), we had to have this answer.

What’s a Stock Day Worth?

In evaluating the various options, we started with analyzing gross profits, and decided to bring everything back to a common denominator—the elegant, simple, standard stock unit day—which for Twodot represents 30 pounds (13.6 kg) of forage dry

matter. “What is that 30 lb. (13.6 kg) worth,” we asked, “when nourishing different classes of livestock, in terms of gross profit/SD?” We looked at custom grazed yearlings; owned yearlings; owned heifers put to the bull and sold as bred replacement heifers; conventional cow/calf, selling weaned calves in the fall; cow/calf, retaining all calves and selling as yearlings; and cow/calf, retaining all calves and running till range- finished at two-plus years.

Every ranch’s resource base is unique, of course, so the following isn’t a recipe. The Twodot prairie is dominated by very high quality cool season perennial grasses. It can reliably pack on 250 pounds (114 kg) of gain over a spring and summer growing season. Sourcing big numbers of yearlings (to either buy or custom graze) is very doable in the Northern Plains—this is still big, open ranching country with lots of cattle. Each pound of gain is worth at least \$.35 (\$.77/kg) in that part of the country (with custom grazing), so if these yearlings are gaining two pounds (.9 kg) per day, the total value of that stock day (each yearling stock day is the equivalent of .8 standard stock days) is worth \$.88 (2 lb. @ \$.35/lb divided by .8). In other words, when put through a yearling animal, each 30 lb. packet of prairie grass is worth \$.86 return to overhead (gross profit after enterprise expenses of \$.02/SD).

Owned yearlings worked out identical to custom grazed yearlings (but at greater risk, with millions of dollars tied up in livestock), the replacement heifer enterprise worked out to around \$1.30/SD (but, again, at greater risk and with lots more potential complications), and all the cow/calf options came in substantially worse (except for a niche grass finished beef scenario requiring daunting volume).

The worst of all was the traditional cow/calf enterprise (selling calves in the fall) at \$.58/SD with today’s markets. In environments with predictable, very high quality growing seasons, it’s hard to justify running cows (from an economic perspective, anyway). There’s just too much energy (grass) that goes into maintaining that cow, the cow loses value over the course of her lifetime and eventually has to be replaced, and the cost of developing (or buying in) that replacement is huge. With young growing animals, they can be growing and gaining in value every day, and if their stay on the ranch coincides with the year’s “high gain” window, they’ll always be profitable under a low cost production model that’s centered on the efficient capture of free sunshine.

Yearlings and the Triple Bottom Line

So, from an economic perspective, the yearlings win. Zach and Shannon are keen to travel extensively, they want to have time to pursue other interests, and they appreciate having slow times throughout the year, so essentially shutting down the ranch for half the year stacks up nicely with their desired quality of life. The only red flag with a purely yearling operation is ecological in nature. With a year round cow/calf herd, most of the grass that grows in the spring and early summer has to be shunted to fall and winter. This means that plants are typically lightly grazed during the growing season, and that there is lots of litter-making material leftover when heading into winter. In this cold, winter-dry, windswept environment, a healthy insulating cover of grass stubble is vital. With yearlings, the bulk of the grazing pressure happens right when everything’s growing, so the threat exists that all that forage could be removed without chance for regrowth, leaving the prairie soil surface overly exposed through the windy winter.

But, by managing stocking rate to ensure ample post-grazing residuals, and by only grazing most pastures one time during the growing season, opportunity for regrowth (which, again, won't be regrazed in a given year) is generous, especially for those pastures grazed early in the season. And, timing of grazing can be switched up from year to year, ensuring that the same pastures aren't repeatedly grazed late in the season (without the chance for regrowth). So, concentrating grazing pressure from May to September is a potential problem, but with good planning it's manageable.

Before we could do our holistic land plan, we needed to have all these issues—economic, social, and ecological—sorted out. Now we had an overall production figure to work with (as a starting point—we realize this can move, hopefully upward, through the years), which again was 876,000 SD (24,000 acres X 36.5 SDA). And, we decided that these stock days are most valuable when put through a growing yearling. Those 876,000 standard stock days, when converted to yearling days, equate to about 1,100,000. If those yearling days are harvested over the course of four months, that equates to a little over 9,000 head. If we go back to the probability that 36.5 SDA is conservative, we can easily envision a nice even size herd of 10,000 head. So, we now had our answer to our big land planning question: “How big could our One Giant Herd potentially be?”

Planning for Ten Grand

We had to step back a little and digest that figure. I've never heard of anyplace running 10,000 head of cattle in one mob. I'm sure it's being done somewhere, so sing out if you're out there and let us know how it's going (or how it went). When we teach land planning and grazing planning, we always say there's no known upper limit to herd size, as long as they can get a drink comfortably. Might 10,000 head breach this limit? We don't know, but we don't think so. Zach, at any rate, is willing to give it a go.

So, if we need to come up with a land plan capable of handling at least 10,000 in one herd, where do we start? Like always, we start with water. We calculated that even the existing four-inch line wouldn't be up to the task, so we had to stand back and reassess. When Zach erased all the fencelines he'd built over the previous years, and imagined how far a yearling could be expected to comfortably walk from water (especially if grazing in a massive herd at high stock density), a big lightbulb lit up. It immediately struck him that a majority (75 percent) of the ranch is either within two miles (3.2 km) of the American Fork River, or within an easy walk of a huge dam that's fed by a strong perennial creek. By rearranging the fence layout to allow access to the river or dam, the water problem is eloquently solved over most of the ranch. We did some quick scenarios, and lots of existing fence could stay in place, and all the existing waterlines could still be used as secondary water sources.

On the balance of the ranch (away from the river and creek-fed dam), the solution was a little slower-coming. We were imagining some pretty wild and extravagant possibilities, but then we stepped back once again and asked ourselves how many stock days this part of the ranch produced. It is a lower producing part of the ranch and, with a big herd of yearlings grazing for just 120 days, would only be used for about three weeks. Based on topography and distance to water, we figured we needed three water points in this area, which means that each point would only be used about a week per year. Two of these potential points are well-placed for a potential reservoir site, and the third point's

reservoir is already there (although it might need a little modification). Two of those sites can be fed by springs and abundant spring snowmelt, and one by a strong, shallow well.

Cattle don't mind drinking reservoir water if they also have access to some clean water (Michael Coughlan, in hot New South Wales, Australia, has proved this with massive cattle herds). If the reservoirs are built deep enough (thereby preventing cattle from walking out into the water), and fitted with a pipe coming out the bottom of the dam, clean, unfouled water can be piped to a long, simple trough fitted with a float valve. The dam itself can provide storage and a drinking source, and the trough can provide a source of cleaner water.

By only providing trough space, 10,000 head would need lots of linear feet. By providing access to both the trough and the reservoir, the actual trough can be much less elaborate. And, as Michael Coughlan has experienced, if cattle have access to a drink of clean water, they're much happier drinking more fouled pond water. If the cattle are only watering at a given point for a week, and then moving to a new, fresh reservoir that's had a year of recovery and recharge, fouling becomes much less of an issue anyway. When the cattle are away, these reservoirs would recover and become oases of biodiversity.

And fencing? We didn't get to drawing new fencelines on the map, but we imagine that permanent fencing might largely be a thing of the past. Lots of pronghorn, white-tail deer, and mule deer make their home here, and for the vast majority of the year, any given spot on the ranch is cattle free. It's tough to justify dozens of miles of high tensile wire when it's so seldom used by cattle, and so frequently torn out by wildlife. So, the idea at this point is to put in permanent posts, but do most of the new fencing with portable polywire. Most of the Two Dot is flat or gently rolling, so stringing up polywire is a breeze, and likely will entail much less labor than maintaining all those miles of high tensile wire.

Zach and Shannon are young leaders in the world of holistically sound land management and beef production. Their keen intellects, combined with tested practical grit, form a rare combination. I look forward to following their progress through the years, and wouldn't be surprised if, maybe a couple generations down the road (thanks in part to their successful example), 10,000 cattle in one herd is the norm. In the meantime, their low cost/high gross profit model has the Jones Family poised to capitalize on the world's growing hunger for high quality, nutrient-dense, ecologically-regenerative protein.