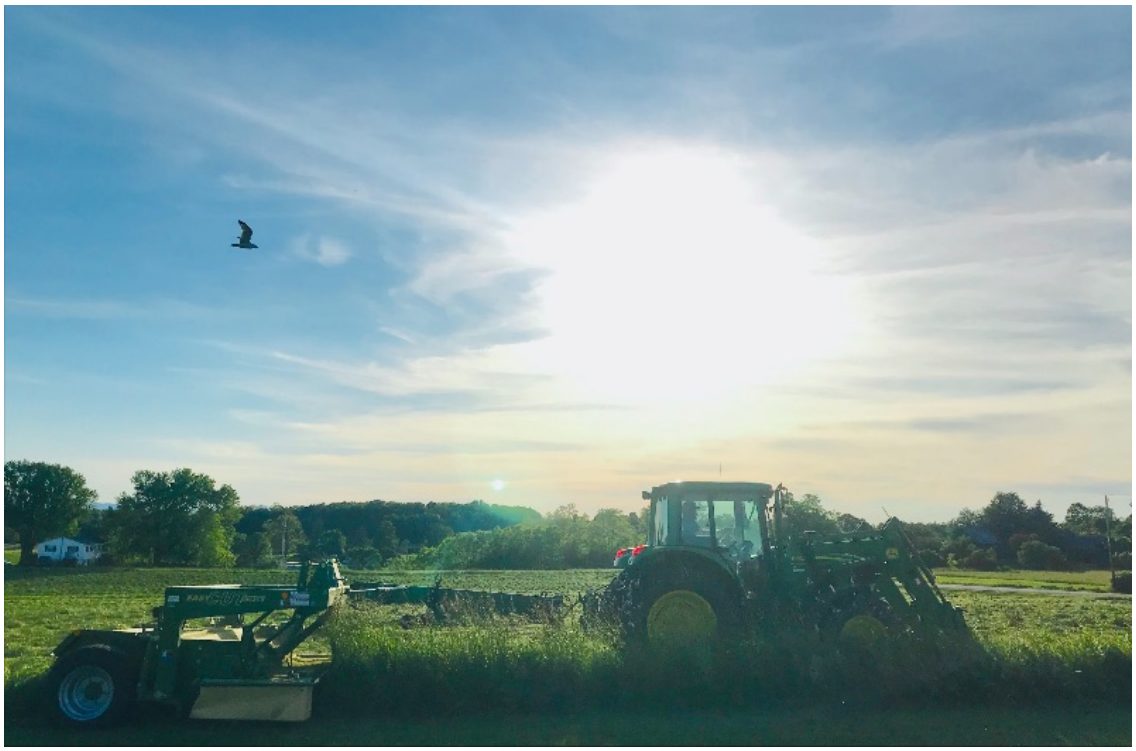
BREAD & BUTTER FARM



A story about haying at Bread & Butter Farm

by Brandon Bless, land and animal manager at Bread & Butter Farm

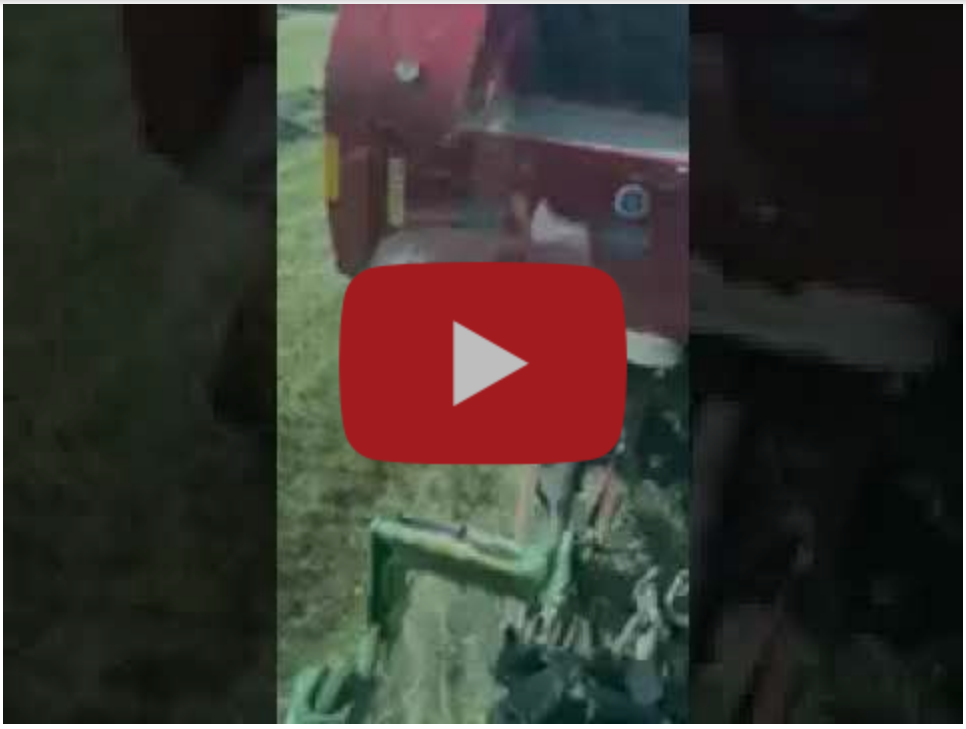
The summer heat is on and that means time to make hay for winter feed. You will notice our pasture fields are progressively getting mowed, tedded, raked, with hay made into large round bales for storage.

WHY WE HAY?

Haying is inherently an extractive practice. It is an ecological disturbance regime that removes +90% of the aboveground biomass from a field. Biomass is too sterile a word here. In reality this "biomass" extraction represents not only plant bodies and reproductive organs but also habitat for pollinators and birds, spiders and snakes, slugs and fungi. And that's only aboveground. Belowground, haying contributes to the compaction of soil (which is another way of saying inhibiting a soil's ability to breathe air and drink water) and associated degradation of soil life habitat, excessive heating and drying on the soil surface (remember soil life is mesophilic and aquatic!), and loss of soil bacteria and fungi diversity and plant root growth.

It might be easiest to over simplify this and think of a grassland as a short forest complete with a closed canopy regulating shade and moisture, and teaming with life above and below ground. Using this analogy, it's curious that we humans are repelled by a clearcut forest, yet compelled by a freshly hayed field.

Haying also involves expensive, fossil-fuel dependent equipment and a global industry of manufacturing and processing of equipment parts and fluids. Feeding hay is often done in animal confinement practices where the manure and urine of the animals is concentrated and must be managed and handled. This concentration of manure can result in nutrient pollution of waterways, and requires expensive equipment use and fuel consumption to handle and spread on fields.

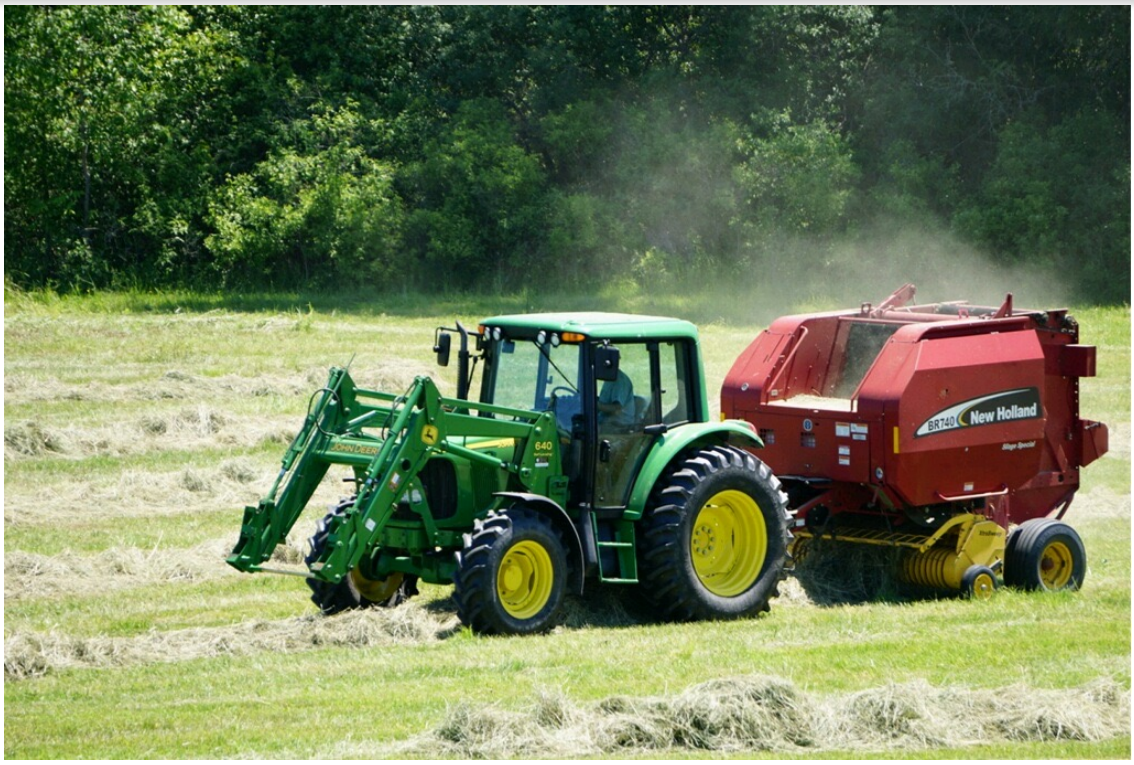


This is not to say haying is "bad", but to make clear that it is extractive. Haying is a critical part of our working landscape, representing the greatest agricultural land use in Vermont outside of forestry, and creating a landscape aesthetic that is utterly ingrained in our regional agrarian identity. Haying also enables us to manage perennial grasslands on scale which has myriad ecosystem benefits. That said, there is also the opportunity cost of haying to consider. For our farm where regenerative grazing is the default, the question is: to graze or not to graze?

Herbivore grazing can be one of, if not *the*, most regenerative non-extractive practices in agriculture. Regenerative grazing attempts to mimic on a micro-scale the macro-patterns of large herbivore herd migrations across grasslands and savannas that, over centuries and millennia, developed the coevolutionary symbiosis of grassland plants and animals, and grew the deepest most fertile soils on the planet (think 10s of feet of nutrient-rich topsoil vs our modern day

nutrient-depleted 0.5-1 foot). We practice regenerative grazing by moving animal herds constantly whograze the top one-third of the plants and *trample* the remaining two-thirds for soil food and habitat while depositing nutrient and enzymatic rich manure, urine, and saliva.

A surface comparison of grazing only the top 1/3 of plants and leaving behind 2/3 versus haying 9/10 of the plants may give the impression that our grazing practice is inefficient and "wasteful" compared to haying. But our results are that when we graze grassland of the same soil type and management history it will outperform hayed land by 20-100% over the growing season (pop quiz: why do we experience greater % plant productivity from grazing vs haying *the drier the weather is*?). Not only that, but our grazing practice yields increased productivity year upon year (hence regeneration!) with up to 400% increase in productivity in our 10 years of grazing management so far. In effect our regenerative grazing is an ecological disturbance regime that enhances habitats, encourages resiliency, enriches soil life, and produces happier and healthier and more productive plants and animals.



So why do we hay?

One answer is we simply can't afford not to at this stage of our farm finances. Here is some quick math to demonstrate:

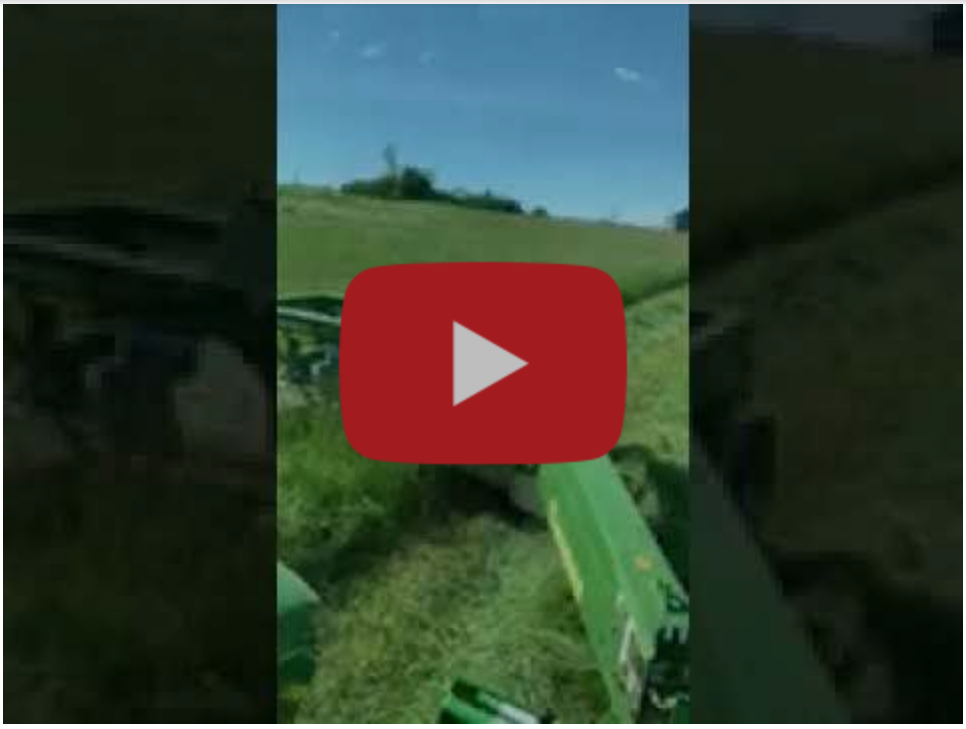
We'll need about 500 4x5 round bales for our 2021 winter-spring season. To purchase 500 quality round bales from organically managed fields will cost us between $25k-32k, depending on quality and supply and demand that year. To make ourselves 500 bales will cost us about $12k. Thus this year alone we will save $13-20k. To put this in perspective, our beef enterprise generates roughly $60k per year in revenue and hay is the single biggest expense. Our financial reality is lean - our margins are narrow, our personal income is basic, and our survival is through thrift. This is a snapshot in time. As we grow and evolve our enterprise businesses, our decision making will evolve accordingly.

An argument against this pure financial math is in the fact that hay is fertility. To buy-in hay is to buy-in fertility from other land that can be fed to our animals

and land - effectively a net gain to our farm boundaries. To make our own hay is simply to move fertility from one on-farm site to another - effectively net zero to our farm boundaries. True. But buying in hay from other land is still extractive for that "other land". Simply because it comes from outside of our farm boundaries does not necessarily make it a net gain overall. As an extreme example, it's like saying I'm going to buy this instead of that gasoline because the oil wasn't drilled in the Alaskan Refuge - I'm still buying and supporting oil drilled in the refuge/ecosystem/habitat of another place.

Another answer to why we hay has to do with scale. It's essential to note that because our animal herds graze and migrate on such a micro-scale (<100 animals on 400+ acres vs millions of animals on 400,000,000+ acres that analogous wild herds may have ranged), our grazing practices are nowhere near perfect and lack the ability to affect ecosystems and landscape function, and thus requires such things as *hay*.

Noting our scale does not diminish the power and authenticity of ourselves, our animals, our plants. It is like knowing you are growing a forest garden in the image of the Amazon rainforest. It is both unequivocally NOT the Amazon, and yet exactly the seed that MAY BECOME the Amazon (did you know there is good evidence both from indigenous knowledge and scientific findings that the Amazonian rainforest is anthropogenic? To learn more about this and many other ways indigenous people across the planet have co-managed ecosystems at landscape-scale for millennia, check out *Changes in the Land* by William Cronon, *1491* by Charles C Mann, and *The Biggest Estate on Earth* by Bill Gammage).



While science is just barely beginning to catch up with recognizing the power and harmony embodied in regenerative grazing, we have modeled our grazing practices on and proven by millennia of indigenous peoples' ecological knowledge and extensive land management practices, and on the knowledge and wisdom held by the animals and plants who coevolved alongside their human counterparts. Because we follow the original trailblazing of ancestry ahead of scientific "re-discovery", our practices are dimensions beyond what can be offered in contemporary scientific observations that so far only show that plants and animals perform better when grazing is intense and short duration with longer periods of rest. One example, is our intact family herds ability to influence epigenetic expression within a single season of regenerative grazing and, more profoundly, in a single generation of calves who become better mothers and fathers, better grazers and migrators, and overall better site adapted physically, hormonally, and economically. This is because we do not separate mothers from babies, grandmothers from grandchildren, uncles from

nephews, and because we generally seek to get out of the way of the emergent wisdom our animals express. For example, when our cattle show us they like to devour entire sumac sprouts and trees certain times of year or that white pine boughs are a favorite winter time hors d'oeuvre, we listen and make these opportunities part of their annual migration cycles and plan to plant many more trees. (Intrigued? for more on this see *Nourishment* by Fred Provenza and *Call of the Reed Warbler* by Charles Massy.)

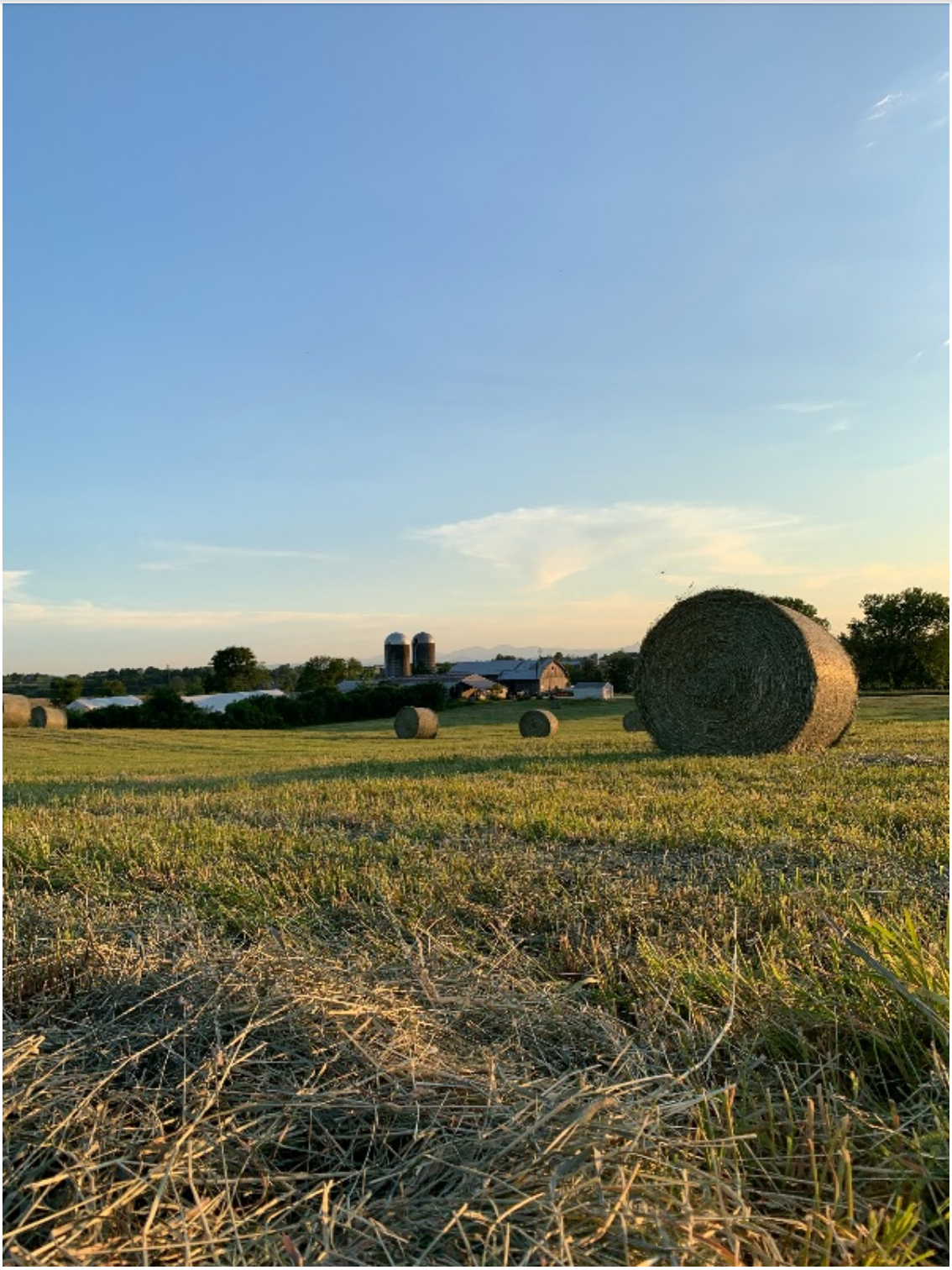
Maybe you've asked yourself by now: How do wild herds sustain themselves throughout the winter without hay? In large part they simply keep grazing through the cold and snow by ranging to lands they know to have good winter forage and acceptable winter weather and keep migrating throughout the winter months. Again, we try to mimic this on our tiny scale.

Our animals winter graze on stockpiled forage (grassland we allow to grow in August undisturbed until winter) throughout the winter. Winter grazing is by far the most economical and ecological practice for winter forage. Economically, with our 2021 herd size, winter grazing will save us about $200/day in hay costs and over $10k throughout the winter season. Ecologically, by allowing grasslands to grow undisturbed for several months of late summer and fall provides longer life cycles for plants and animals and soil life to enjoy the "short forest" habitat and reproduce. Going into winter, this stockpiled grasslands acts as a thick "armor" for the soil through our harsh and volatile winter of freeze-thaws and desiccating winds. Our animals then graze this tremendous stockpile of forage when the ground is frozen and leave behind more fertility and a thick residual of plants making for the earliest and lushes spring time growth.

Winter grazing is ideal, but because we are bounded by our farmland scale, there are still 2-3 months across winter and early spring when either the soil is thawed and too wet and soft to sustain our animal herds without compaction or there is an impenetrable ice crust the cattle can't break to find the forage beneath. Because we don't have the option to migrate elsewhere, during this time we feed our animals hay in our winter bedded pack shed. We then compost the bedding at the end of the year to be spread back onto the fields

that we hayed. (Interestingly, cattle winter graze through deep snow by using their nose, face and strong neck to expose the preserved forage beneath. While horses may use their large plate-like hooves to crush ice and snow and expose forage. Some farmers say the ice-breaking behavior of 1 horse can service 20 head of cattle with adequate winter forage.)

In short, in our current financial state, scale, and winter weather pattern we *need* to hay.



Now the question becomes: *how* do we hay?

In the past years, we have always relied on custom hay operators to arrive once in the summer with all their equipment to mow and bale all our fields in a concentrated time period before they move onto to other farms throughout neighboring counties. This has been challenging for us for two primary reasons. The first is that we haven't been able to control the timing of the operator's arrival because we're a small farm located far away for most custom hay operators we've worked with, so they fit us in when they can. This may mean they don't arrive until August when the forage quality has dropped significantly, or they come when the soil conditions are too wet which leads to otherwise unnecessary compaction that may take decades to alleviate. The second reason is that we can't control the quality of the work. Operators may have mowers that scalp the ground leaving only bare centimeters of residual to the plants and causing greater disturbance and poorer regrowth, or they may not know fields well and cause deep ruts in known wetter areas or mistakenly mow a neighbor's land or ecologically protected land or skip an field section, or they may not adhere to the finished aesthetic expected by our leased land neighbors and general community.

To address these challenges, we are thrilled and grateful that this year we have partnered with our neighbor and his newly formed company, Red Barn Baling. Working together, we can now control for timing and quality for more nutritious hay, less soil disturbance, better regrowth, and enhanced aesthetic.

We hay when it's as dry as possible thus minimizing compaction, especially on our clay soils which handle equipment well only when dry. To further minimize compaction we use relatively smaller, lighter weight equipment and seek to optimize the number of equipment passes required in the field. We leave 4-inch plant residual for less disturbance and better regrowth.

We avoid haying the same land more than 1x per year when possible (some of our leased land is hay-only). We give back to the land with strategic grazing cycles pre or post haying to improve soil health and grow higher quality hay

forage. We apply our compost to hay fields. We subsoil land that is over-compacted allowing it to breathe and drink again and plant roots to grow deeper.