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# Winter Bale Grazing in Michigan & the Great Lakes Region

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# What is bale grazing?

Bale grazing is a cost-effective method for feeding livestock in late fall and winter. Producers place bales of hay or baleage in a pasture or other field in rows or grids before winter fully sets in. Livestock are then given access to a few bales at a time by moving temporary electric fencing in a pattern similar to that used in strip or rotational grazing in summer.

(For information on baleage, see the MSU Extension news article titled "Baleage is different than all other forage making practices" at <u>https://bit.ly/3Pw3NV5</u>.) When compared to conventional feeding systems, bale grazing has the potential to cut labor and fuel costs, reduce wear and tear on equipment (especially tractors), keep livestock cleaner and drier, improve soil health, and make feeding faster and easier.

Bale grazing is most commonly used for feeding beef cattle, but it can also be used with dry dairy cattle and other hay-eating species, including sheep, goats, horses, and llamas. This bulletin focuses on bale grazing for beef cattle.

# How does bale grazing work?

Where to place the hay bales depends on your goals for the field and your planned feeding schedule. You can either (a) set out the entire winter's hay supply at one time in the fall and use temporary fencing to give the cattle access to a few bales at a time or (b) set out a few bales at a time periodically throughout the winter.

#### Access to water

In winter, cattle often have fewer water sources than in summer due to frozen lines and

connectors. Start by giving them access to the bales nearest the water source, then move to the next closest set each time you adjust the temporary fence. While they may need to travel farther for water, grazing expert Jim Gerrish notes that dry cows can walk a mile or more to reach it (personal communication, August 28, 2024).

#### Fencing

Surround the pasture or field where the bale grid is with a sturdy permanent fence. To start,

Figure 1. Cattle producers using a winter bale grazing system typically place hay bales 15 to 100 feet apart in rows inside a permanent perimeter fence. The bales for a single feeding interval are separated by temporary fencing, which is moved to let the cattle into a new row when they have eaten (or walked on) the bulk of the hay in the current row. Using hay or bale rings (also called *bale feeders*) helps reduce hay waste.



place one hot wire between the first and second rows of bales so the cattle can only get to the first row. Place another wire between the second and third rows for added security in case the first wire is breached. After the cattle eat the hay in the first row, move the first wire to between the third and fourth rows, continuing to hopscotch the wires down the field as the cattle eat the hay in each row. This is similar to the strip or rotational grazing method that many producers use in the summer.

### Laying out the grid

Producers using a bale grazing system typically set out all the bales for the whole winter in one day once the soil is firm enough to withstand wheel traffic and hoof action. Bales are typically set 15 feet to 100 feet apart in rows (Figure 1). Spacing should be based on the desired nutrient concentration going back into the soil and the field's soil type and drainage.

Note that if you are setting out a winter's worth of round bales in the fall, set the bales on their sides, not their ends, so the bales absorb less Figure 2. Animals fed by bale grazing stay clean, which helps maintain the natural insulating properties of their coats. (Photo: MSU Extension)



moisture from rain and snow. If you're only setting out a few bales at a time (enough to last a week, for example), the orientation of the bales isn't as important.

# What are the benefits of bale grazing?

Bale grazing of winter hay offers many benefits.

As long as they can get to windbreaks, livestock do quite well outside. Producers have wintered cattle near the Lake Superior shoreline in the Upper Peninsula for decades and have successfully bale grazed 500-cow herds in western Canada. Even in stormy weather, herds that have access to shelter still tend to stay near windbreaks and feed in the open. This environment helps keep their bodies free of mud and manure, which helps preserve the insulation value of their hair (Figure 2).

When managed properly, bale grazing cattle distribute manure, urine, and organic matter more effectively than when they are fed in confinement because they follow the rows of hay bales across the field. Bale grazing also eliminates the task of scraping and hauling manure from confinement lots, lowering labor and equipment costs.

It could be said that bale grazing feeds the cattle and the field at the same time. The nutrients from the manure and urine that cattle deposit on a field gradually become available to the soil microbes and plant roots that are still actively growing under the snow.

Concentrated barnyards or sacrifice lots with soil bases quickly turn to mud and become nutrient sinkholes in wet or wintry weather. The more mobile nutrients, including nitrogen and potassium, will gradually leach into the subsoil where mechanical scraping may not capture them in the spring.



As mentioned previously, bale grazing reduces winter labor requirements because all that is required is periodically moving temporary fences and possibly bale rings—along with checking that the water hasn't frozen and doing a general welfare check on the livestock.

Some producers considering bale grazing worry that cattle hooves may damage their fields. However, pastures or other fields used for bale grazing generally suffer no permanent damage from hoof action. Hoof damage is typically limited to the area right around the bales. When bales are properly spaced across the field and feeding locations are moved regularly, the damage is mostly superficial and temporary rather than deep and permanent. Any light damage is offset by what the field gains in nutrients, forage seeds, and organic matter from manure, urine, and wasted hay. These gains can rejuvenate lowyielding fields into more productive stands after just a few years of bale grazing.

## Reducing the Spread of Bovine Tuberculosis

- If your farm is in Michigan's Modified Accredited TB Zone or in a surrounding county, follow the
- state's "Wildlife Risk Mitigation Program: Standards and Guidelines" (PDF; <a href="https://bit.ly/4hdnaOj">https://bit.ly/4hdnaOj</a>)
- to help reduce the spread of bovine tuberculosis. For more information, see the Bovine
- Tuberculosis page (<u>https://www.michigan.gov/mdard/animals/diseases/bovine-tuberculosis</u>) on
- the Michigan Department of Agriculture and Rural Development website.

# What equipment will I need?

To set up and run a successful bale-grazing operation, you will need:

- A sod field with good drainage and, in extreme weather, wind protection. Grain stubble fields can be used as long as you closely monitor the soil for thawing.
- Temporary fencing (optional, depending on the system being used).
- A frostproof, reliable water source within reasonable walking distance for the cattle.
- Electricity for pumping water and powering temporary electric fencing—You can improvise

# Winter bale grazing guidelines

This section provides helpful tips and guidelines for running a successful bale grazing operation without harming the soil or the cattle's performance. with solar panels and storage batteries if needed.

- Equipment for moving hay—If you place all the bales you'll need for the winter in the field in late summer or early fall, you may not need a tractor to feed cattle through the winter. You probably won't need to move the bales and you can move the temporary fencing by hand, thus avoiding gelled fuel lines, dead batteries, snow plowing, and a lot of cold-weather wear and tear on the tractor engine and other equipment.
- Optional: Enough bale rings (also called *bale feeders*) for all the bales the cattle will have access to during a single feeding interval.
- Avoid setting bales in low spots, waterways, and wetlands.

Table for 25 [Cows], Please! Calculating Hay Quantity   The following example calculates how much hay a producer with 25 lactating cows would need per feeding interval in a bale grazing system.				
Number of lactating cows: 25				
Average cow weight: 1,400 pounds				
Hay bale size and type: 4-foot by 5-foot round bales, about 750 pounds per bale				
<b>Total daily hay usage per cow:</b> 39 pounds, eaten and wasted (Buskirk, n.d.). (The 39 pounds comes from estimating that the 1,400-pound cow will eat 2% of her body weight in dry matter, estimating dry matter content at 85%, and predicting hay waste at 15%.)				
1,400 lb. cow × 0.02 ÷ 0.85 dry matter ÷ 0.85 waste = 38.75 pounds hay				
<b>Typical hay spoilage:</b> Average hay spoiled between baling and feeding: 12% ( <b>Note:</b> "Wasted hay" is hay that goes uneaten because it has been trampled into the ground or because the cattle have refused it. "Spoiled hay" is hay that has decomposed due to moisture, age, or other factors.)				
Feeding interval: 3 days				
Calculating the amount of hay needed for the feeding interval:				
25 cows $\times$ 39 lbs. hay per day $\times$ 3 days = 2,925 lbs. hay				
Adjusting for 12% spoilage:				
2.925 lbs. ÷ 0.88 = 3.324 lbs.				
With 750-pound bales, this would total 4.5 bales (or, realistically, 5 bales in a row.) More hay will be wasted without bale rings (as much as 40% to 50%), but along with adequate rest, feeding without bale rings will benefit soil health the most.				
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Provide a reliable drinking water source for the cattle. According to grazing experts Jim Gerrish and Greg Halich (personal communication, August 28 and August 22, 2024, respectively), watering sites can be much farther from the bale grazing locations in winter than water needs to be from cattle in summer because cattle overgrazing the grass in areas they've grazed before is not a concern in winter.	Use durable, long-term perimeter fences to securely contain animals.			
	Use fields that have natural or built windbreaks so cattle have access to shelter in harsh weather.			
	Plan feeding moves according to your schedule. Some producers move their fences daily and others once a week or even less often.			



Figure 3. Mechanical feeding with bale grinders or unrollers also offers some of the benefits of bale grazing. (Photo: MSU Extension)



- Monitor the body condition (fat cover) of the cows in the herd. If young cattle are thin do not let them run out of hay. If the overall herd is in good shape (condition score of 5 or 6) and the youngest have at least a condition score of 4.5, consider letting the herd run out of baled hay for a day so they clean up any residual hay and don't get too fat to calve easily. (For information on body condition scoring, see Oklahoma State University Extension's "Body Condition Scoring of Cows" at <a href="https://extension.okstate.edu/fact-sheets/body-condition-scoring-of-cows.html">https://extension.okstate.edu/fact-sheets/body-condition-scoring-of-cows.html</a>.)
- Set out enough bales to support the number of cattle you're feeding for the feeding interval, or the number of days you want to go between feedings (see "Table for 25 [Cows]" on the previous page).
- Feed some lower quality grass or legume hay that is between 95 and 130 Relative Feed Value, or RFV. (RFV is an index that compares forage quality against full-bloom alfalfa [Dunham, n.d.]). Cattle tend to eat too much high-quality hay (151 RFV and up) if they have unlimited access to it over several days. Feeding some lower quality hay with high-quality hay can help balance the ration and limit overconsumption. When choosing hay you'll need to take into account several variables, including:

- » Weather conditions (primarily air temperature and wind speed).
- » Field conditions (such as whether the cattle have shelter from the wind and how much space is available at the feeding site).
- » Cattle conditions (such as type of cattle, mud accumulation on hair coats, stage of pregnancy, and parasite loads).
- Modify the standard bale grazing system to fit your farm. For example, some producers deliver hay in windrows across the field each day using a bale grinder or unroller for round bales, or an improvised manure spreader for big square bales (see figures 3 and 4), or by feeding small square bales. This modification increases the daily wear and tear on the tractor and other equipment, but still offers the advantage of letting the cows distribute manure nutrients uniformly across the field while providing plenty of feeding space and giving the producer more control over how much hay they offer each day. Using bale feeders can help minimize hay waste, but bale feeders are costly and many producers only have enough to hold a week's worth of bales. So, they move their feeders across fields and fill them daily or weekly.

- Provide windbreaks in case of extreme weather but remember that beef cattle don't need and generally won't voluntarily shelter in a building in the winter (Figure 5).
- Test the soil for nutrient composition on bale grazed sites at least 3 months after feeding has ended to gain an accurate picture of how much the soil fertility has improved. Bale grazed fields typically show improvements in levels of phosphorus, potassium, calcium, organic matter, and some micronutrients. Monitoring is especially important to be sure phosphorus and other nutrient levels in fields stay within Michigan GAAMPS, or Generally Accepted Agricultural and Management Practices. (For information on current GAAMPS, visit the GAAMPS section of the Michigan Department of Agriculture and Rural Development website at https://www. michigan.gov/mdard/environment/rtf/gaamps.) Note that you can pull soil samples at any time of year, but to get the greatest benefit from soil testing, you should pull samples from the same field at the same time each year.
- Soil health tests can also measure improvements in physical, biological, and chemical properties. Indicators of improved soil health include improved water infiltration and water holding capacity, reduced soil compaction, and improved aggregation, carbon sequestration, and microbial biomass (Soil Health Nexus, 2025).

Try bale grazing for a short period in the dead of winter when soils are most likely to stay snow-covered and frozen if you're concerned about the practice causing sod damage or soil compaction. Most producers find that in time the minor surface damage to the field is easily justified by the increased soil fertility, ease of feeding, and lower machinery and labor costs with bale grazing. Plan ahead to ensure that any damaged areas have adequate rest the following grazing season. Over time, producers tend to expand the winter period during which they feed their herds by bale grazing.

#### Figure 4. Big square bale feeding at the Michigan State University Lake City Research Center. (Photo: MSU Extension)



# Summary

Bale grazing works in many situations and its popularity continues to grow on Michigan beef farms. The benefits of bale grazing outweigh the labor and effort needed to adjust the feeding system to make it work on an individual farm. These benefits include:

- Cleaner animals because they are not kneedeep in mud and manure.
- Improved soil nutrients (from manure, urine, and uneaten hay being distributed where it is needed most).
- Less manure to haul from winter feeding lots.

Depending on the farm, all the bales can be put out in the fall and tractors can be parked for the winter. If bale-grazing cattle must be fed daily Figure 5. Even in harsh weather, cattle prefer to stay in the open near the hay bales. (Photo: MSU Extension)



or weekly, the labor and equipment benefits will decrease as compared to systems with longer intervals between feedings but they won't be eliminated.

Bale grazing can be done in any geographical region of Michigan as long as the herd has

adequate feed, water, and shelter from the wind. Finding the bale grazing practice that works on your operation will take time and effort and will likely need to be adapted to the weather patterns each year.

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#### **Additional Online Resources**

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