How to Calculate Hay Inventory Needs
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This calculation is best described using a step-by-step procedure using an example. For this example, we will use a cow herd of 45 moderately conditioned cows that average 1300 lb at weaning time. Hay inventory consists of 225 large round bales of good quality hay stored outside weighing an average of 1200 lb each. The winter feeding period will last 150 days.

Step 1 – Calculate Daily Forage Dry Matter Intake (DMI) Per Cow
DMI of hay will vary from about 1.8% to 2.7% of body weight. The most accurate way to estimate DMI is to use the neutral detergent fiber value from an analyzed hay sample (120 ÷ %NDF = percent of body weight on a DM basis), but for this calculation we will assume we have a good quality forage and that cows will have a hay DMI of 2.5% of their body weight per day.

Average cow weight x hay DMI (% of cow weight, as a decimal) = DMI/d

1300 x .025 = 32.5 lb of hay DMI/day

Step 2 – Adjust Daily Hay Disappearance Per Cow for Waste
In addition to what cows consume, there will be some waste associated with feeding hay and this must be accounted for when calculating winter feed needs. While the waste factor varies by spoilage and type of hay feeder, bales stored outside could be expected 20% of the stored hay to be wasted while inside stored bales would be expected to have about 7% wastage. For this calculation, we will use the DMI of 32.5 lb/cow daily calculated in Step 1 and hay that is stored outside with 20% wastage (i.e. a disappearance factor of 1.2).

DMI/d x disappearance factor = DM disappearance/cow daily

32.5 lb of DMI/cow daily x 1.2 = 39 lb of hay disappearance/cow daily (DM basis)

Step 3 – Calculate Winter Hay Inventory Needs Per Cow for the Feeding Period
For this calculation, we have a 150 day feeding period and a hay disappearance of 39 lb/cow daily as calculated in step 2.

Hay DM disappearance/cow daily x days = Hay DM needed/cow

39 lb of hay/cow daily (DM basis) x 150 days = 5850 lb of hay DM needed/cow

Step 4 – Determine Average Bale Dry Matter (DM) Weight by “Lot”
“Lot” is defined as a single cutting from a field with similar quality. Ideally, a representative sample of bales in each lot should be weighed to obtain an
average bale weight. Using the baler manufacturer’s baler capacity is not a true indication of bale weight. Similar size bales vary in weight by forage type, bale density and bale moisture. For these reasons, obtaining a realistic bale weight can be justified. The amount of DM in a bale is best calculated after the hay in a “lot” is analyzed for nutrients and a DM value has been determined. For inventory purposes, however, one could assume that bales inside, under cover, contain about 88% DM (12% moisture); and bales stored outside, exposed to the elements, contain about 80% DM (20% moisture).

Average bale weight x percent DM of hay expressed as a decimal = DM/bale

1200 lb bale x .80 for bales stored outside = 960 lb of DM/bale

**Step 5 – Calculate Bales Needed Per Cow for Feeding Period**

For this calculation we will use the 5850 lb of DM needed/cow (consumption + waste) calculated in Step 3 as the amount of hay disappearing from inventory for each cow during the feeding period, and the average bale weight of 960 lb (DM basis) as calculated in Step 4.

Hay DM needed/cow ÷ bale DM weight = bales needed/cow

5850 lb of hay needed/cow ÷ 960 lb DM/bale = 6.1 bales/cow

**Step 6 – Calculate Total Bales Needed for Cow Herd**

For this calculation we have 45 cows that will each consume 6.1 bales during the feeding period as calculated in Step 5.

Cows in the herd x number of bales needed/cow = total bales needed

45 cows x 6.1 bales/cow = 275 bales needed for feeding period

**Step 7 – Do We Have Enough Hay?**

In this calculation we need to compare bales on inventory with the number of bales calculated in Step 6.

Bales on inventory – bales needed = Number of bales in surplus or deficit

225 bales on inventory – 275 bales needed = 50 bales deficit

**Step 8 – What do we do now?**

If we have more bales than we need, there may be an opportunity to sell excess hay at a profit. If we are short on hay supply, a winter feeding strategy needs to be developed. Options may include one or more of the following; purchase hay, limit feed hay to stretch supply, limit feed a high concentrate diet, and developing a strategic supplementation strategy that will meet cow requirements.