

Determining the Value of Standing Alfalfa in 2022

Kevin Jarek - UW-Madison, Division of Extension, Crops and Soils Agent - Outagamie County

Determining a “fair” market value for standing alfalfa during the 2022 growing season may be a challenge considering the highly favorable market conditions for corn and soybeans. As of April 2022, new crop corn is near \$7.00 per bushel for fall delivery while new crop soybeans are more than \$14 per bushel. *Opportunity cost* can be defined as the loss of a (potential) gain from other possible alternatives (rotating to a grain crop) when another alternative is chosen (keeping the existing alfalfa stand).

Due to the wide variation in established corn and soybean yields from county to county, each individual landowner will have their own unique circumstances to consider when evaluating opportunity cost. Yield estimates (https://www.nass.usda.gov/Statistics_by_State/Wisconsin/Publications/County_Estimates/) are available for those who may not have actual production history (APH) records as both parties negotiate these issues. Landowners should consider both the economic and environmental impacts (long term crop rotation plans, erosion limitations, etc.) before they make any final decisions related to a particular alfalfa stand in 2022. Open and honest communication about both party’s needs is required for a successful negotiation this year.

The absence of daily quotes as compared to other agricultural commodities (grains) requires us to rely on the most recent hay market prices available at <https://cropsandsoils.extension.wisc.edu/hay-market-report/>. The three most significant factors to consider when determining the potential value for any individual cutting of alfalfa or the stand for the entire growing season include the following:

A) Expected Dry Matter (DM) Yield in Tons per Acre B) Estimated Value of a Ton of DM C) Harvesting Costs

Ideally, one would be able to weigh the forage being harvested from any individual cutting from a particular field. This is the best way to ensure that both parties are treated equally in any formal arrangement in which standing alfalfa is bought or sold. If a scale is available, multiple forage samples should be collected during the process of harvesting to determine an accurate value for the average dry matter (DM) content of the feed being sold. Once you have agreed upon a fair price or value for a ton of DM (may be with or without harvesting costs), you simply multiply the harvested tonnage by the agreed upon value per DM ton then adjust for harvesting costs if they were not already taken into consideration. Unfortunately, not all farms have access to drive-over scales or state-certified scales at harvest.



Measuring alfalfa maturity stage and height

Expected dry matter (DM) yield can be estimated by measuring alfalfa stand density or by utilizing multi-year on-farm data sourced from the Wisconsin Alfalfa Yield and Persistence (WAYP) program. The project is managed by the University of Wisconsin-Madison/Division of Extension. The 2021 WAYP summary can be viewed at: <https://arlington.ars.wisc.edu/wp-content/uploads/sites/115/2022/04/2021-WAYP-Summary.pdf>.

- 1) **Stand Density:** Alfalfa stands with an **average of 55 stems per square foot** are defined as not being limited and having full season yield potential. Due to the high variability in alfalfa stem counts throughout many fields these past few growing seasons, it would be wise for buyers and sellers to evaluate stands to determine a realistic potential yield before a sale is agreed upon. WAYP project data can help you estimate DM yield derived from on-farm data collected over the past 14 years. Local

growing conditions, alfalfa stand condition after overwintering, age of the stand, composition of the stand, soil texture/series, soil fertility, and soil drainage can all significantly impact alfalfa DM yields during any given growing season. It is not advisable to purchase standing alfalfa without taking each of these considerations into account before any final arrangement is agreed upon by all parties involved.

stand density (stems/sq ft)	action
>55	stem density not limiting yield
40-55	some yield reduction expected
<39	consider replacing stand

Source: Alfalfa Stand Assessment – Is This Stand Good Enough to Keep? – Dan Undersander, Forage Agronomist, UW-Madison

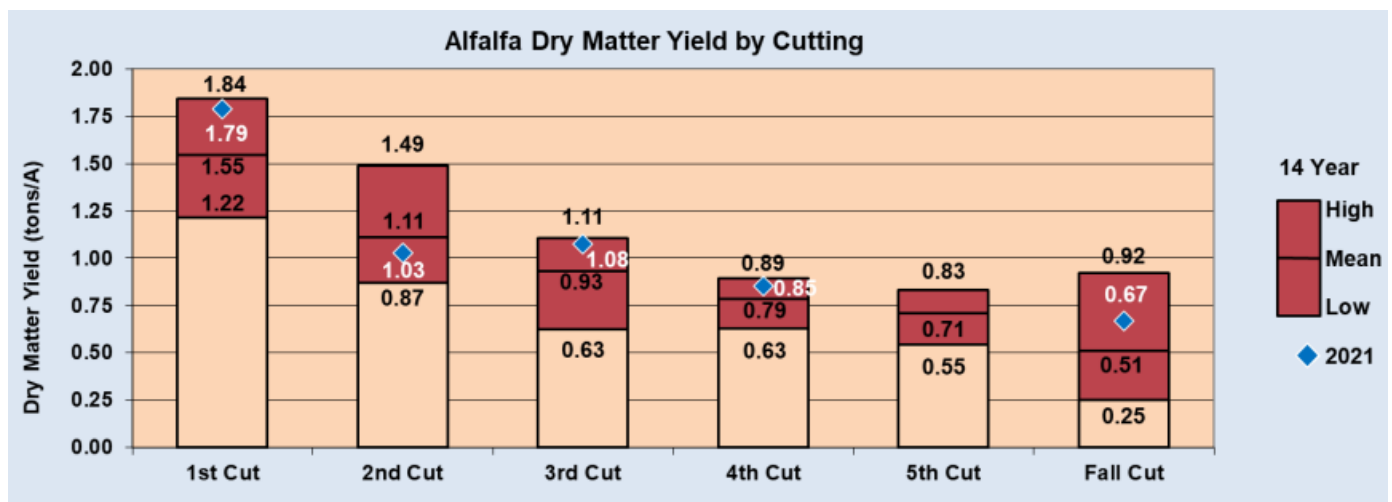
2) **Percentage of Overall Season Yield Per Cutting as Determined by the WAYP Program On-Farm Data:**

3 cut system – 46% (1st crop) – 28% (2nd crop) – 26% (3rd crop)

4 cut system – 36% (1st crop) – 25% (2nd crop) – 21% (3rd crop) – 18% (4th crop)

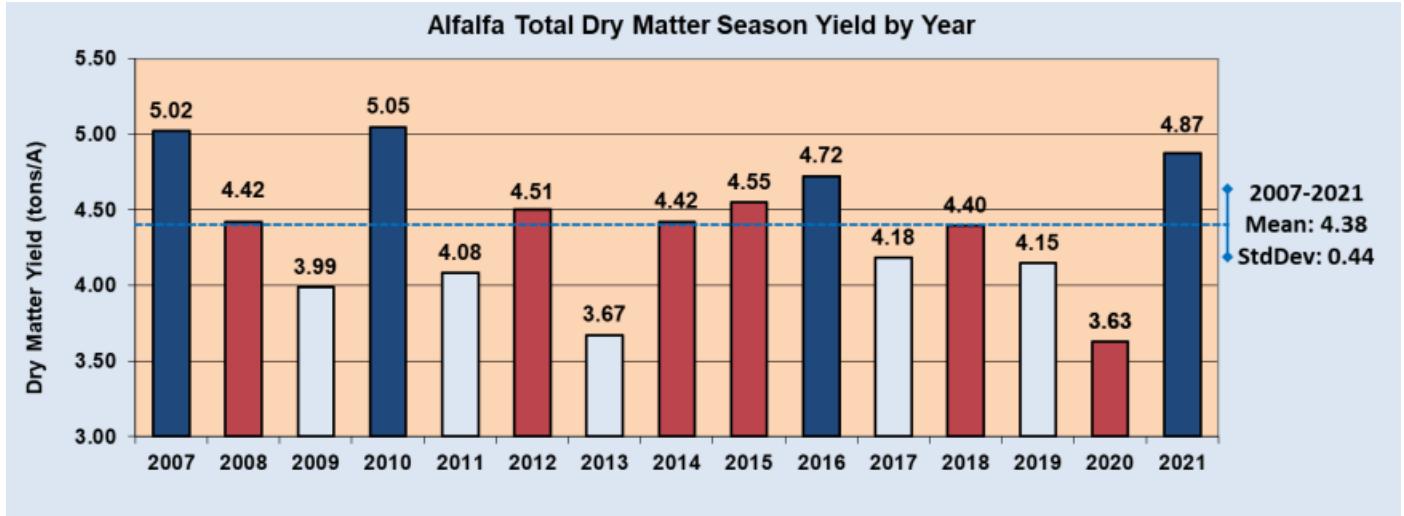
5 cut system – 32% (1st crop) – 21% (2nd crop) – 18% (3rd crop) – 16% (4th crop) – 13% (5th crop/fall cut)

WAYP data collection begins with the first full production year following new seeding. Fifth cutting and late fall cutting data was collected in years when available. It should be noted that four-cut systems represent the largest percentage of the data. The low, mean (average), and high values for DM yield over the life of the project are illustrated below. In addition, 2021 data is included so you can compare the most recent year’s data to the other benchmark measurements established over the past 14 years. As evidenced below, 2021 was a particularly good year for yield with three of the first four cuttings yielding above the project mean. Above average temperatures during the month of October extended the 2021 growing season. As a result, a number of fall cuttings were harvested statewide that helped bolster forage inventories late last year and as we head into the 2022 growing season.



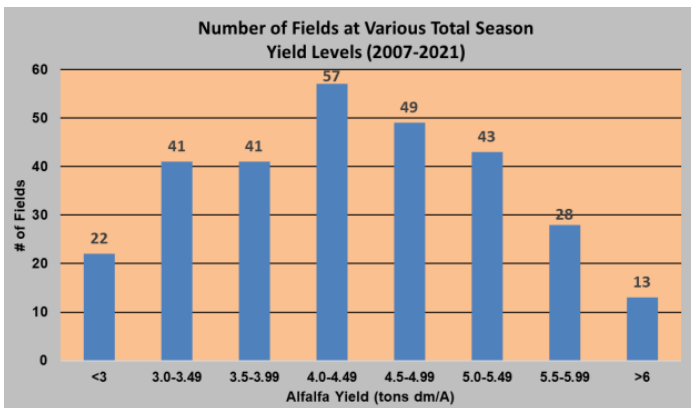
Source: Wisconsin Alfalfa Yield and Persistence (WAYP) Program Summary, 2021

- 3) **Total Season Yield:** The WAYP program has an observed yield range of less than 3.0 tons to more than 6.0 tons DM per acre. The most frequently observed yield has been **4.0-4.49 Tons per DM per Year**. The following chart illustrates the annually observed mean of alfalfa DM yield in tons per acre from 2007-2021. The average yield of first through fourth crops over the project is 4.38 tons DM per acre. The 2021 growing season data resulted in a 4.87 tons of DM yield, third highest recorded in 14 years.

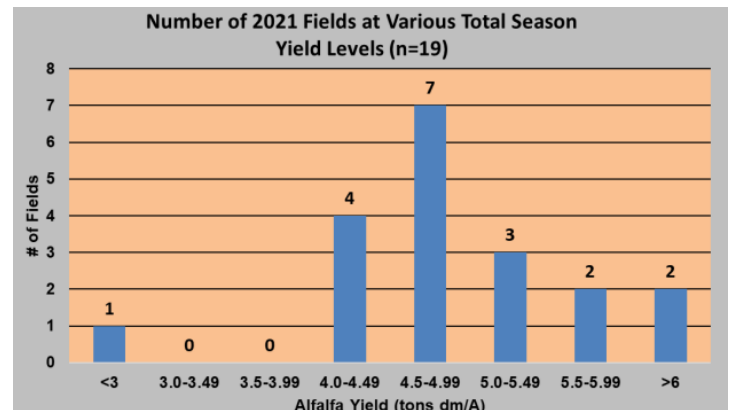


Source: Wisconsin Alfalfa Yield and Persistence (WAYP) Program Summary, 2021

Dry Matter Yield Level Distribution from 2007-2021



Dry Matter Yield Distribution 2021 Growing Season



Source: Wisconsin Alfalfa Yield and Persistence (WAYP) Program Summary, 2021

- 4) **Weather Risk and Field Losses:** Management practices applied to the site by the buyer during the cutting and harvesting of alfalfa will influence the final quality measurements. Purchased baled hay may have a known, measured quality indicator like Relative Forage Quality (RFQ) or Relative Feed Value (RFV). Alfalfa purchased from the field has an unstable quality complex as weather risk, insect or disease pressure, advancing maturity, leaf shatter, and harvesting losses need to be considered and accounted for when determining the final price. An adjustment of 25 percent to the value of the alfalfa standing in the field may be considered a reasonable method to further account for the buyer's risk.



Merging alfalfa windrows before harvest

5) Determining the Value of a Ton of DM Alfalfa



Small square bales being harvested in Outagamie County

Hay Market Demand and Price Reports for the Upper Midwest are located at <https://cropsandsoils.extension.wisc.edu/hay-market-report/> on the UW-Madison, Division of Extension, Crops and Soils website with updates posted regularly. The most recent report (**April 11, 2022**) indicates large square bales of Prime Quality (>151 RFV/RFQ) alfalfa averaged \$235.00 per ton. The value of a ton of DM is determined via the following calculations:

Price for a Ton of DM

As baled hay, assume moisture of 15 percent which means it is 85 percent DM or **0.85**

$$\begin{array}{rcl} \$235.00 & \times & \text{as fed ton} \\ \text{as fed ton} & & \mathbf{0.85 \text{ ton DM}} \end{array} = \begin{array}{r} \$276.47 \\ \text{Ton DM} \end{array}$$

When is the last time you successfully harvested all your alfalfa without any weather damage? One may harvest four high quality cuttings, or one may harvest four lower quality cuttings. Earlier we identified the difference between purchasing alfalfa that has already been harvested. It is a known quality. Standing alfalfa must be adjusted for both field losses and potential weather risk, both of which can significantly impact the quality of the harvested forage. **The buyer and seller can decide if they wish to use a factor other than 25%.**

If we use \$276.47 per ton DM and apply a 25% risk adjustment, we end up with a risk adjusted value for a ton of DM standing alfalfa as follows: (\$276.47 X 0.25 = \$69.12), \$276.47 - \$69.12 = **\$207.35 per ton of DM.**

- 6) **Harvesting Cost:** Based on the costs reported in the **Wisconsin Custom Rate Guide 2020** located at <https://fyi.extension.wisc.edu/news/2021/05/12/2020-custom-rate-guide/> or **2022 Iowa Farm Custom Rate Survey** <https://www.extension.iastate.edu/agdm/crops/pdf/a3-10.pdf> one would expect to pay the following for the field operations identified below:

<u>Mowing and Conditioning per acre:</u>	<u>Windrow Merging per acre:</u>	<u>Chopping, Hauling, and Filling per acre:</u>
\$16.61 per acre, statewide average (WI - 2020)	\$14.00 per acre, statewide average (WI - 2020)	\$45.00 - \$65.00 per acre, \$55.00 average *
\$12-\$25 per acre, \$16.20 statewide average (IA - 2022)	\$10-\$15.25 per acre, \$14.30 statewide average (IA - 2022)	Visit the WI Custom Rate Guide for charges expressed in <i>dollars/hour</i> or <i>dollars/ton</i> to calculate costs using those posted values.

*Estimated range based on farm data, 2020 WI Custom Rate Guide does not provide per acre cost.

Using values cited earlier, one may spend \$17 per acre cutting and conditioning the alfalfa, \$14 per acre merging the alfalfa, and \$55.00 per acre (chopping, hauling, and filling - **adjust your costs as needed**) chopping, hauling, and filling an upright silo or a bunker silo resulting in \$86.00 per acre invested for each cutting. **One's harvesting costs may be higher or lower than those cited here;** however, this is what is used for this example. If one harvests four (4) cuttings, total harvest costs are \$344.00/acre for the season (\$86.00 X 4 cuttings = \$344.00). **If the buyer's harvesting costs are less, one can adjust downward. If the buyer's harvesting costs are higher, one can adjust upward.** While the landowner who established the alfalfa has the expense of the land, taxes, seed, chemical, and fertilizer, the buyer not only has the harvesting costs, but assumes the risk of field losses and weather damage exceeding the 25 percent quality adjustment discussed earlier.



Harvesting first cutting alfalfa haylage in Outagamie County

Once one has calculated or agreed upon the value of a ton of DM and has made a reasonable yield estimate, one may proceed. In this first example we used a 4.0-ton DM yield for the season at a value of \$207.35 per ton DM. Four (4) tons of DM X \$207.35 per ton DM = a final harvested value of \$829.40. After we deduct the cost of harvesting \$344.00, (4 cuts X \$86.00), we are left with the following:

Harvesting **4.0 tons of DM** total value would be \$829.40 less harvesting costs of \$344.00 = **\$485.40 residual**

1st Cutting = \$ 485.40 X 36% of total yield (1.44 tons DM) for the season = \$174.75

2nd Cutting = \$ 485.40 X 25% of total yield (1.00 tons DM) for the season = \$121.35

3rd Cutting = \$ 485.40 X 21% of total yield (0.84 tons DM) for the season = \$101.93

4th Cutting = \$ 485.40 X 18% of total yield (0.72 tons DM) for the season = \$ 87.37

Harvesting **4.5 tons of DM** total value would be \$933.08 less harvesting costs of \$344.00 = **\$589.08 residual**

1st Cutting = \$ 589.08 X 36% of total yield (1.62 tons DM) for the season = \$212.07

2nd Cutting = \$ 589.08 X 25% of total yield (1.13 tons DM) for the season = \$147.27

3rd Cutting = \$ 589.08 X 21% of total yield (0.94 tons DM) for the season = \$123.71

4th Cutting = \$ 589.08 X 18% of total yield (0.81 tons DM) for the season = \$106.03

Harvesting **5.0 tons of DM** total value would be \$1,036.75 less harvesting costs of \$306.28 = **\$730.47 residual**

1st Cutting = \$ 730.47 X 36% of total yield (1.80 tons DM) for the season = \$262.96

2nd Cutting = \$ 730.47 X 25% of total yield (1.25 tons DM) for the season = \$182.62

3rd Cutting = \$ 730.47 X 21% of total yield (1.05 tons DM) for the season = \$153.40

4th Cutting = \$ 730.47 X 18% of total yield (0.90 tons DM) for the season = \$131.49

Harvesting **5.5 tons of DM** total value would be \$1,140.43 less harvesting costs of \$344.00 = **\$796.43 residual**

1st Cutting = \$ 796.43 X 36% of total yield (1.98 tons DM) for the season = \$286.71

2nd Cutting = \$ 796.43 X 25% of total yield (1.38 tons DM) for the season = \$199.11

3rd Cutting = \$ 796.43 X 21% of total yield (1.15 tons DM) for the season = \$167.25

4th Cutting = \$ 796.43 X 18% of total yield (0.99 tons DM) for the season = \$143.36

Harvesting **6.0 tons of DM** total value would be \$1,244.10 less harvesting costs of \$344.00 = **\$900.10 residual**

1st Cutting = \$ 900.10 X 36% of total yield (2.16 tons DM) for the season = \$324.04

2nd Cutting = \$ 900.10 X 25% of total yield (1.50 tons DM) for the season = \$225.02

3rd Cutting = \$ 900.10 X 21% of total yield (1.26 tons DM) for the season = \$189.02

4th Cutting = \$ 900.10 X 18% of total yield (1.08 tons DM) for the season = \$162.02

Harvesting **6.5 tons of DM** total value would be \$1,347.78 less harvesting costs of \$344.00 = **\$1,003.78 residual**

1st Cutting = \$ 1,003.78 X 36% of total yield (2.34 tons DM) for the season = \$361.36

2nd Cutting = \$ 1,003.78 X 25% of total yield (1.63 tons DM) for the season = \$250.95

3rd Cutting = \$ 1,003.78 X 21% of total yield (1.36 tons DM) for the season = \$210.79

4th Cutting = \$ 1,003.78 X 18% of total yield (1.17 tons DM) for the season = \$180.68

Every cutting of alfalfa removes a significant amount of potassium (K) from the soil. A one-hundred-pound application of potash fertilizer (0-0-60 or 0-0-62) provides 60 or 62 lbs. of K₂O per acre. If full alfalfa yield potential is to be realized, we need to replace the nutrients removed from the field during harvest. The UW Nutrient and Pest Management Fast Facts identifies the specific quantities of nutrients removed by various field crops and is available at <https://ipcm.wisc.edu/download/pubsNM/NutrientManagementFastFacts.pdf>.

One DM ton of harvested alfalfa removes 60 units of K₂O. Using a price of \$885/ton for 0-0-62, we can calculate the cost per unit of K₂O as follows: 2,000 lbs. X 0.62 = 1,240 lbs. of K₂O per ton of fertilizer, \$885/ton divided by 1,240 units of K₂O per ton = \$0.71 per unit. The chart below illustrates the estimated removal rates for each of the potential alfalfa yields. Pest management also needs to be considered. Guidelines for treatment thresholds for potato leafhoppers are at <https://fyi.extension.wisc.edu/forage/cut-bale-scout/>.

Alfalfa DM Yield Tons/Acre	LBS of K ₂ O Removed Per Ton of DM Yield	Total LBS K ₂ O Removed	Cost Per Unit of K ₂ O	Expense to Replace Removed K ₂ O
4.0	60	240	\$ 0.71	\$ 170.40
4.5	60	270	\$ 0.71	\$ 191.70
5.0	60	300	\$ 0.71	\$ 213.00
5.5	60	330	\$ 0.71	\$ 234.30
6.0	60	360	\$ 0.71	\$ 255.60
6.5	60	390	\$ 0.71	\$ 276.90

Summary

When a drive-over or state-certified scale is not available to measure yield, purchasing alfalfa by the cutting or by the acre may be difficult given the widespread variability in fields. Focusing time and effort on the three most significant considerations when determining the value of standing alfalfa can help. The buyer needs to



estimate as accurately as possible what the potential DM yield may be, and the seller needs to account for reasonable harvesting costs associated with getting the crop out of the field. As discussed earlier, the best option is always to weigh the crop as it is harvested and adjust for DM. However, if that is not an option, walking the fields, estimating stems counts per sq. ft., and assessing overall plant health may help all parties involved arrive at a fair value and avoid later conflict.

Alfalfa stand that may be limited by stem counts

Additional Methods for Determining the Value of Alfalfa – Is There an App for That?

Additional methods to calculate the value of standing alfalfa include an app that can be downloaded for **free** at <https://play.google.com/store/apps/details?id=com.smartmappsconsulting.haypricing>. Those with iPhones and iPads can download the app from the Apple Store by searching “Hay Pricing”.