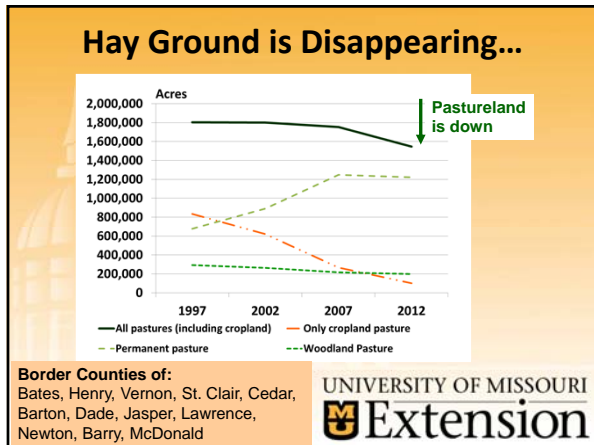
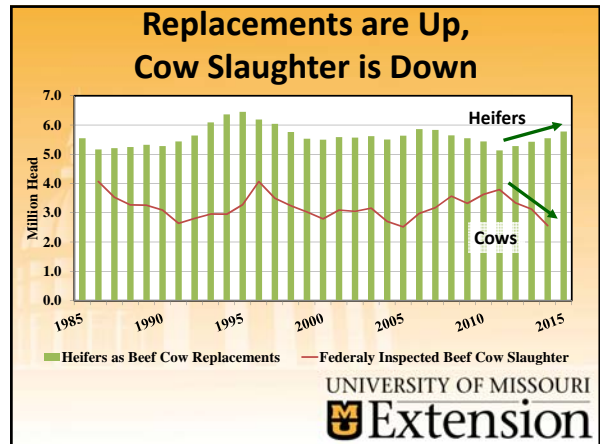


Making the Most of Winter Forages

Mark W. Jenner
Agriculture Business Specialist
University of Missouri Extension

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The Profit Equation Variables

- **Cost Variables**
 - **Feed Cost**
 - Operating Cost
 - Depreciation Cost
 - Capital Charge
 - Hired Labor
 - Family Labor
- **Production Variables**
 - Calf Weight
 - Calf Price
 - Cull Weight
 - Cull Price
 - Weaning Percentage
 - Calving Distribution
- **Other Variables**
 - Herd Size
 - Investment

52% of Variation in Returns to Labor and Management are explained in feed costs, (IA 2001)

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What Options are Available?

Evaluate feed sources and costs

- Buy high quality hay
- Produce more, high quality hay, for less cost
- Rent more ground for spring hay/winter stockpile
- ~~Intensify spring and summer grazing management~~

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Profitability in the Cow-Calf Industry

- What does the average Missouri cow-calf producer make per cow per year?
- What does "average" even mean?
- Is average good enough?

NO!!!

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Returns of MO Cow-Calf Producers 2000-2012 (MN Finbin records)

	All Farms	Low 20%	40 - 60%	High 20%
Average weaning weight	484	517	476	477
Lbs weaned/exposed female	415	437	430	412
Feed cost per cow	\$314.63	\$395.90	\$324.66	\$256.45
Avg wgt/ Beef Calves sold	621	609	606	655
Avg price / cwt.	\$113.61	\$115.29	\$112.72	\$110.04
Net return over lbr & mgt	(\$39.47)	(\$483.72)	\$0.12	\$242.94

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Low is 150% > than High

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How Can We Estimate the Cost Alternative Winter Forage Values?

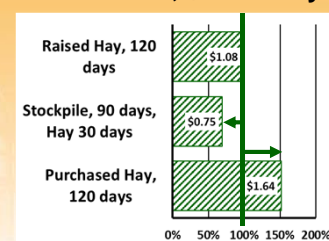
- Per 1,000 lb Bale?, Per Acre?, Per lb?, Per Cow?
- What is a reasonable bale cost? \$25, \$35, \$45?
- Pasture rental rates per acre? \$25, \$35, \$45?
- What if we graze it (stockpile) over the winter?
- Winter feed costs are higher/head/day than Spring/summer pasture costs

We need to just pick some numbers...

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Let's Start with the Answers, First

- Winter Feed costs, \$/head/day



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Relative Cost to Deliver a Unit of Energy to Ruminants

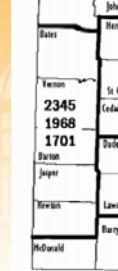
Grazed pasture	100
Alfalfa hay	192
All hay	222
Silage	277
Grains & concentrates	322
Dehydrated forages	419

Source: Dr. Rob Kallenbach, State Forage Specialist, University of Missouri

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2015 Pasture Rental Rates in This Area, \$30 - \$42/acre

Rent as a % of land value



Pastureland

Good: \$2,345/acre x 1.8% = \$42.20/acre

Average: \$1,968/acre x 1.8% = \$35.40/acre

Poor: \$1,701/acre x 1.8% = \$30.60/acre

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Harvesting Costs 160 acres 1 cutting

Expense	Share of Cost
Fuel (@\$2.70/gal)	14.60%
Labor (@\$17.15/hour)	20.60%
Supplies - (net wrap, oil, grease, etc.)	11.10%
Ownership Expense	53.70%

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Harvesting Costs 160 acres 1 cutting

Machine activity (not custom)	Labor Hours /acre	Fuel Gallons /acre	Operating Costs \$/acre	Ownership Costs \$/acre	Total Costs \$/acre	Trips /acre
Disk mower-conditioner (9 ft); 105 MFWD	0.18	0.81	\$6.55	\$6.32	\$12.88	1
Wheel rake, V hitch (8 wheel); 75 HP	0.05	0.17	\$1.22	\$1.39	\$2.61	1
Round baler, net wrap (1500 lb); 105 MFWD	0.16	0.73	\$6.87	\$9.28	\$16.15	1
Total	0.38	1.71	\$14.64	\$16.99	\$31.63	3

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Harvesting Costs 160 acres 2 cuttings

Machine activity (not custom)	Labor Hours /acre	Fuel Gallons /acre	Operating Costs \$/acre	Ownership Costs \$/acre	Total Costs \$/acre	Trips /acre
Disk mower-conditioner (9 ft); 105 MFWD	0.35	1.63	\$13.11	\$9.51	\$22.62	2
Wheel rake, V hitch (8 wheel); 75 HP	0.1	0.33	\$2.43	\$2.08	\$4.52	2
Round baler, net wrap (1500 lb); 105 MFWD	0.32	1.46	\$13.75	\$14.39	\$28.14	2
Total	0.77	3.42	\$29.29	\$25.98	\$55.27	6

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What is the Cost of a Bale of Hay?

• Harvesting Costs

- 1 July cutting, 2,500 lbs **\$12.65/bale**
(2.5, 1000# bales)
- 2 cuttings, 6,000 lbs **\$ 9.21/bale**
(6, 1000# bales)

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What is a Bale of Nutrients Worth?



1000 lb. bale of grass hay



- 25 lb of N
- 7.5 lb P₂O₅
- 20 lb K₂O

N=\$0.71, P=\$0.55, K=\$0.55

2013

30% N - \$5.32

100% P₂O₅ - \$4.12

100% K₂O - \$11.00

Total = \$20.44

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What is a Bale of Nutrients Worth?



1000 lb. bale of grass hay



- 25 lb of N
- 7.5 lb P₂O₅
- 20 lb K₂O

N=\$0.62, P=\$0.30, K=\$0.40

2014

30% N - \$4.65

100% P₂O₅ - \$2.25

100% K₂O - \$8.00

Total = \$14.90

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What is the Cost of a Bale of Hay?

- Harvesting Costs
 - 1 July cutting, 2,500 lbs \$12.65/bale
 - 2 cuttings, 6,000 lbs \$ 9.21/bale
- Fertility Costs
 - 2013 \$20.44/bale
 - 2014 \$14.90/bale
- Cost/Bale, Harvest & Fertility
 - \$24 to \$33/bale

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Stored Hay Wastage Considerations

What does it cost to lose 50% of harvested hay?



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Cost of Hay Due to Waste

% waste	Hay cost \$/ bale	1000 lb /bale	\$/lb DM	30 lb DM/day	days /bale
0.0%	\$35.00	1,000	\$0.035	\$1.05	28.6
10.0%	\$38.89	900	\$0.039	\$1.17	25.7
20.0%	\$43.75	800	\$0.044	\$1.31	22.9
30.0%	\$50.00	700	\$0.050	\$1.50	20.0
40.0%	\$58.33	600	\$0.058	\$1.75	17.1
50.0%	\$70.00	500	\$0.070	\$2.10	14.3

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Winter Season Feed Costs Based on:

- Cow feed intake at 30 lbs of Dry Matter (DM) per head per day (30 lbs DM/hd/day)
- Each acre of forage yields 6,000 lbs DM/acre
- Bales are set at 1,000 lbs/bale
- Purchased hay costs \$40/bale
- Fertilizing 60 lbs of N on August 1, is estimated to yield 3,500 lb DM per stockpiled acre.

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In General, Stockpiled Fescue vs. Hay

- Feeding hay –
\$0.80 to \$1.00/cow/day
- Feeding stockpiled fescue –
\$0.40 to \$0.50/cow/day
- 20 percent CP in October
Drops 2% per month

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DM Costs, Hay Produced on Rented Ground, \$/Head/Day

Rent Hay Ground for 2 Cuttings	\$/acre	Yield,		\$/lb DM
		lb DM	\$/bale	
Pasture rental rate	\$40	6,000		\$0.007
2 Cuttings, 6,000 lbs		6,000	\$9.21	\$0.002
Fertilizer, 2014		1,000	\$14.90	\$0.015
Total Cost, Double Cut DM				\$0.023
Usable hay (consumption, 80% * (1-wastage, 20%))				64%
Cost of Daily 30 lb DM Consumption, \$/head				\$1.08

Cost per head for **120 days** of feeding hay produced on rented ground, ...**\$129.95/head**

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DM Costs, Buying Hay, \$/Head/Day

Total Cost, Purchased Hay DM	Yield,		\$/lb DM
	lb DM	\$/bale	
1000 lb bale, purchased	1,000	\$35.00	\$0.04
Usable hay (consumption, 80% * (1-wastage, 20%))		64%	
Cost of Daily 30 lb DM Consumption, \$/head			\$1.64

Cost per head for **120 days** of buying hay, ...**\$196.88/head**

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DM Costs, Spring Hay and Winter Stockpile, \$/Head/Day

Total Cost, Hay/Stockpile DM	\$/acre	Yield, lb DM	\$/bale	\$/lb DM
Pasture rental rate	\$40	6,000		\$0.007
Fertilizer Hay, 2014		1,000	\$14.90	\$0.015
1 Cutting, 2,500 lbs		2,500	\$12.65	\$0.005
Total Cost, Spring Hay, \$/lb DM/cow				\$0.020
Fertilizer Stockpile, 2014 (N \$/lb=1/3 NPK \$/lb)				\$0.005
Fall Stockpile, 3500 lbs		3,500	\$0.004	\$0.004
Total Cost, Stockpile, \$/lb DM/cow				\$0.009
Total Cost, Hay+Stockpile, \$/lb DM				\$0.035
Usable stockpile (consumption, 80%)			Additional land costs 80%	
Average Cost of Daily DM Consumption				\$0.75

Cost per head for **90 days** of winter stockpile, **PLUS** feeding spring produced hay for **30 days**, ...**\$89.83/head**

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Managing Winter Stockpile

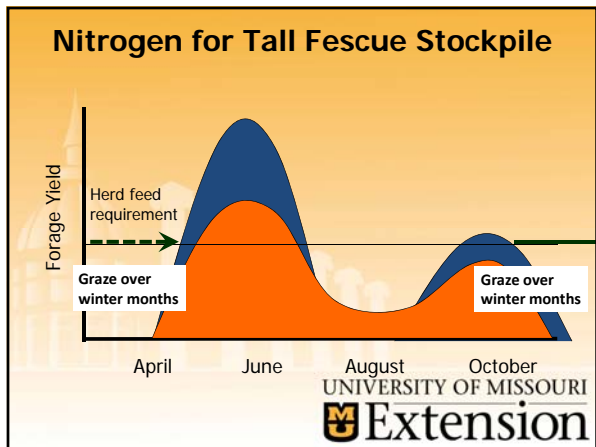
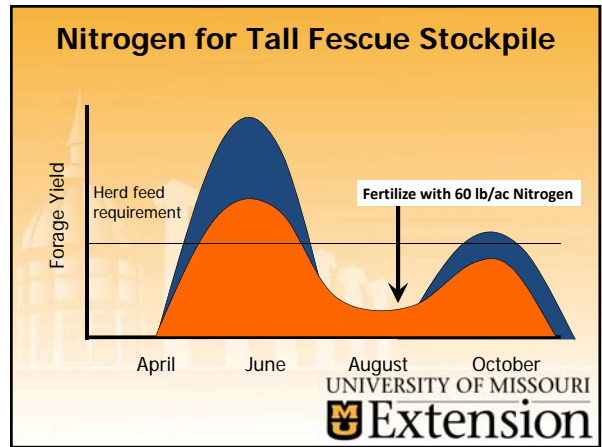
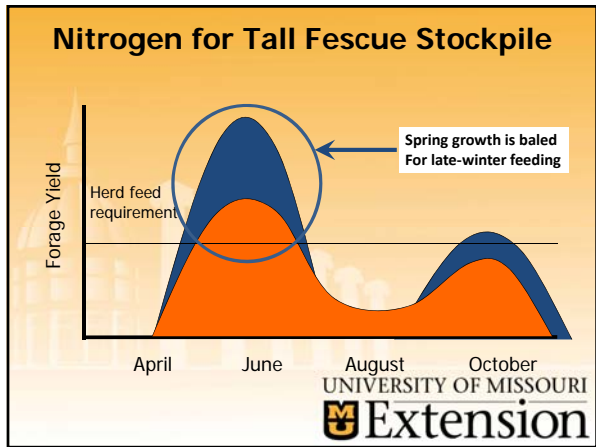
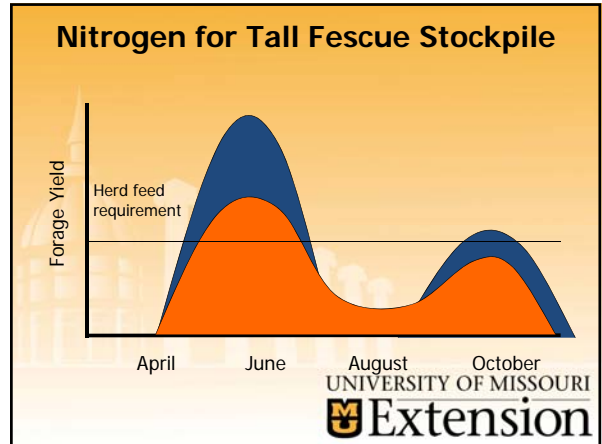
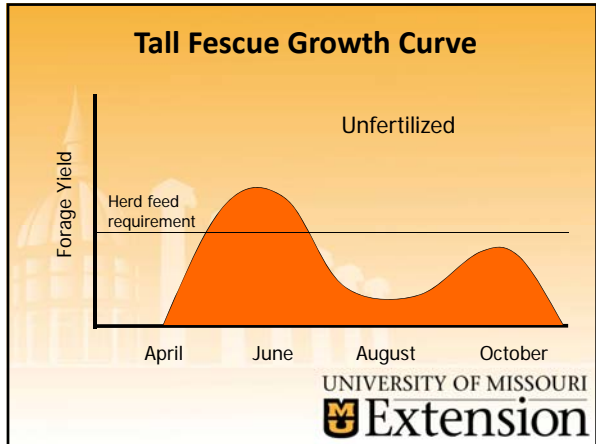
- **Winter stockpiling** is the management of pastures in the summer and fall for grazing during winter
- Spring growth is baled for hay in May when forage quality is high
- Fall growth is fertilized in August
- When spring/summer system is finished for the season, herd is moved to winter stockpile

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Hay Quality Management

- Cutting hay on May 15 has higher forage quality than hay harvested on July 15
- More volume may be harvested in a single, summer hay crop, but forage energy will be less
- Here, less high quality hay has a higher value than more of a lower quality

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Where Are Hay Nutrients Landing?



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Where Are Hay Nutrients Landing?



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Raised vs. Purchased Hay Nutrient Distribution

Raised hay

- Mandates even nutrient distribution to retain nutrient credit

Purchased hay

- Importing nutrients allowing strategic nutrient placement



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Hay Nutrient Distribution on Rented vs. Owned Forage Ground


Owned Hay Ground

- It is easier to keep hay nutrients on pastures that produce the hay

Rented Hay Ground

- Tenant may remove nutrients without replacement
- Hay removal without nutrient replacement may mine nutrients without realizing it
- Hay nutrients should be part of lease agreement



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Supplementing Our Low-Quality Hay

David Hoffman
Regional Livestock Specialist

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Steps to a Supplementation Program

- Step 1: Know the Quality of Forage (Hay Test).
- Step 2: Know what the cattle require.
- Step 3: Determine supplementation needs.

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Supplementation Goals

- 1st Priority: **PROTEIN**
 - Maximize forage intake and utilization.
 - Improve effectiveness of energy supplementation
- 2nd Priority: **ENERGY**
 - Meet the animal's needs.
 - Does the animal need to maintain, gain or lose weight?

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2008-12 Harvested Forage Quality

Test Value	Average	Range
Crude Protein (%)	8.4	5.7 – 16.5
TDN (%)	50.2	44.5 – 64.7
ADF (%)	46.0	28 - 52
NDF (%)	67.5	51 - 80

Hay Samples: 108

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2008-12 Harvested Forage Quality

Test Value	High Quality	Poor	Corn Stalks
Crude Protein (%)	16.5	5.7	4.7
TDN (%)	57.9	44.5	40.0
ADF (%)	37	52	53
NDF (%)	56	80	

High Quality Hay (Fescue/Clover): baled 1st week of May 2012.

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Supplementation for Average Hay (Cass County)

	Stage of Production				Avg. Hay
	Early Lact	Mid Lact	Dry	Pre-Calf	
Daily Intake (lb)	23.8	23.0	20.8	22.3	21.3
TDN (lbs/day)	15.2	12.8	10.1	11.8	10.7
Protein (lbs/day)	2.7	2.1	1.4	1.7	1.8
Soybean Meal (lbs/day)	1.9	0.6	-	-	
Corn (lbs/day)	3.2	1.8	-	1.2	
Suppl. Cost (\$/day)	\$0.67	\$0.28	-	\$0.11	

Corn: \$5.00/bu SBM: \$400/ton

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Supplementation for High Quality Hay

	Stage of Production				High Quality Hay
	Early Lact	Mid Lact	Dry	Pre-Calf	
Daily Intake (lb)	23.8	23.0	20.8	22.3	25.7
TDN (lbs/day)	15.2	12.8	10.1	11.8	14.8
Protein (lbs/day)	2.7	2.1	1.4	1.7	4.2
Soybean Meal (lbs/day)	-	-	-	-	
Corn (lbs/day)	0.5	-	-	-	
Suppl. Cost (\$/day)	\$0.05	-	-	-	

Corn: \$5.00/bu SBM: \$400/ton


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Supplementation for Poor Hay

	Stage of Production				Poor Hay
	Early Lact	Mid Lact	Dry	Pre-Calf	
Daily Intake (lb)	23.8	23.0	20.8	22.3	18.0
TDN (lbs/day)	15.2	12.8	10.1	11.8	8.0
Protein (lbs/day)	2.7	2.1	1.4	1.7	1.0
Soybean Meal (lbs/day)	3.5	2.2	0.8	1.5	
Corn (lbs/day)	4.7	3.2	1.6	2.9	
Suppl. Cost (\$/day)	\$1.12	\$0.73	\$0.30	\$0.56	

Corn: \$5.00/bu SBM: \$400/ton



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Supplementation for Corn Stalks


	Stage of Production				Corn Stalks
	Early Lact	Mid Lact	Dry	Pre-Calf	
Daily Intake (lb)	23.8	23.0	20.8	22.3	18.5
TDN (lbs/day)	15.2	12.8	10.1	11.8	7.4
Protein (lbs/day)	2.7	2.1	1.4	1.7	0.9
Soybean Meal (lbs/day)	3.8	2.5	1.0	1.7	
Corn (lbs/day)	5.1	3.8	2.0	3.3	
Suppl. Cost (\$/day)	\$1.22	\$0.84	\$0.38	\$0.64	

Corn: \$5.00/bu SBM: \$400/ton

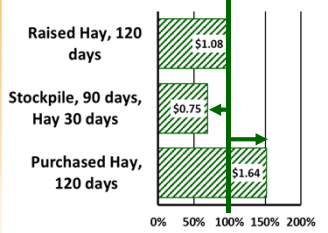

Importance of Hay Testing

- Provides analysis of quality of forage.
- Determines proper supplementation strategy.
 - Protein
 - Energy
- Make management changes following year to improve quality.




Management of Winter Forages can Lower Winter Feed Costs

- Winter Feed costs, \$/head/day


It Pays to Reduce Hay-Feeding Days

Cost/d/hd	Days of hay				
	30	60	90	120	150
\$0.75	\$22.50	\$45.00	\$67.50	\$90.00	\$112.50
\$1.00	\$30.00	\$60.00	\$90.00	\$120.00	\$150.00
\$1.25	\$37.50	\$75.00	\$112.50	\$150.00	\$187.50
\$1.50	\$45.00	\$90.00	\$135.00	\$180.00	\$225.00
\$1.75	\$52.50	\$105.00	\$157.50	\$210.00	\$262.50




Managing More with Less - Conclusion

- PAY ATTENTION - The World has Changed
- Managing more production or fewer resources
 - Manage highest quality forage for minimum cost
 - Timing of hay (spring vs. summer)
 - Maximize nutrient utilization (hay vs pasture)
 - Avoid waste hay
 - Manage pasture rentals
 - Grazing costs less than hay



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