Evaluating a Early Weaning Drought Management Strategy

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Reducing Forage Needs

When forage production is low and it becomes necessary for producers to make management adjustments to reduce forage needed for the cow-calf enterprise, there are several options that can be employed:

- Sell cows
- Early wean calves
- Lease additional pasture
- Feed additional energy to reduce grazing

It can be challenging to cost effectively lease pasture, feed energy, or sell cows just to buy them back when forage production improves. Early weaning, especially when combined with one or more of the other options listed, can be a useful tool to manage forage supply while minimizing the need to feed energy or dramatically liquidate cattle.

A forage budget can be developed mathematically or visually estimated by experienced producers. Regardless of the method employed, during years of low forage production, producers should calculate or estimate stocking rate reductions needed to balance forage supply and demand. Mathis and Encinias publication Guide B-126, "*Early Weaning Beef Calves"* outlines a method for calculating a forage budget.[1]

Early Weaning

Early weaning of calves is a management tool that producers can implement to reduce the forage needs of the cow-calf enterprise and improve and or maintain cow condition and reproductive performance. "Early weaning" is weaning calves anytime earlier than "normal." Calves in New Mexico are typically weaned when they are 6 to 8 months old; however, calves can be weaned as early as 6 weeks of age. When calves are weaned early to improve reproductive performance, they may be weaned just prior to the breeding season to impact reproduction in the breeding season that immediately follows. Getting a little late for this option on spring calving ranches in New Mexico. However, calves can still be weaned 30 to 90 days earlier than normal in attempt to reduce the postpartum interval during the breeding season that follows 6 to 8 months later and decrease cow energy requirements.

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[1] Mathis, Clay P. and Manny Encinias. 2005. "Early Weaning Beef Calves." NMSU Cooperative Extension, College of Agriculture and Home Economics. Guide B-126 pp1-6. http://aces.nmsu.edu/pubs/_b/welcome.html

Although, early weaning is not advocated for all producers all of the time, early weaning can provide a management alternative in situations such as drought, when large amounts of purchased forage would be necessary to maintain a cow herd through normal weaning time or when cows are already too thin to rebreed. Studies at both New Mexico State University[2] and Oklahoma State University[3] show that early-weaned calves can be efficiently raised to a normal weaning weight with minimal labor and facilities.

Why Early Weaning Works

Lactation roughly doubles the daily energy and protein requirement for a typical beef cow. Removing the calf at six to eight weeks into lactation obviously reduces the quantity and quality of forage needed to maintain the cowherd. Reasons for improved rebreeding after early weaning involve more than nutrition, however. Research has shown that the removal of the nursing calf causes hormonal changes in the cows that stimulate estrus. Estrus activity can then be induced in cows too thin to cycle while still suckling a calf.

Managing the Early Weaned Calf

The most critical time is the first two weeks after early weaning. Calves must overcome the stress of weaning and learn to eat dry feed very quickly. The first ration should be very palatable and high in protein and energy, since the total ration consumption will at first be small. Creep feeding in the pasture prior to early weaning is helpful, but may not be feasible; however, 6-8 week old calves don't generally eat much creep while still nursing on the cow.

At the time of early weaning, all calves should be vaccinated for blackleg and malignant edema. Consult a local veterinarian for other suggested vaccinations. All calves not intended for breeding replacements should be implanted. The calves should be placed in a small pen with some type of shelter available. The feed bunk and water source should be easily accessible and recognizable. A starter ration that has worked well is shown in Table 1. It may not be practical for smaller cowherds to purchase bulk quantities. Most feed mills have high quality starter/creep rations that can be purchased in a bag, that are high in both energy and protein. In the example starter ration, cottonseed hulls are used as the sole roughage source, since they are extremely palatable. If chopped hay is substituted for cottonseed hulls, molasses should be added to minimize dust. Avoid alfalfa pellets, because calves tend to sort them from the concentrate portion of the ration, a problem that can lead to founder if too much concentrate is eaten. Soybean meal is preferred over cottonseed meal for young calves.

Table 1: Starter Ration

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[2] Foster, L. 1996. "Cow herd nutrition during a drought." Western Beef Producers 2nd March.

[3] Lusby, K. S., R. P. Wettemann, and E. J. Thurman. 1981. "Effects of early weaning calves from first-calf heifers on calf and heifer performance." J. Anim, Sci. 53:1193-1197. And Lalman, David. 1983. "Early Weaning for the Beef Herd." Oklahoma State University Cooperative Extension. ANSI-3264. 4pp.

Production Assumptions								
Number of Calves Weaned	176			Days on Feed	12			
Calf Early Wean WT	300			Rate of Gain, lbs per day	1.5			
Feed Rate, as % of body wt	2.50%			End/Market Wt	318			
Feed Rate, Avg lbs per day	7.725			(Note: Feed rate = weighted avg of begin and end wt)				
Cow Herd Size (Exposed)	**200**							
Ration		$/ton	% of Ration		Lbs		Cost/lb Ration	Cost/ton
Rolled Corn	$	356.43	64.00%		1280	$	0.1782	$ 228.12
Soybean meal	$	400.00	20.00%		400	$	0.2000	$ 80.00
Cottonseed Hulls	$	140.00	10.00%		200	$	0.0700	$ 14.00
Cane Molasses	$	180.00	5.00%		100	$	0.0900	$ 9.00
Supplement	$	500.00	1.00%		20	$	0.2500	$ 5.00
	$	-	0.00%		0	$	-	$ -
	$	-	0.00%		0	$	-	$ -
	$	-			0	$	-	$ -
Feed mill markup	$	50.00	NA	NA		$	0.0250	$ 50.00
Other	$	-	NA	Na		$	-	
Total Ration Cost			100.00%		2000	$	0.1931	$ 386.12
Total Ration Cost Per Head								$ 17.90
Ration Cost per pound of gain								$ 0.9942
Total Pounds/Tons of Ration Fed			16315.20	Pounds			8.16	Tons

Calves should be hand fed the starter ration until consumption reaches 4-7 lbs/head/day, depending on calf weight at time of weaning. This normally takes 10-14 days. To insure that smaller and more timid calves get a chance at feed and water, limit 20 calves per pen during the critical first few days on the starter ration. Placing one or two older calves that are accustomed to eating and drinking in with the early-weaned calves helps to reduce stress on the weaned calves. Observations have indicated that the newly weaned calves tend to follow the older calves to the feed bunk and caterers.

After 10-14 days on the starter ration, the early weaned calves can be moved to a larger pen and switched to a “calf grower ration.” Tables 2 and 3 report calf grower rations for calves placed in feedlot situation and calves fed on the ranch. Both rations are actual rations being used by producers, and are often dependent on availability of commodities and not so much cost of commodity.

Table 2 and 3 estimate total other feeding cost associated with early weaning feeding program, labor, vet/med, fuel, trucking, etc. Producer should be careful not to under estimate total cost of feeding calves, on or off the ranch.

NOTE: The rations in this document were developed using the “Early wean Ration Calculator Plus.xlt” that can be downloaded at: http://aces.nmsu.edu/drought/index.html The template does not balance a ration, but will help calculate the cost per unit of production fro a given ration.

Table 2: Early Weaning Ration No. 1: Feedlot Ration

Senario 4 Calf Ration: Inadequate Forage, Early weaning, Calves fed at feedlot (Ration

Production Assumptions	NOTE: Only input/change BLUE values/numbers		
Number of Calves Weaned	176	Days on Feed	90
Calf Early Wean WT	300	Rate of Gain, lbs per day	1.6
Feed Rate, as % of body wt	3.00%	End/Market Wt	444
Feed Rate, pounds per day	11.16	(Note: Feed rate = weighted avg of begin and end wt)	
Cow Herd Size (Exposed)	**200**		

Ration	$/ton	% of Ration	Lbs	Cost/lb	Ration Cost/ton
Ground Hay	$ 225.00	28.00%	560	$ 0.1125	$ 63.00
WDG	$ 95.00	58.50%	1170	$ 0.0475	$ 55.58
Burrs	$ 70.00	12.00%	240	$ 0.0350	$ 8.40
Supplement/minerals	$ 500.00	1.50%	30	$ 0.2500	$ 7.50
		0.00%	0	$ -	$ -
	$ -	0.00%	0	$ -	$ -
	$ -	0.00%	0	$ -	$ -
	$ -		0	$ -	$ -
Feed mill markup	$ 50.00	NA	NA	$ 0.0250	$ 50.00
Other	$ -	NA	Na	$ -	
Total Ration Cost		100.00%	2000	$ 0.0922	$ 184.48

Total Ration Cost Per Head			$ 92.64
Ration Cost per pound of gain			$ 0.6434
Total Pounds/Tons of Ration Fed	176774.40 Pounds	88.39 Tons	

Other Feeding Cost	Unit	Cost/Unit	Quanity	Total	Cost Per Heac
Labor	Total		100	$ -	$ -
Water Improvments	total		1	$ -	$ -
Vet Med/Health	Per Head	$ 12.00	100	$ 1,200	$ 6.82
Fuel and Oil	Total		1	$ -	$ -
Supplies	Total		1	$ -	$ -
Trucking (feed to ranch)	Loaded Mile	$ 4.00	135	$ 540	$ 3.07
Yardage per hd per day		$ 0.30	15840	$ 4,752	$ 27.00
Other		$ -		$ -	$ -
Total Other Early Wean/Feeding Cost				$ 6,492	$ 36.89

Total Early Weaning Cost per Head	$ 129.53
Total Early Weaning Cost per pound of gain	$ 0.90
Total Early Weaning Cost per Cow	$ 113.99
Total Additional Cost to Cow Herd From Early Weaning	$ 22,797.23

Problems to look for during the drylot rearing of the calves, on or off the ranch include: 1) respiratory problems, especially during the first few days; 2) sorting of the ration, which can lead to founder; 3) coccidiosis and 4) scouring. If coccidiosis is felt to be a potential problem, a cocciostat should be fed at the start of the early weaning period. If dust is a problem, investment in some hose and sprinklers might be necessary. Ideally, early-weaned calves are started with a ration high in energy and protein and are gradually changed to a grower-type ration as their total intake increases.

Table 3: Early Weaning Ration No. 3, Custom Feed Delivered to Ranch

Senario 5 Calf Ration: Inadequate Forage, Early weaning, Calves fed on ranch (Ration 3

Production Assumptions	NOTE: Only input/change BLUE values/numbers		
Number of Calves Weaned	176	Days on Feed	90
Calf Early Wean WT	300	Rate of Gain, lbs per day	1.8
Feed Rate, as % of body wt	3.00%	End/Market Wt	462
Feed Rate, pounds per day	11.43	(Note: Feed rate = weighted avg of begin and end wt)	
Cow Herd Size (Exposed)	**200**		

Ration	$/ton	% of Ration	Lbs	Cost/lb	Ration Cost/ton
Rolled Corn	$ 305.00	25.00%	500	$ 0.1525	$ 76.25
Soybean meal	$ 243.00	20.00%	400	$ 0.1215	$ 48.60
Cottonseed Hulls	$ 218.00	30.00%	600	$ 0.1090	$ 65.40
Cane Molasses	$ 70.00	24.90%	498	$ 0.0350	$ 17.43
Supplement	$ 4,975.00	0.10%	2	$ 2.4875	$ 4.98
	$ -	0.00%	0	$ -	$ -
	$ -	0.00%	0	$ -	$ -
	$ -		0	$ -	$ -
Feed mill markup	$ 50.00	NA	NA	$ 0.0250	$ 50.00
Other	$ -	NA	Na	$ -	
Total Ration Cost		100.00%	2000	$ 0.1313	$ 262.66
Total Ration Cost Per Head					$ 135.10
Ration Cost per pound of gain					$ 0.8339
Total Pounds/Tons of Ration Fed		181051.20	Pounds	90.53	Tons

Other Feeding Cost	Unit	Cost/Unit	Quanity	Total	Cost Per Head
Labor	Total	$ 15.00	176	$ 2,640	$ 15.00
Water Improvments	total	$ 500.00	1	$ 500	$ 2.84
Vet Med/Health	Per Head	$ 12.00	176	$ 2,112	$ 12.00
Fuel and Oil	Total	$ 800.00	1	$ 800	$ 4.55
Supplies	Total	$ 500.00	1	$ 500	$ 2.84
Trucking (feed to ranch)	Loaded Mile	$ 4.00	135	$ 540	$ 3.07
Yardage		$ -		$ -	$ -
Other		$ -		$ -	$ -
Total Other Early Wean/Feeding Cost				$ 7,092	$ 40.30
Total Early Weaning Cost per Head					$ 175.39
Total Early Weaning Cost per pound of gain					$ 1.08
Total Early Weaning Cost per Cow					$ 154.35
Total Additional Cost to Cow Herd From Early Weaning					$ 30,869.00

Expected Calf Performance

Depending on ration and environmental factors, daily gains of commercial calves will likely average between 1.5 lbs/day to 2.0 lbs/day from 6-8 weeks of age to 205 days of age. Calves can be expected to consume 3% of their body weight, or an average of 9-10 lbs of feed/day during the early weaning period, with a feed conversion of 4.5 lbs of dry matter per pound of gain, again depending on the ration and environment. Weaning

weight for early weaned calves will depend on beginning early weaning weight and days on feed. In our example calves weighed 300 lbs at time of early weaning. Performance of early-weaned calves compared to pasture reared calves will depend on the growth potential of the calves, the level of milk production of the dams and the level of management.

All roughage fed to early-weaned calves should be mixed in desired portions in a complete ration. When free-choice hay is available, some calves may consume mostly hay, which provides protein, minerals and energy. By increasing the roughage level of the complete rations as the calves get bigger and thus increasing their daily ration intake, the correct levels of protein, energy and minerals can be "metered" into the calves.

Improving Reproductive Performance

The relationship between reproductive success and body condition at calving is based on energy. Cows must have energy to support all bodily activities, but some functions have a higher priority for energy use than others. Cows can only direct energy toward resuming the estrous cycle after calving if energy intake exceeds the combined requirements for maintenance, growth and lactation. Energy demands of a lactating cow can be very high. It is important that the cow is in adequate body condition at calving so that stored energy can be used to support her needs. If she does not have enough stored energy at calving, she must gain weight during lactation so that she will have enough energy to begin cycling again. However, it is difficult to cost effectively increase body condition of cows in early- to mid-lactation with supplemental feed. This is why body condition at calving is strongly related to the length of the postpartum anestrous period (time between calving and first heat) in beef cattle. Cows that are thinner at calving take longer to resume cycling after calving and are less likely to become pregnant during the breeding season[4].

Since body condition at calving influences reproductive performance, early weaning can be utilized to improve the chance that a cow is in acceptable body condition. As previously noted, research has show that weaning calves early can greatly lower a cow's nutrient requirements by ceasing lactation. More specifically, if the calf is weaned at 60 days of age (2 months), the cow's daily energy requirement declines by 37 percent. Reducing the nutrient requirements of lactation by weaning the calf makes early weaning an option to manage thin cows to achieve short- and long-term improvements in reproductive performance.

Penciling it Out: What makes sense?

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[4] Mathis, Clay P., Jason E. Sawyer and Ron Parker. 2002. "Managing and Feeding Beef Cows Using Body Condition Scores." NMSU Cooperative Extension Service, College of Agriculture and Home Economics, Circular 575, 9pp. http://aces.nmsu.edu/pubs/_b/welcome.html

An economic analysis of 5 weaning/early weaning scenarios are shown in Table 4. Our basic assumptions for these scenarios are; a spring calving program on native range is used in which calving begins about March 15. An 88% calf crop with 475 lb weaning weights is considered average for cows raising their calves in average to good forage production years. For this example analysis, we have 176 calves, 200 cows and heifers and 10 bulls currently on the ranch, and forage conditions continue to deteriorate. In an effort to reduce forage demands and maintain the reproductive performance of the cowherd, we want to evaluate and compare the feasibility of early weaning under the following scenarios/situations:

Scenario 1: Standing forage is inadequate and the decision is too traditionally wean calves in late October. The available supply of hay and protein supplement is inadequate to meet the nutrient requirements of the cow. Cows will be in poor condition through the remainder of breeding season and into the fall and winter months.

Scenario 2: Standing forage is inadequate and the decision is too traditionally wean calves in late October. Adequate hay and protein will be fed to the cowherd too meet her nutrient requirements and maintain reproductive performance.

Scenario 3: Standing forage is inadequate and the decision is too early wean calves July 30th and to sell as early weaned calves. Adequate hay and protein will be fed to the cowherd too meet her nutrient requirements and maintain reproductive performance following weaning.

Scenario 4: Standing forage is inadequate and the decision is too early wean calves July 30th and to place calves in feedlot for approximately 90 days—market late October. Early wean Starter and Feedlot ration, reported in Tables 1 and 2 above, respectively, were used in this scenario. Adequate hay and protein will be fed to the cowherd too meet her nutrient requirements and maintain reproductive performance following weaning.

Scenario 5: Standing forage is inadequate and the decision is too early wean calves July 30th and to dry lot the calves on the ranch for approximately 90 days—market late October. Early wean Starter and Feedlot rations, reported in Tables 1 and 3 above, respectively, were used in this scenario. Adequate hay and protein will be fed to the cowherd too meet her nutrient requirements and maintain reproductive performance following weaning.

Table 4 reports net returns to calf production for each of the five scenarios. Note that cull sales are not included as part of the analysis, as we want to look at the economic feasibility of various weaning options during drought.

For 2011, net returns to calf production were substantially greater for Scenario 1, where we had an inadequate forage situation and the decision was made to traditionally wean

calves and not to purchase additional feed to meet the nutrient requirements of the cow. As might be expected, calf-weaning weights were lighter than normal, but because not additional resources were put into the cow herd, return to calf production was greater, in 2011. However, this revenue advantaged in 2011 is completely offset by lower reproductive performance in 2012, 60% of cows exposed, coupled with than normal weaning weights due to poor pasture conditions resulting from heavy use/demand the previous year. It is also highly probable that cow in poor condition at time of calving, will also impact the reproductive efficiency for 2012.

Table 4: Costs and Return Analysis for Early Weaning vs Traditionally Weaning of Calves Born in March 2011;

Impact on Returns for 2011 and 2012			Senario 1-5		
2011-2012 Production Assumptons	Senario 1: Inadequate Forage, Traditionally wean, Cow requirements not met	Senario 2: Inadequate Forage, Traditionally wean, Cow requirements are met	Senario 3: Inadequate Forage, Early weaning, Calves sold at early wean wt	Senario 4: Inadequate Forage, Early weaning, Calves fed at feedlot (Ration 1)	Senario 5: Inadequate Forage, Early weaning, Calves fed on ranch (Ration 3)
Cow drought ration: July-15-May 15					
Hay-Lb/hd/day	4.50	10.00	4.00	4.00	4.00
Protien--20% cube, Lb/hd/day	2.50	3.00	1.50	1.50	1.50
Supplement/minerals-Lb/hd/day	0.20	0.20	0.20	0.20	0.20
Total feed Cost for Cow, $/cow	$ 157.43	$ 263.03	$ 120.23	$ 120.23	$ 120.23
Cost for Early-Weaned Calf, $/cow	$ -	$ -	$ -	$ 113.99	$ 154.35
2011 Returns					
Average Weaning Wt, lbs	440	460	300	444	462
Calving Rate %	88%	88%	88%	88%	88%
Weaned wt./cow, lb	387.2	404.8	264	390.72	406.56
Avg Market price for calf, $/lb	$ 1.50	$ 1.45	$ 1.65	$ 1.50	$ 1.45
Calf Returns ($/lb x wean lb/cow)	$ 580.80	$ 586.96	$ 435.60	$ 586.08	$ 589.51
Net (Calf Returns-feed Costs)	$ 423.37	$ 323.93	$ 315.37	$ 351.86	$ 314.94
Total Other Non Drought Cost/Cow	$ 250.00	$ 250.00	$ 250.00	$ 250.00	$ 250.00
Net (Calf Returns-total cow cost)	$ 173.37	$ 73.93	$ 65.37	$ 101.86	$ 64.94
2012 Returns (Assumes no drougth)					
Total Cow Cost, Non Drought	$ 475.00	$ 475.00	$ 475.00	$ 475.00	$ 475.00
Average Weaning Wt, lbs	450	475	475	475	475
Calving Rate %	60%	88%	92%	92%	92%
Weaned wt./cow, lb	270	418	437	437	437
Avg Market price for calf, $/lb	$1.45	$1.40	$1.40	$1.40	$1.40
Calf Returns ($/lb x wean lb/cow)	$391.50	$585.20	$611.80	$611.80	$611.80
Net (calf-total cow cost)	($83.50)	$110.20	$136.80	$136.80	$136.80
			Two Year Summary		
2011-2012 Returns	$ 89.87	$184.13	$202.17	$238.66	$ 201.74

Note: Returns do NOT include cull cow sales, 20% cubes at $320/ton and medium quality hay at $200/ton

Scenario's 2, 3, 4 and 5 all report positive net returns to calf sales, but $100 to $70 per cow less then Scenario 1. Scenario 5, Early weaning calves and feeding on the ranch reported the lowest return at nearly $65 per cow, closely followed by Scenario 3, early wean and sell calves at early wean weight. Scenario's 4, dry lot calves off the ranch reported the greatest positive return at $101 per cow, clearly due to the lower ration cost in this example. Clearly the results of each of these Scenarios are dependent on the production and cost of production assumptions made. A higher ration cost for cows under Scenario 2 would quickly reduce any benefits to feed cows vs calves. The real cost not computed hear under Scenario 2 it that the cow and calves are more than likely still on the range foraging.

For 2012, the impact of reproductive performance, or lack there becomes evident. In Scenario 1, it is likely, depending on the condition of cows at calving in 2012, and the condition of the range; these cows will continue to struggle reproductively. The impact of not meeting the nutrient requirement of the cows while continuing to lactate on pastures with inadequate forage will likely impact the productivity of the range resources and the cow herd. Scenario 1 report a negative $83.50 per cow in 2012, that is a $250 per cow decrease in revenue from 2011.

Conversely, in Scenario 2, the investment made in feed to meet the nutrient requirement of the cow and maintain her body condition and reproductive performance does pay off, but is will likely have a much greater effect on net cash flow, than early weaning and aggressively reducing the energy demand of the cow herd.

Scenario 3, 4, and 5--assuming a 92% calf crop the following year from early-weaned cows, along with their lower wintering cost, early weaning only shows a $20-55 advantage for the two-year period over purchasing hay in 2011, to maintain cow condition with—Scenario 2. Again, the real cost, not reported hear, is the loss of forage from maintaining lactating cows through October.

In Scenarios 2-5, feeding to maintain cows conditions netted more positive outcome over living through poor conception rates with underfed cows—Scenario 1. The advantage to early wean and feed calves vs early wean and market calves right away will clearly depend on early wean weight and market price vs the ration costs—the whole ration cost. Scenario 5 suggest if feed cost for developing calves is over $1.10 per pound of gain, one should closely evaluate production and market risk of feeding calves. This is due the simple economics that total cost of production start to have a greater impact on the bottom line when development cost for calves reach $1.10 per pound of gain. Clearly, higher market prices and weaning weight can help.

NOTE: it is important to note the analysis reported in Table 4 does NOT include revenue from cull sales. This was intentional; we are interested in evaluating the economic feasibility of various weaning/early-weaning programs. The most likely place for early weaning is in a situation where poor conception rates are expected. Depending on concentrate and hay prices, early weaning might be an economically feasible alternative to purchasing large amounts of hay to maintain cow condition. Producers should substitute their own feed costs as appropriate in this budget

This analysis was complete using the “Early wean Ration Calculator Plus.xlt” that can be downloaded at: http://aces.nmsu.edu/drought/index.html Producers are encourage to input their own production, financial and marketing assumptions.