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Valuing a Replacement Heifer

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Cornhusker Economics

Cooperative Extension

Institute of Agriculture & Natural Resources
Department of Agricultural Economics
University of Nebraska – Lincoln

Valuing a Replacement Heifer

Market Report	Yr Ago	4 Wks Ago	9/10/99
<u>Livestock and Products,</u>			
<u>Average Prices for Week Ending</u>			
Slaughter Steers, Ch. 204, 1100-1300 lb Omaha, cwt.	56.75	65.04	65.91
Feeder Steers, Med. Frame, 600-650 lb Dodge City, KS, cwt.	*	*	84.48
Feeder Steers, Med. Frame 600-650 lb, Nebraska Auction Wght. Avg.	*	90.20	82.75
Carcass Price, Ch. 1-3, 550-700 lb Cent. US, Equiv. Index Value, cwt.	90.41	101.26	102.15
Hogs, US 1-2, 220-230 lb Sioux Falls, SD, cwt.	30.05	34.75	32.00
Feeder Pigs, US 1-2, 40-45 lb Sioux Falls, SD, hd.	*	21.56	*
Vacuum Packed Pork Loins, Wholesale, 13-19 lb, 1/4" Trim, Cent. US, cwt.	98.13	122.80	108.50
Slaughter Lambs, Ch. & Pr., 115-125 lb Sioux Falls, SD, cwt.	73.13	88.07	74.18
Carcass Lambs, Ch. & Pr., 1-4, 55-65 lb FOB Midwest, cwt.	165.00	183.50	174.00
<u>Crops,</u>			
<u>Cash Truck Prices for Date Shown</u>			
Wheat, No. 1, H.W. Omaha, bu.	2.52	2.80	2.97
Corn, No. 2, Yellow Omaha, bu.	1.70	1.71	1.66
Soybeans, No. 1, Yellow Omaha, bu.	5.08	3.23	4.68
Grain Sorghum, No. 2, Yellow Kansas City, cwt.	3.01	4.22	2.91
Oats, No. 2, Heavy Sioux City, IA, bu.	*	1.12	1.11
<u>Hay,</u>			
<u>First Day of Week Pile Prices</u>			
Alfalfa, Sm. Square, RFV 150 or better Platte Valley, ton.	*	57.50	90.00
Alfalfa, Lg. Round, Good Northeast Nebraska, ton.	52.50	*	35.00
Prairie, Sm. Square, Good Northeast Nebraska, ton.	70.00	57.50	*
* No market.			

Fall is an important time for Nebraska beef cattle producers. Decisions are often made about retaining or acquiring replacement females for either sustaining or growing the beef cow herd. Just how many bred heifers or heifer calves should be retained or acquired will depend on the replacement rate for the mature cows and whether or not the producer is planning to change total cow numbers. An important aspect of the retention (or buying) decision is the value of a bred female.

In the July 22 issue of "The Market Advisor" Dr. Harlan Hughes of North Dakota State University discussed some important issues related to valuing a bred heifer. One of the points he made relates to the timing of retention compared to the phase of the cattle price cycle. A heifer that begins production near the start of the higher price cycle will be worth more than one that begins production later in that same cycle. If a producer waits to make the retention decision until the cash prices have turned up, he or she has probably missed the highest value of the heifer.

The procedure for estimating the value of a bred heifer is based on capital budgeting or discounting techniques and includes 5 steps.

1. Estimate future prices
2. Estimate future costs and returns/cow
3. Project cull salvage value after assumed number of calves.
4. Decide on appropriate discount rate.
5. Calculate the present value of the cash flow stream

Step 1, estimating future prices, is an important activity since the prices are needed to project the future returns per cow (Step 2). Dr. Hughes used work conducted at the University of Missouri and Iowa State University's Food and Agricultural Policy Institute (FAPRI) to arrive at average weaned calf prices for 500-600 pound weaned calves. Those prices are shown in the accompanying table.

Step 2, estimating future costs and returns, is the most



important step in the procedure. To do this the producer must have an excellent understanding of the costs and returns of her/his cow-calf operation. Dr. Hughes used the information from a North Dakota herd to demonstrate the concept. He used returns over cash expenses excluding family living costs to estimate the annual net income. The returns were based on an 87 percent weaned calf crop. Cows weaned 489 pounds of calf per cow exposed to breeding. Costs were held constant over this time period at \$316 per cow. He estimated that the salvage value (**Step 3**) would be \$400 after 7 calves.

Step 4 is deciding upon an appropriate discount rate. Why do we discount future returns to obtain a present value? First, one must consider the opportunity cost of the capital. If we have a dollar today we can either invest it or use it to pay off debt. In either case it is worth more today than if it were to be received at a future date. Secondly, the future is uncertain so money received today should have more value to us than at a future date since we know today what we can do with that money. Third, we still experience inflation even though it is lower than in the past. We know that a year from now, one-dollar will have less purchasing power than today. Since many producers utilize borrowed capital to develop or buy replacement females, the use of a short or intermediate term borrowing rate as the discount rate seems appropriate. For the accompanying example, Dr. Hughes used an 8 percent discount rate (9 percent reduced for income tax impact). A higher discount rate will result in a smaller present value for the same flow of returns.

The **final step** is to estimate the present value by using the appropriate discount factor for each year. The example shows the factors for years 2000 through 2007 when the female is culled. These are multiplied times the net returns for that year. The discounted values are then summed to provide the estimated present value that is \$783. The \$783

value means that if heifer development cost or the purchase price is \$783, the producer will experience an 8 percent return on the net cash returns from this heifer over her expected, productive life (if all of our assumed costs and returns occur). If cost or purchase price is higher, a lower rate of return will result. If the female can be purchased or developed for less than \$783 returns will be higher. Heifer development cost includes the value of the weaned heifer calf. If a 9 percent discount rate is used the present value of the bred heifer drops to \$750, and at 10 percent the value becomes \$719.

Suppose heifer calves are retained this year. These calves will not be in production until the year 2001. If we expect an additional year of returns for the year 2007 to be \$75 (assume the prices start again to improve by 2007) what will be the expected value of the bred heifer? We drop the \$106 projected cash income for 2000 and add the \$75 to 2007 and recalculate as though we are at this time a year from now. The discounted present value of a bred heifer in the year 2000 then drops to \$765 so we have missed some of the peak. Again that would need to be compared to the cost of either developing or purchasing a bred heifer a year from now. The cost of developing a bred heifer a year from now will include the opportunity cost of the heifer calf this fall (what could she bring as a weaned calf) plus the costs of developing her from weaning to next fall. Remember that those development costs should include the fact that not all heifers exposed to breeding will actually be pregnant next fall. If a producer desires to have 15 bred heifers to add to the cowherd next fall, then 20 will probably need to be retained and the associated costs for the extras should be included. If lucky, the associated development costs for the extra heifers may be offset by their value when culled for being open or other reasons.

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YEAR	PRICE 500-600 lb CALVES (\$/cwt)	NET INCOME	DISCOUNT FACTOR	PRESENT VALUE
2000	87	\$106	.9259259	\$98
2001	91	\$123	.8573388	\$105
2002	94	\$136	.7938322	\$108
2003	92	\$127	.7350299	\$93
2004	90	\$116	.6805832	\$79
2005	82	\$81	.6301696	\$51
2006	76	\$54	.5834940	\$32
Cull value	NA	\$400	.540269	\$216
PRESENT VALUE OF COW				\$783