University of Nebraska Lincoln Beef Economics Team Annual Beef Heifer Replacement Forecasts for the 2017 – 2018 Production Season

What is a reasonable value to spend on beef replacement heifers for the coming 2017-2018 production season? Like many decisions this may seem very complex or difficult to determine, and it can be since there are many factors. The intention of this report is to help stakeholders in two ways. First letting them see some "best guesses" forecasts, using some common sources of information, i.e. FAPRI, Kansas State data. Secondly making it known that an electronic spreadsheet is available for individual use. For those wishing to make their own forecasts. Regardless of the complexity and the challenges faced in making a good prediction of heifer values, it is none the less important to do so. Ranch profitability is not the result of a single choice but the culmination of all management, marketing and production choices. Therefore better individual choices such as controlling costs are likely to result in increased profitability. Some choices have a larger role in affecting profits and sustainability and the costs of brood cow replacements are basic to profitability. No forecast is any better than the accuracy of the information used to make it, while great pains were taken to assure the use of the best information, only time will determine its true value. The information provided here is intended for use with this thought in mind.

When purchasing replacement heifers many factors should be considered, listed below are three factors seen by the authors as critically important:

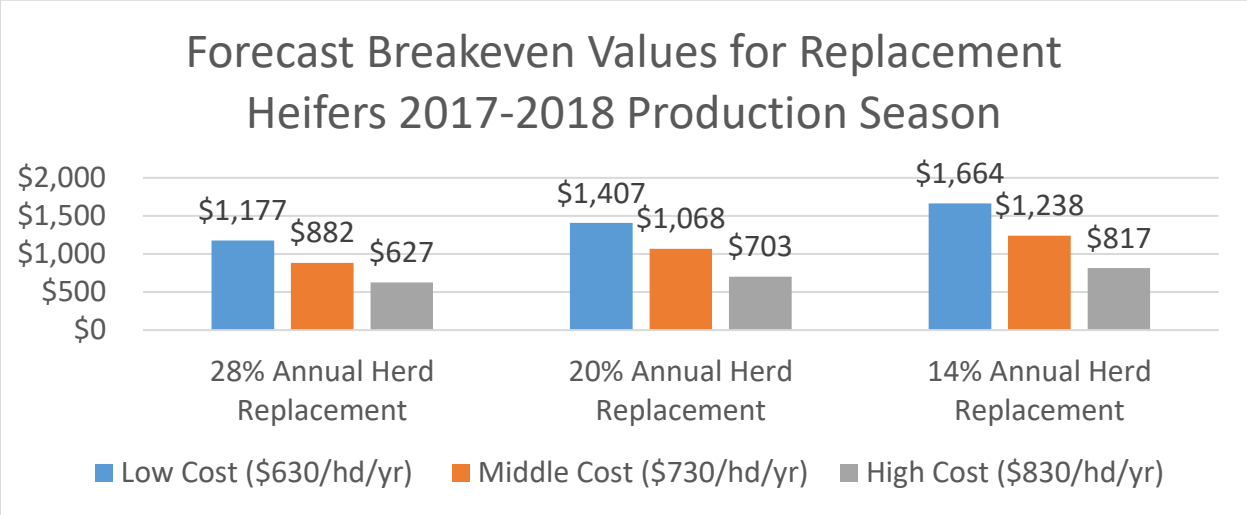
1) The heifer's ability to stay in the herd as a cow (longevity)
2) Current and future expected difference between costs and revenues (includes cattle cycle)
3) Genetic compatibility with herd mates and operators goals and management style

Since it is difficult to anticipate and quantify all the possible conditions, types and choices that might be made, we propose nine general costs (factor 2) and replacement condition (factor 1) scenarios and leave the other variables and factors to be considered such as genetics, management style and so forth to those making the choice to buy or raise particular replacement females. Two of the primary factors that influence the value of a replacement beef females are the costs and revenues per calf weaned (factor 2) and the length of time they are available for repaying those initial costs (factor 1). In the instance of weaned calf costs many factors contribute to this, pregnancy rates, overall feed costs, herd health programs, and so on. We make a simplifying assumption that producers are of one of three cost types. Low costs producers have an annual cost which averages approximately $630/hd. The mid cost producer has an annual cost of approximately $730/hd. The high cost producer has the highest annual cost which is on average approximately $830/hd. These values are based on the authors making subjective adjustments to Kansas and FAPRI information, to represent Nebraska production costs. Revenues are based on FAPRI calf and cow forecasts for the next 10 seasons. Capturing the longevity of anyone particular animal is a difficult proposition at best. Therefore we used the idea that past production performance is the best predictor of future performance and use average herd age and replacement rates to govern turnover and cow life. Under this premise brood cows in a younger averaged herd would have a shorter production life whereas cows in an older averaged herd would on average have a longer production life. To provide uniformity a $1500 purchase value regardless of cost structure or average herd ages was established. This value provides a bench mark whereby the replacement heifer's age is calculated upon exceeding the breakeven point. On the other hand the estimated breakeven values for each scenario are based on forecast costs and longevity.

General Forecasts

Forecasts range from about a low of $627/hd/yr to a high of $1664/hd/yr, (Table 1). The best case scenario is where cost are lowest and herd average age is highest, the lowest annual replacement rate. The lowest breakeven value is for the highest replacement rate and the highest cost. From these results it can be extrapolated producers could breakeven with an $1,800/hd heifer value if their cost were lower than the $630/hd/yr by $32.09/hd/yr for the 14% replacement rate. Cost would be 597.91/hd/yr.

Table 1



To accomplish the same $1800/hd breakeven value for replacements without changing costs would require increasing herd average age by 6.36 months making the average herd age approximately 6.5 years of age. To obtain this average, annual herd replacement rate would need to fall close to 11%. These heifer value projections indicate producers should be conservative in their investment in replacement heifers. Another possible take, given that these predictions are accurate, could go something like this; In the long run (many seasons) heifer value will likely be a breakeven proposition. Some years will result in an over expenditure while others will provide a windfall. This last idea is the most likely case, but, key to success given it is true is the fact that winning years will at least return as much as losing years. Therefore these predictions become invaluable in providing help in deciding when to take advantage of a winning year, and when to be more conservative.

Low Production Cost Heifer Values

Age scenario #1 results illustrate the outcome of a **young-aged cow herd, an average replacement rate near 28%** in a **low cost production environment.** From Table 2, below, the simulation average breakeven price for purchasing a replacement heifer is **$1,177.19**/hd/yr. The average age of the cow herd is **4.09** years old with a positive return at an average of **5** years of age, remembering that **$1,500**/hd replacement cost is incurred. Cows culled before 5 years of age on average have a negative effect on profits, while those culled later have on average a positive effect on profits. As one would expect this breakeven age effect is identical for all three age scenarios for low cost production.

Table 2

Low Costs Producer with a Young Aged Cow Herd	
Average Breakeven Price	**$1,177.19**
Average Age to Positive Return	**5**
Average Cow Age of the Herd	**4.09**

Age scenario #2 for **low costs producer's, medium-aged cow herd about a 20% average replacement rate** has a higher projected replacement value. In this scenario breakeven price for purchasing a replacement heifer is increased by **$230.13**/hd/yr making the expected affordable costs of a heifer **$1.407.32**/hd/yr. See Table 3 below. The average age of the cows in this herd is simulated at **4.94** years of age. Given the **10.2** month increase in average herd age from the previous scenario, every **1** month of average age increases the breakeven value by **$22.56**/hd/yr.

Table 3

Low Costs Producer Middle Aged Cow Herd	
Average Breakeven Price	**$1,407.32**
Average Age to Positive Return	**5**
Average Cow Age of the Herd	**4.94**

The last **low cost producer** age scenario, #3 results, Table 4, has the oldest average aged cow herd, with a **5.99 years of age average herd age, and close to a 14% average replacement rate.** In this scenario, the forecasted purchase replacement value per heifer is highest at **$1,664.15/hd**. Each additional month's increase in the herd's average age, breakeven heifer **replacement value** increases by **$21.36**/hd/yr compared to scenario #2.

Table 4

Low Costs Producer with an Aged Cow Herd	
Average Breakeven Price	**$1,664.15**
Average Age to Positive Return	**5**
Average Cow Age of the Herd	**5.99**

Middle Production Cost Heifer Values

In age scenario 1 for the **middle costs producer the cow herd averages 3.94 years of age.** Cow costs average **$729.50**/hd/yr about **$100**/hd/yr more than the low cost producer. In this scenario, breakeven price for purchasing a replacement heifer is forecast to be **$882.29**, (Table 5) about **$295** less than the low cost producer with the same herd. Translated into marginal terms for every **$1** saved in production costs **$2.95** more are available to be spend on replacements. These middle costs producers have a predicted positive return when cows are seven years of age, again assuming a **$1,500** average heifer replacement value. This breakeven period holds true for all three age scenarios for middle cost producers.

Table 5

Middle Cost Producer with a Young Aged Cow Herd	
Average Breakeven Price	**$882.29**
Average Age to Positive Return	**7**
Average Cow Age of the Herd	**3.96**

The 2nd age scenario, middle aged cow herd with a simulated average herd age of **4.98** years, for the **middle cost of production** has a breakeven value of **$1,068.73** (Table 6) for purchasing replacement heifers. This cost is **$338.59** less than for the low costs producer and approximately **$186** more than the younger cow herd with the same cost structure. These differences amount to about a **$15.23**/hd/yr for each 1 month average increase in herd age and **$3.39** increase in breakeven costs for every **$1** reduction in costs.

Table 6

Middle Cost Producer with a Middle Aged Cow Herd	
Average Breakeven Price	**$1,068.73**
Average Age to Positive Return	**7**
Average Cow Age of the Herd	**4.98**

Age scenario #3 results, Table 7, for the **aged cow herd** that averaged **5.96** years of age**,** for the **middle cost producer** has the highest breakeven for its cost group. The breakeven price for purchasing replacement heifers is **$1,238.51**/hd/yr**, $425.64**/hd/yr, less than the low cost producer, a reduction in breakeven value of **$4.26**/hd/yr for every dollar of increased cost. This scenario has an estimated decrease of **$14.15**/hd/yr in breakeven value for every 1 month decrease in average herd age.

Table 7

Middle Cost Producer with an Aged Cow Herd	
Average Breakeven Price	**$1,238.51**
Average Age to Positive Return	**7**
Average Cow Age of the Herd	**5.96**

High Production Cost Heifer Values

Age scenario #1 results, Table 8, herd average age of **4.09** years, under **high cost production conditions** has the lowest predicted breakeven heifer value, **$627.24**/hd/yr, which is **$549.95**/hd/yr less than the same aged herd under the lowest costs conditions. This amounts to an average drop in heifer breakeven value of **$2.75**/hd/yr for each **$1**/hd/yr increase in costs. The model predicts it takes 13 years of productive cow life before the cow is profitable when an average heifer replacement cost of **$1,500** for all three scenarios.

Table 8

High Cost Producer with a Young Cow Herd	
Average Breakeven Price	**$627.24**
Average Age to Positive Return	**13**
Average Cow Age of the Herd	**4.09**

The 2nd age scenario results, Table 9, simulated herd average age of **4.80** years, for **high costs producers** has a breakeven value of **$702.96**/hd/yr, which is less than half of the low cost producer scenario with a **$704.36**/hd/yr decrease, a decrease of **$3.52**/hd/yr for every **$1**/hd/yr increase in cost. With **$75.72**/hd/yr breakeven value difference between the young and middle aged cow herds an increase of **1** month in average herd age is worth a predicted **$8.89**/hd/yr, under the same cost structure. See table 9 below.

Table 9

High Cost Producer with a Middle Aged Cow Herd	
Average Breakeven Price	**$702.96**
Average Age to Positive Return	**13**
Average Cow Age of the Herd	**4.80**

The 3rd age scenario results, Table 10, for the **high cost producer** has a herd age average of **6.07** years and a breakeven of **$817.37**/hd/yr which is about **$421.14**/hd/yr and **$846.78**/hd/yr less than the middle and low cost producer's respectively for the same age scenario. The reduction in average breakeven values amounts to about a **$4.23**/hd/yr for every **$1**/hd/yr increase in cost. In this final scenario there is a **$114.41**/hd/yr breakeven value difference between it and the middle aged cow herd. Given the herd average difference in months an increase of **1** month in average herd age is worth a predicted **$7.50**/hd/yr, under the same cost structure.

Table 10

High Cost Producer with an Aged Cow Herd	
Average Breakeven Price	**$817.37**
Average Age to Positive Return	**13**
Average Cow Age of the Herd	**6.07**

Conclusion

As the cost of production per calf increases the amount producers are able to pay for replacements decreases and vice versa. The breakeven values for heifers are more responsive for the low cost producer than they are for high cost producer. For instance a 1 month increase in herd average age increases the lowest cost structure breakeven by about $22/hd/yr, while the same 1 month increase in herd average for the high production costs scenarios averages over $8/hd/yr. Note that there is a synergetic effect between cost structure and replacement rate, making production and cost choices very

important to consider if not tricky. As longevity of cow replacements increases, average herd age increases, breakeven values also increase. Low cost low replacement herds are able to afford higher heifer replacement costs. The key to buying higher priced profitable replacements is based on your cost structure, and your herd replacement rate. To reiterate, the primary effects of this work are driven by two factors 1) culling, which is generally driven by pregnancy rates and 2) annual cow production costs, primarily due to feeding (pasture, hay and supplementation cost). To afford higher replacement costs higher levels of cost control and increased productivity must be achieved. Increasing productivity while increasing costs will have a mixed effect and which will dominate depends on the degree which each changes. The electronic Excel spreadsheet that generated these results is available upon request to the authors. The primary information required to use this decision aide include 11 years consecutive years of annual cow cost, expected pregnancy rates, death rates weaning rates, price or value expectations for both calves sold and cull cows.