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CHALLENGES WITH HEIFER SELECTION: HOW MANY SHOULD I BREED AND WHAT ARE THEY WORTH?

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CHALLENGES

The beef industry in the last several years has seen unprecedented high prices for feeder calves, finished steers, replacement breeding cattle, and cull cows. It's easy to be lulled into complacency and bid our current and past profits back into replacements if we are not vigilant. By all accounts, the national cow herd is growing as a result of retaining more beef replacement heifers and culling fewer beef cows. The big ticket cost item for the cow herd, feed, has increased over the last decade as a result of rising grassland values, inflation in all land values, and diversion of pasture and hay land into grain production in many areas of the country. Rasby (2015) recently reported that pasture leases in Nebraska have nearly doubled since 2000 and are approaching $50/cow-calf pair on a monthly basis. Recently, we have seen lower corn prices and marginally lower cost of some supplemental feeds that follow corn prices, but the annual cost of keeping a cow has increased. In addition, the most recent four month period, depending on which region of the country you reference, feeder calf prices have dropped somewhere between $30 and $60/cwt. FAPRI (2015) projections for weanling feeder calf prices (600-650 lb, Oklahoma City) for 2015 through 2020, respectively, are $242, $225, $198, $182, $169, and $163/cwt.

One of our biggest challenges in making cow herd expansion decisions at the ranch level, is accurately estimating future prices, not on the average, but on the day we decide to buy an input or sell an output. If we had the perfect crystal ball, and we could accurately predict what the prices of feed (pasture, hay, supplements), feeder calves, cull cows, fuel, equipment replacement, and interest rates would be over the next eight to ten years, the answer to, "What are replacement heifers worth?" would be relatively easy to calculate. Without accurate price forecasting, all we can do is create a number of possible scenarios using our best estimate of price ranges that seem possible for the most volatile components. The purpose of this paper is not to come up with a single answer to the questions of; "How many heifers should I breed?" and "What are they worth?", but rather to work through some likely scenarios that hopefully will provide some insight that will stimulate the thought process to make the best informed decisions that result in optimizing long-term ranch profitability.

Let's begin by trying to answer the question of, "What are replacement heifers worth" in today's market? My simplistic answer is, "All cattle are worth market price, anything above or below that is based on perceived value." The question then becomes, "Is perception equal to reality?" The value of raised replacement heifers on the ranch's cash flow statement, and what price someone will buy or sell quality replacement heifers, may not be the same dollar value. Therefore, value of replacement females is not easily determined, and a single answer definitely does not fit all ranches. The bottom line really boils down to, "What are the input and output prices going to look like in the future?" and "How much risk is the ranch willing to take?"

Annual cost of keeping a cow varies from ranch to ranch, and each ranch needs to individually and accurately determine their costs. Rasby (2015) recently suggested in his budget for Nebraska that annual feed costs are $508.88 for mature cows, $558.25 for two-year old heifers, and $358.25 for replacement heifers. Other cash costs (vet/med and costs for buildings, equipment, marketing, and operating expenses) averaged $85 per cow, and ownership costs (interest, bull cost, insurance, and depreciation) averaged $133 per cow. This resulted in annual cow costs, excluding labor, of $727 for mature cows, $776 for two-year old heifers, and $576 for replacement heifers.

There is always danger in using assumptions and averages when trying to determine profitability. However, if we could determine net present value of replacement females we can gain some insight into the question, "What are replacement females worth?" There are several easy to use Excel spreadsheet decision making tools available. The spreadsheet application developed by Iowa State (Schulz and Gunn, 2015) was downloaded from the website (see reference below to access) and used for this simulation. The values used in the simulation were; annual cow costs ($400, 500, $600, and $700), future weanling steer prices during the productive life of the replacement female ($160, $180, $200, $220, and $240/cwt), calf weaning weights (500 vs. 600 lb for mature cows with a 40 lb discount for the two-year old female), salvage value of cull cows (1200 lb for two-year old heifers vs. 1250 lb for mature cows with a cull cow price of $80/cwt), a 5% discount rate (could be interest on operating loan, or a family draw) and a range from one to eight calves produced during a replacement heifer's productive life. The resulting maximum bid prices (or breakeven price) are presented in Table 1.

If we assume for a moment that we could buy (or the ranch is willing to sell) replacement heifers with a relatively low bid price of $1000 (ex. 600 lb @ $167/cwt) after weaning, and that all weanling replacement heifers will become pregnant during their first breeding season, then only the areas highlighted in light color within each table section represent production parameters where heifers can be profitable. In contrast, the dark shaded areas in each section of Table 1 provide an estimate of the maximum bid price that should be for heifers to remain profitable in the example scenarios. The simulation suggests that the only profit opportunity for replacement heifers valued at $1000, comes after weaning their sixth calf when they are capable of weaning 500 lb calves (1st calf = 460 lb), with an average annual cow cost of $400, and when future calf prices average $220/cwt across all years. If we assume calf prices will return to an average of $240/cwt for the productive life of the female, then a profit opportunity comes following weaning of the fourth calf. If replacement heifers are capable of producing 600 lb calves as a mature cow (1st calf = 560 lb), then profit opportunities exist following weaning of the seventh calf, when future calf prices are $180/cwt, fourth calf when valued at $200/cwt, third calf when valued at $220/cwt, and second calf when valued at $240/cwt. If annual cow cost increases to $500, there is a profit opportunity, but only when mature cows wean a 600 lb calf with an average value of $220/cwt (7th calf) and $240/cwt (4th calf).
Let's look at the numbers another way:

1) What would happen if we could purchase a weanling replacement female for $1000, but our ranch data says that only 85% of the heifers can be expected to be pregnant at the end of the breeding season. What's the breakeven value of this replacement heifer now?
Answer: $1000 ÷ .85 = $850.
2) If replacement heifers are selling for $2000, what should I do? If we look in the tables, there are only two scenarios where these heifers can be profitable. In each case annual cow cost must average less than $400, calf weaning weights must average 600 lb (mature cow basis) and future calf prices need to average $240/cwt (after weaning the seventh calf and eighth calf). If the ranch can sell a replacement heifer for $2000, it appears the simulation would suggest that would be a more profitable alternative.

3) If replacement heifers could be sold off the ranch for $1000, what would my profit/loss position be if I retain her? If we assume ranch weanling calf prices will average $180/cwt, annual cow cost will average $600, calf weaning weights will average 500 lb (mature cow basis), and the cow will produce 3 calves during her productive life; then the simulation would suggest that we will lose $1170 per retained female. This is determined by finding the number in the table associated with these assumed values (-170) and adding the lost opportunity cost of $1000 = $171 + $1000 = $1171 loss per retained heifer.

If we use the same assumptions for purchasing a bred, yearling replacement heifer that was used for purchasing a weaning replacement heifer, and we add an assumed $400 development cost to her value ($1000 + $400), we have a base price of $1400 to use for comparison. Table 2 provides insight into what the maximum bid price (breakeven) could look like for the bred, yearling replacement female. Interestingly, results presented in Table 2 mirror the results shown in Table 1 and can be interpreted in a similar manner to that described above. The two big advantages of purchasing a bred yearling vs. a weanling replacement heifer prospect, in this simulation, is that we know the bred yearling is at least bred and capable of conception. In both replacement heifer scenarios, however, there are no guarantees the next breeding season will result in a pregnancy. A second advantage of purchased bred heifers vs. purchased weanling heifers, at the ranch level, is that it does eliminate one management group which will reduce labor and facility requirements.
Again, the table values presented here are not intended to be the final answer, but rather they are intended to stimulate thought. This exercise does, however, provide a glimpse of what could happen under a limited number of possible scenarios. Each ranch is encouraged to use their most realistic numbers and conservative feeder calf projections to calculate net present value of both their retained and/or purchased young replacement females to optimize profitability into the future. The Schulz and Gunn (2015) net present value spreadsheet is but one example of a decision-making tool that could be used.

The answer to the second question, “How many should I breed?” obviously hinges on our answer to the first question and how much risk the ranch is willing to accept. If we agree with the range in assumed values used in this simulation, then one might conclude that if the market provides an opportunity to sell quality weanling replacement females at a premium to $1000, then a ranch might be more profitable over the next several years by selling a larger percentage of this year’s heifers calves, and delay herd expansion. Additionally, if a ranch can develop replacement heifers for less than $400 and sell pregnant yearlings for a premium above $1400, there might be some profit opportunity. If replacement heifers are retained or purchased to maintain herd size, consider selecting only those heifers that have the highest potential to increase the long term genetic and profit potential of the ranch.

SUMMARY

1) “All cattle are worth market price, anything above or below that is based on perceived value.” Perceived value may not equal real value.
2) Be realistic in your cost projections, and a bit conservative in revenue generation when making replacement heifer decisions that can a long term impact on ranch profitability.
3) Use decision making tools to help determine net present value of replacement heifers in your ranch operation.
4) Evaluate how much risk your ranch is willing to accept.
5) Low annual cow costs, heavy weaning weights per cow exposed, and high feeder calf prices individually, and collectively, are important parameters that improve the odds of profitability.

LITERATURE CITED

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NOTES

Table 1. Maximum Bid Price for Weanling Replacement Heifer Calves with Differing; Average Calf Weaning Weights, Annual Cow Costs, and Projected Calf Prices

	460/500… Wwt, lb[a], $400 Annual Cost[b]					460/500… Wwt, lb[a], $500 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	461	502	544	586	628	275	317	358	400	442
2	454	539	624	709	794	182	266	351	436	521
3	413	539	665	791	917	58	184	310	436	562
4	374	539	704	869	1034	-59	106	271	436	602
5	336	539	741	944	1146	-171	31	234	436	639
6	301	539	777	1015	1253	-278	-40	198	436	674
7	267	539	811	1083	1355	-379	-108	164	436	708
8	235	539	843	1147	1451	-476	-172	132	436	740
	460/500… Wwt, lb[a], $600 Annual Cost[b]					460/500… Wwt, lb[a], $700 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	89	131	172	214	256	-97	-55	-14	28	70
2	-91	-6	79	164	249	-277	-192	-107	-22	63
3	-296	-170	-44	82	208	-651	-525	-399	-273	-147
4	-492	-327	-162	3	169	-925	-760	-595	-430	-264
5	-679	-476	-274	-71	131	-1186	-984	-781	-579	-376
6	-856	-618	-380	-142	96	-1435	-1197	-959	-721	-483
7	-1026	-754	-482	-210	62	-1672	-1400	-1128	-856	-584
8	-1187	-883	-579	-275	30	-1898	-1594	-1289	-985	-681
	560/600… Wwt, lb[a], $400 Annual Cost[b]					560/600… Wwt, lb[a], $500 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	533	584	635	686	737	347	398	449	500	551
2	596	698	801	903	1006	323	426	528	631	734
3	620	772	924	1076	1228	266	418	570	722	874
4	644	843	1042	1241	1440	211	410	609	808	1007
5	666	910	1154	1397	1641	159	402	646	890	1134
6	687	974	1260	1547	1833	109	395	682	968	1254
7	708	1035	1362	1689	2016	61	388	715	1042	1369
8	727	1093	1458	1824	2190	16	382	748	1113	1479
	560/600… Wwt, lb[a], $600 Annual Cost[b]					560/600… Wwt, lb[a], $700 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
	161	212	263	314	365	-24	26	77	128	179
	51	154	256	359	461	-221	-119	-16	86	189
	-89	63	215	367	519	-444	-292	-140	12	164
	-222	-23	176	375	574	-655	-456	-257	-58	141
	-349	-105	139	382	626	-857	-613	-369	-125	118
	-470	-183	103	389	676	-1048	-762	-476	-189	97
	-585	-258	69	396	723	-1231	-904	-577	-250	77
	-694	-329	37	403	768	-1405	-1040	-674	-308	58

[a] 1st calf weaning weight = either 460 or 560 lb, 2nd and subsequent calves = either 500 or 600 lb.

[b] Annual cow cost across all calf crops; [c] Parity number; [d] Projected average calf price across calf crops ($/cwt)

Table 2. Maximum Bid Price for Bred Yearling Heifers with Differing; Average Calf Weaning Weights, Annual Cow Costs, and Projected Calf Prices

	460/500… Wwt, lb[a], $400 Annual Cost[b]					460/500… Wwt, lb[a], $500 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	842	883	925	967	1009	751	793	834	876	918
2	835	920	1005	1090	1174	658	743	828	912	997
3	794	920	1046	1172	1298	534	660	786	912	1039
4	755	920	1085	1250	1415	417	582	747	912	1079
5	717	920	1122	1325	1527	305	507	710	912	1115
6	682	920	1158	1396	1634	198	436	674	912	1151
7	648	920	1192	1464	1735	97	369	641	912	1184
8	616	920	1224	1528	1832	0	304	608	912	1217
	460/500… Wwt, lb[a], $600 Annual Cost[b]					460/500… Wwt, lb[a], $700 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	660	702	744	785	827	570	611	653	695	737
2	481	566	650	735	820	304	388	473	558	643
3	275	401	527	653	779	16	142	268	394	520
4	79	244	410	575	740	-259	-93	72	237	402
5	-107	95	298	500	703	-520	-317	-115	88	290
6	-285	-47	191	429	667	-769	-530	-292	-54	184
7	-454	-182	89	361	633	-1005	-734	-462	-190	82
8	-616	-311	-7	297	601	-1231	-927	-623	-319	-14
	560/600… Wwt, lb[a], $400 Annual Cost[b]					560/600… Wwt, lb[a], $500 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	914	965	1016	1067	1117	824	874	925	976	1027
2	976	1079	1182	1284	1387	799	902	1005	1107	1210
3	1001	1153	1305	1457	1609	742	894	1046	1198	1350
4	1025	1224	1423	1622	1821	687	886	1085	1284	1483
5	1047	1291	1535	1778	2022	635	878	1122	1366	1610
6	1068	1355	1641	1928	2214	585	871	1158	1444	1731
7	1089	1416	1743	2070	2397	538	865	1192	1519	1846
8	1108	1474	1839	2205	2571	492	858	1224	1590	1955
	560/600… Wwt, lb[a], $600 Annual Cost[b]					560/600… Wwt, lb[a], $700 Annual Cost[b]				
	Average Feeder Calf Price, $/cwt					Average Feeder Calf Price, $/cwt				
Calf, no.[c]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]	$160[d]	$180[d]	$200[d]	$220[d]	$240[d]
1	733	784	834	885	936	642	693	744	795	845
2	622	725	828	930	1033	445	548	650	753	856
3	482	634	786	938	1090	223	375	527	679	831
4	349	548	747	946	1145	12	211	410	609	808
5	222	466	710	954	1197	-190	54	298	541	785
6	102	388	674	961	1247	-382	-95	191	477	764
7	-13	314	641	968	1295	-565	-238	89	416	744
8	-123	243	608	974	1340	-739	-373	-7	358	724

[a] 1st calf weaning weight = either 460 or 560 lb, 2nd and subsequent calves = either 500 or 600 lb.

[b] Annual cow cost across all calf crops; [c] Parity number; [d] Projected average calf price across calf crops ($/cwt)