BISON BENCHMARK PROJECT SPECIAL 10 YEAR REPORT

Introduction

In 2009, the Saskatchewan Bison Association (SBA), along with support from the Canadian Bison Association (CBA), identified a need for current production and financial performance information to support industry growth and prosperity. This resulted in discussions with the Saskatchewan Ministry of Agriculture that resulted in an application to the Industry Development Fund to support a special project to address this need. The application was approved to address a number of objectives.

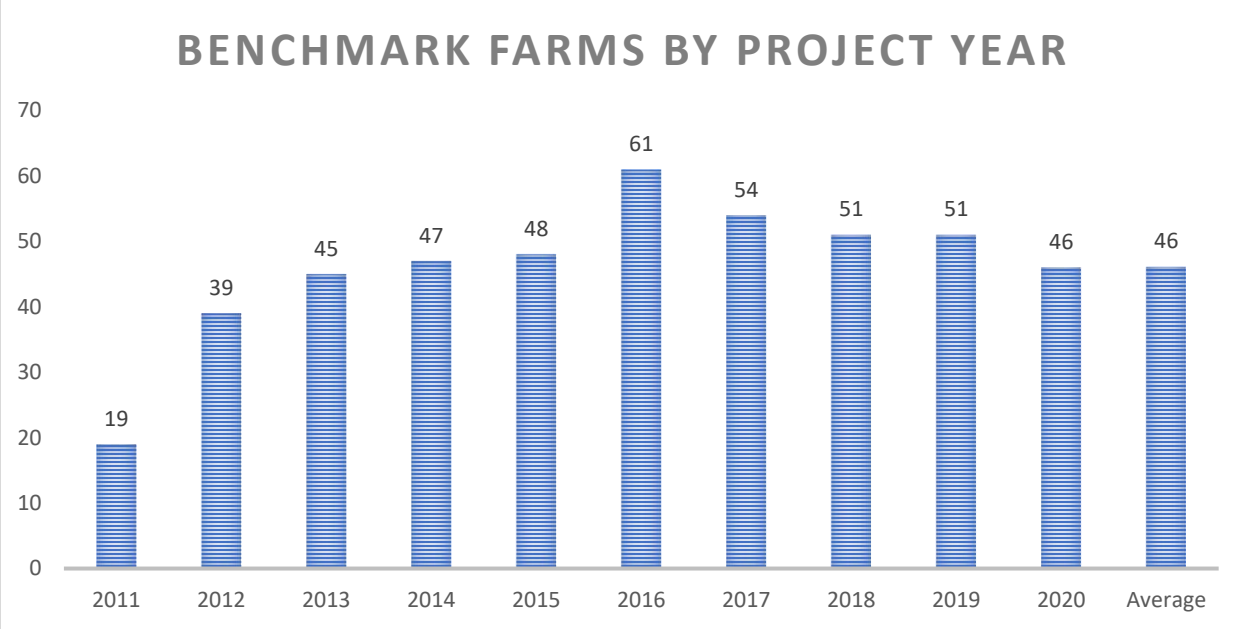
The following were the key set of project objectives:

- To benchmark cost-of-production and production performance data for bison operations, involving cow-calf, backgrounder and finish enterprises.
- To develop/acquire a standardized computerized Cost of Production (COP) enterprise/whole farm database for the Saskatchewan bison industry that can be updated annually and used for future studies and policy development.
- To provide information to enable participants to compare their farm business performance with other operations.
- To improve extension services for on-farm management practices including those of First Nations through the use of benchmark measurements and worksheets.
- To utilize research results on farming efficiency, competitiveness, value added etc., to greatly enhance bison industry policies and programs.
- To provide information that will encourage new research in this relatively new industry.
- To have more accurate information which business plans can be developed to attract capital to the bison industry.

After five successful years of the benchmark project, in 2014 the SBA (along with CBA) sought to extend the project. The financial support from the Saskatchewan Ministry of Agriculture, as well as the SBA and CBA, and two years of financial support from Alberta Agriculture and Forestry provided the basis for the bison benchmark project to be successfully extended for another 5 years.

The benchmarking project was successful because of the participation of many bison producers in the Saskatchewan, Alberta, and Manitoba. Initially, the number of producers contributing was modest, and then increased as they understood the benefits of the project and its objectives. The contribution of producers in the categories of cow-calf, backgrounding and finishing enterprises, over the benchmark project's 10 years is represented in the following chart and tables.

The data for the project was collected through direct contact with the producer. This ensured that the data collected was complete and interpreted consistently by the participating producers. Participants were provided feedback on the financial and production performance of their operations when compared to the averages of producers in the same class. There were no statistical tests performed on the data.



Please note the totals in the tables are different in certain years because not every benchmark farm had all three bison enterprises within their operation for each project year.

Benchmark Cow-Calf Enterprise by Size Category
For 10-Year Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cows	8	18	21	20	26	30	30	30	28	26	24
100 Plus Cows	9	17	21	25	17	29	23	21	23	20	21
Total	17	35	42	45	43	59	53	51	51	46	44

Benchmark Backgrounding Enterprises by Category
For 10-Year Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	3	15	16	19	23	19	16	17	21	21	17
Over 100 Bulls	6	7	9	6	6	8	7	3	4	6	6
Under 100 Heifers	4	11	17	20	23	21	16	20	21	24	18
Over 100 Heifers	3	8	6	6	6	5	6	2	3	7	5
Total	16	41	48	51	58	53	45	42	49	58	46

Benchmark Finishing Enterprises by Category
For 10-Year Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	4	12	13	19	19	17	10	16	13	10	13
Over 100 Bulls	4	8	7	5	8	7	6	2	7	6	6
Under 100 Heifers	3	14	14	18	20	17	14	15	11	13	14
Over 100 Heifers	0	5	5	4	4	5	3	2	4	3	4
Total	11	39	40	46	51	46	33	35	35	32	37

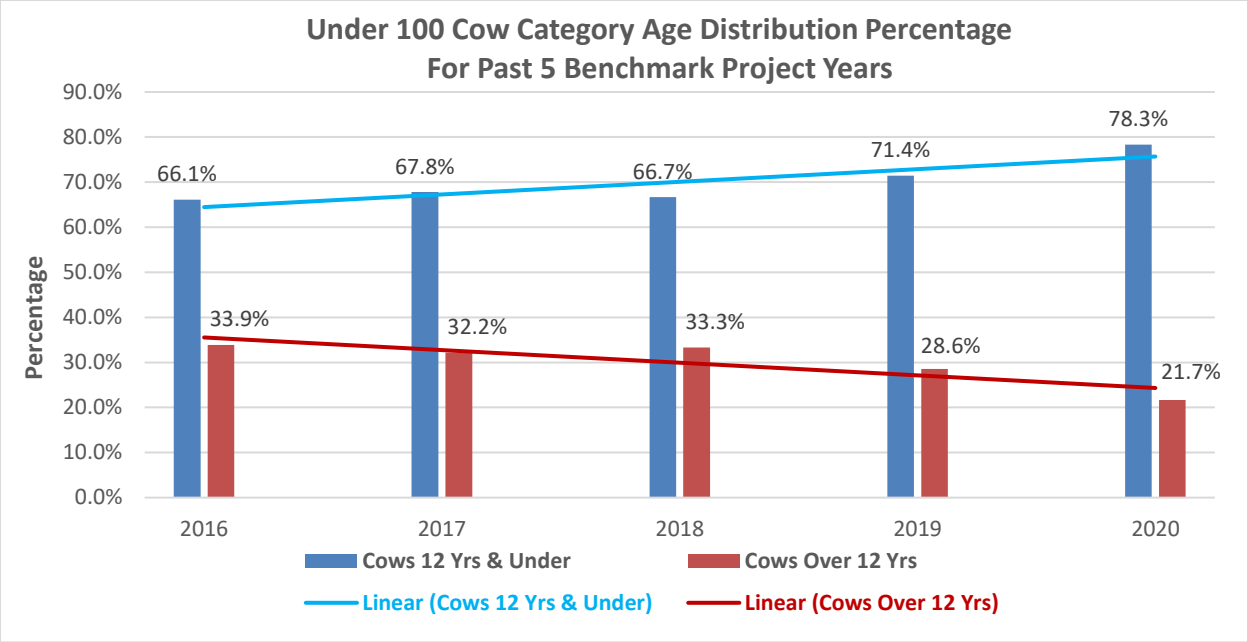
Below are the key production performance and financial performance factors of the cow-calf, backgrounding and finish enterprises that resulted from the benchmark project over the past 10 years.

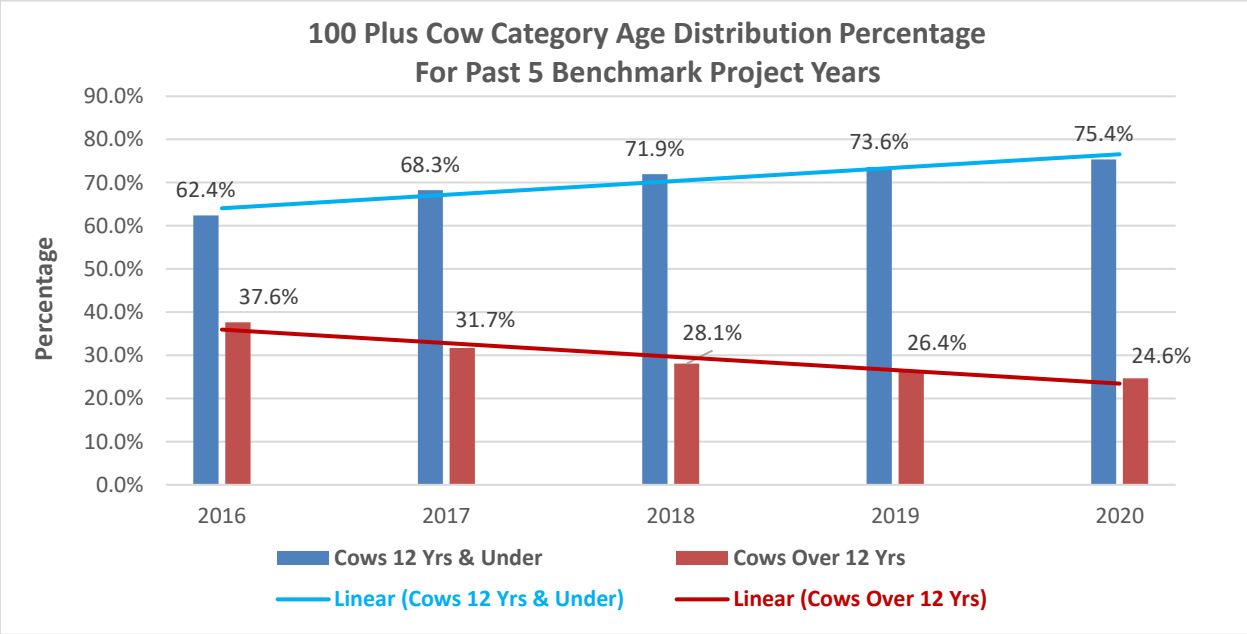
Cow-calf Enterprises

Production Performance Factors

Cow Age Distribution

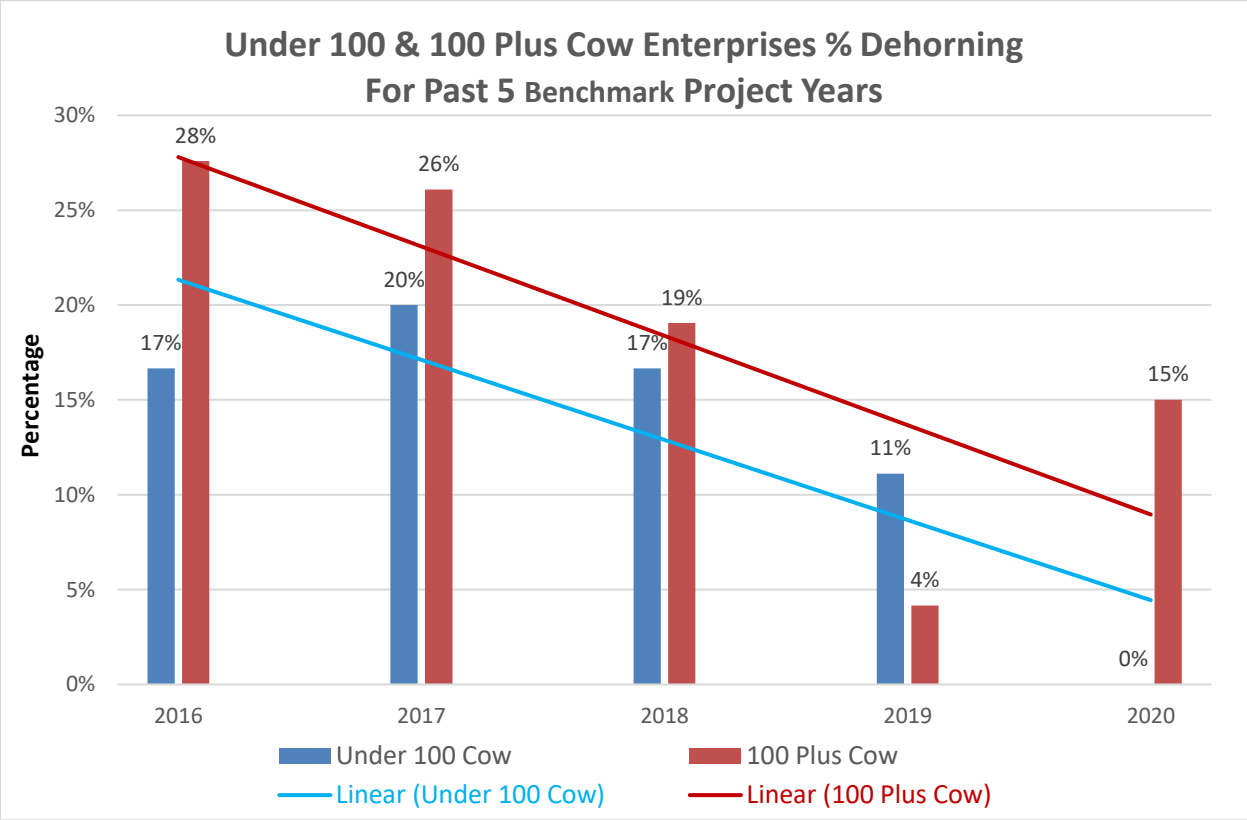
The cow age distribution data collection began in benchmark project year 2016. Therefore, the results represent the most recent five years of the project.



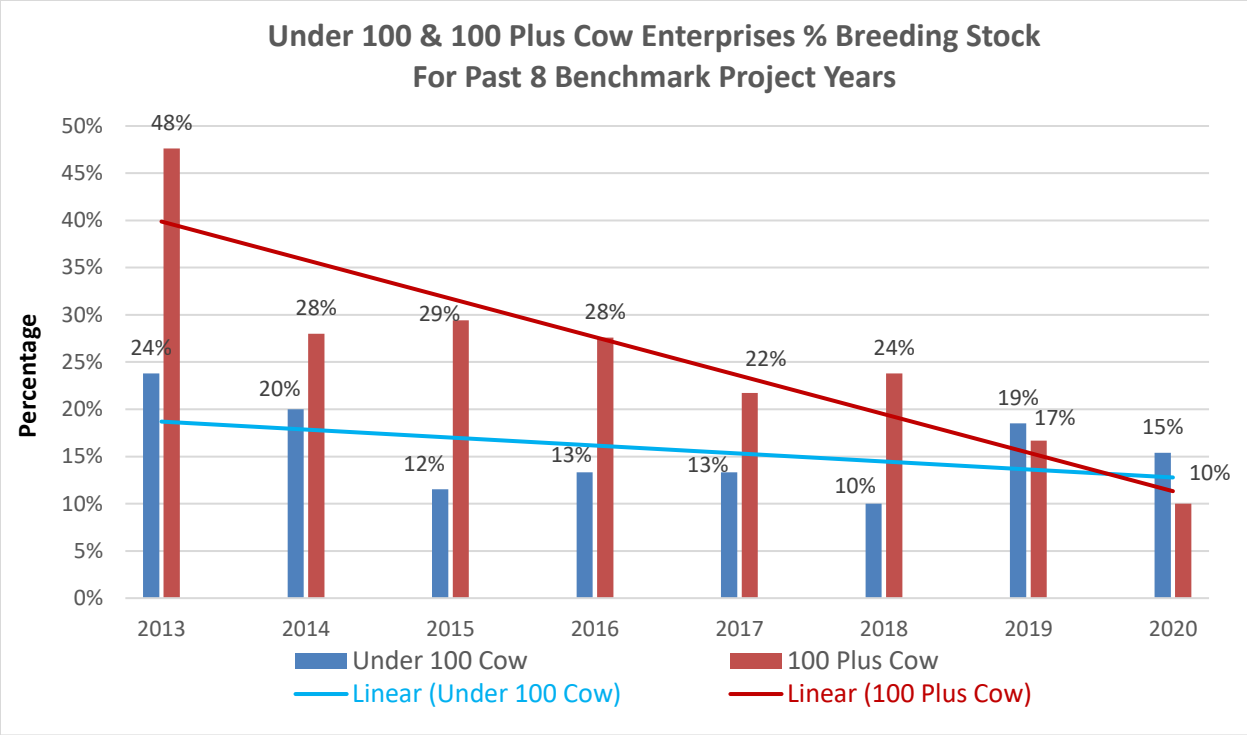


This performance factor in the cow-calf enterprises demonstrates how the age of the cow herd changed over time. The data is shown for each of the Under 100 and 100 Plus cow enterprise categories. The trend line for both cow enterprise categories provided evidence that the less than 12 years of age cows increased in the herds, while the number of cows over 12 years of age decreased. This indicated that the average age of cow herd became younger, which supported more replacements being added to cow herds over this five-year period.

Dehorning %
Data collection on dehorning percentage began in project year 2016. Over the five years, dehorning decreased in cow herds for both the Under 100 & 100 Plus cow-calf enterprises.



Breeding Stock %
The data collection for this production performance factor began in project year 2013. Over the 8-year period of review, the percent of breeding stock sold decreased in both the Under 100 and 100 Plus cow-calf enterprises. The interesting point here is that beginning in 2013, there were many more cow-calf enterprises selling breeding stock in the 100 Plus cow-calf enterprise category, compared to the Under 100 cow-calf enterprise category. The percentage difference between the two cow-calf categories decreased over time.



Bull to Cow Ratio

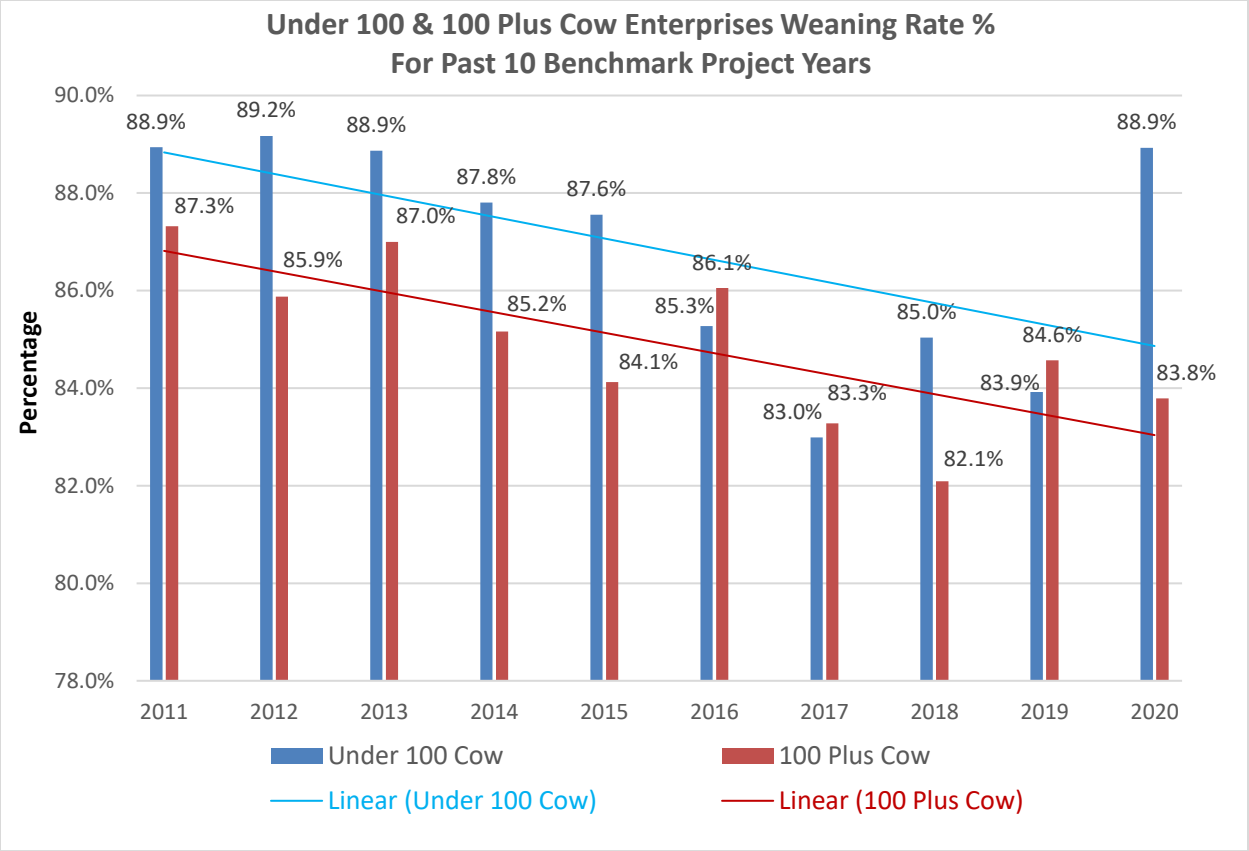
For this production performance factor, the bull to cow ratio virtually unchanged over the 10-year benchmark project period for both cow-calf enterprise categories. The average of 15 to 16 cows per herd bull is the bison industry norm.

Under 100 & 100 Plus Cow Enterprises Bull to Cow Ratio
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cows	15	15	17	13	14	14	15	15	15	16	15
100 Plus Cows	16	15	16	16	14	16	16	16	16	16	16

Weaning Rate Percentage

Weaning rates over the 10-year benchmark project period decreased in both the Under 100 and 100 Plus cow-calf enterprises. Despite this trend, the overall average weaning rates were higher in the Under 100 cow-calf enterprise (87%) compared to the 100 Plus cow-calf enterprise (85%).



Weaning Weights

Weaning weights are a very important production performance factor in the bison industry. Overall, average weaning weights for bulls and heifers in the Under 100 cow-calf enterprises category were slightly higher than for those in the 100 Plus cow-calf enterprises category over the 10-year benchmark project period.

Under 100 & 100 Plus Cow Enterprises Bull & Heifer Calf Weaning Weights
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cow-Bull Wt	517	488	484	475	473	481	471	476	507	523	487
100 Plus Cow-Bull Wt	496	491	490	471	481	464	465	486	483	493	482
Under 100 Cow-Heif Wt	466	438	432	433	424	421	429	430	457	474	440
100 Plus Cow-Heif Wt	449	444	439	427	438	424	417	443	440	447	437

Average Days to Weaning

Average days to weaning for the Under 100 cow-calf enterprise category has remained relatively unchanged over the 10-year benchmark project period. For the 100 Plus cow-calf enterprise category though, the trend over the benchmark project period indicates that the average days to weaning has declined. However, the Under 100 cow-calf enterprises demonstrated an overall, lower average days to weaning (283), compared to the 100 Plus cow-calf enterprises (271).

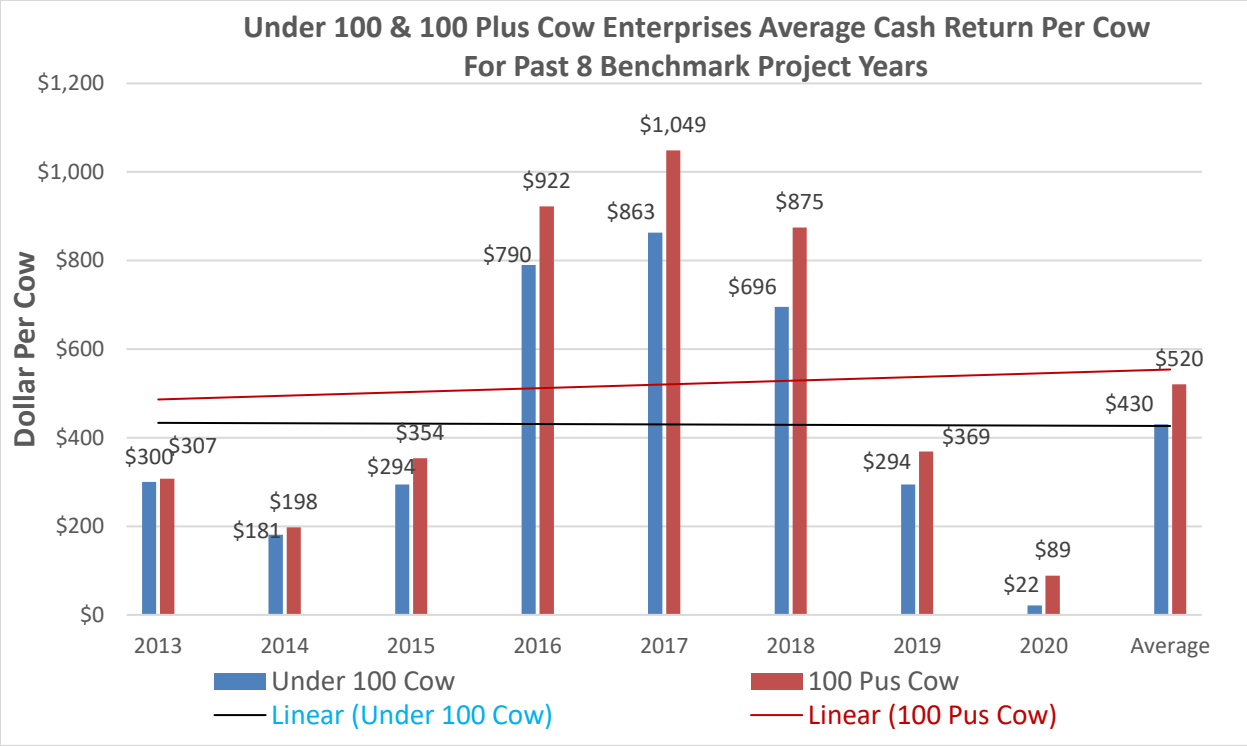
Under 100 & 100 Plus Cow Enterprises Average Days to Weaning
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cow	293	289	290	293	281	268	277	267	287	285	283
100 Plus Cow	259	278	281	268	294	251	276	272	258	276	271

Financial Performance Factors

Average Cash Return Per Cow

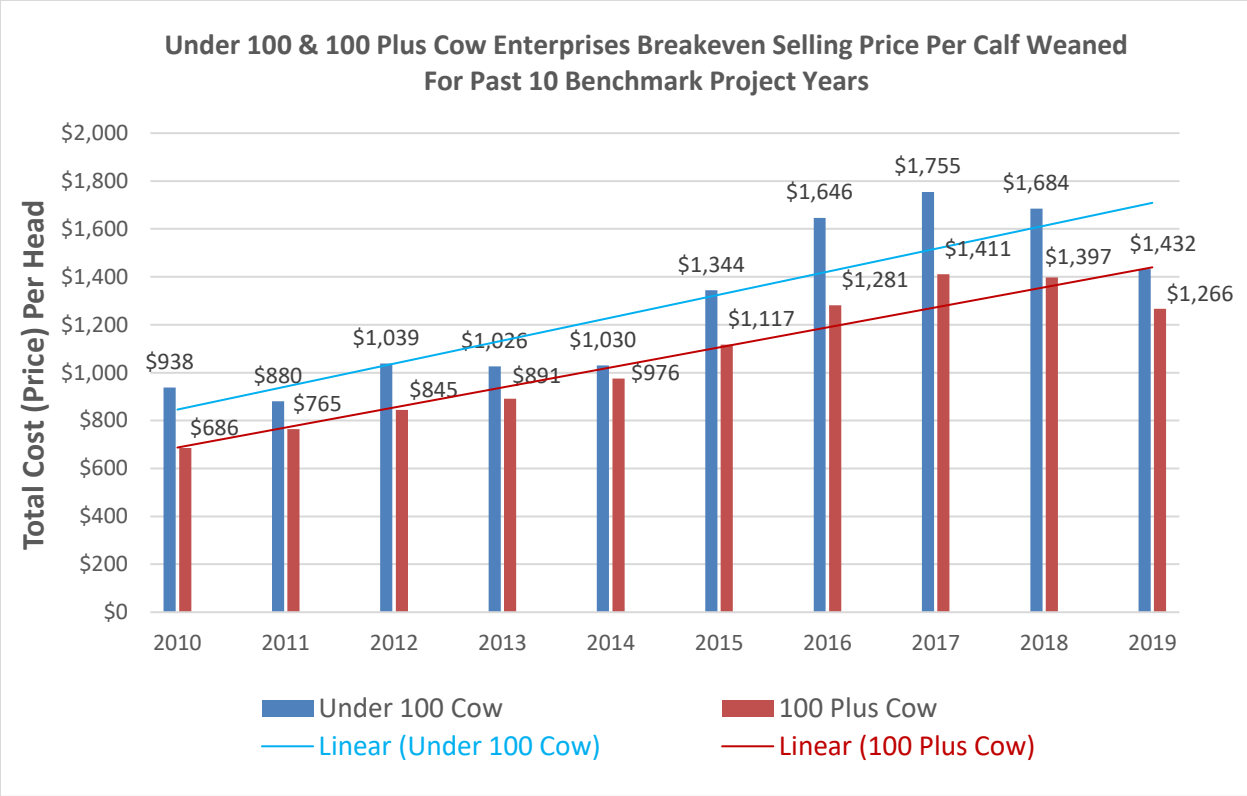
The data collection for this financial performance factor began in project year 2013. Over the 8-year period of review, the average cash return per cow increased slightly both the Under 100 and 100 Plus cow-calf enterprises. The average increase was approximately $100 per cow higher for the 100 Plus cow-calf enterprise compared to the Under 100 cow-calf enterprise.



Breakeven Price Per Calf Weaned

This financial performance factor represents the calf price that equals the total cost of production for the respective cow-calf enterprises.

Over the 10-year benchmark project period, the breakeven price per calf weaned increased for both the Under 100 and 100 Plus cow-calf enterprises. The average calf price to cover all production costs was approximately $200 per calf higher in the Under cow-calf enterprise, compared to the 100 Plus cow-calf enterprise.



Total Cost of Production and Total Feed Costs
These two factors represent the most important factors for assessing financial performance.

Over the 10-year benchmark project period both financial factors increased for the Under 100 and 100 Plus cow-calf enterprises.

In the Under 100 cow enterprise, the absolute value of the contributing portion of feed costs to total cost of production increased from approximately $400 per head (cows + bulls) to around $650 per head. This represents a percentage contribution increase of 8%, from 47% to 55%. In comparison, for the 100 Plus cow-calf enterprise, the absolute value of contributing portion of feed costs to total cost of production increased from approximately $250 per head to around $500 per head. However, this represents a percentage contribution decrease of 6%, from 55% to 49%.

The above comparison suggests that the 100 Plus cow-calf enterprise is more economical and reinforced by economies of scale.

Under 100 & 100 Plus Cow Enterprises Total Cost of Production (COP) Per Head (Cows+Bulls)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cows	$782	$742	$862	$835	$841	$1,028	$1,284	$1,393	$1,316	$1,186	$1,025
100 Plus Cows	$560	$617	$687	$712	$763	$868	$995	$1,081	$1,101	$986	$837

Under 100 & 100 Plus Cow Enterprises Feed Costs Per Head (Cows+Bulls)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Cows	$371	$341	$351	$364	$375	$405	$467	$526	$566	$538	$430
100 Plus Cows	$308	$313	$316	$371	$363	$402	$427	$463	$533	$481	$398

Backgrounding Enterprises

Production Performance Factors

Purchase/Retention and Shipping Weights – Background Bulls

This production performance factor reflects the relationship of purchase or retention weights for calves moving into the backgrounding enterprises of a bison operation. Over the 10-year project period, the purchase/retention weights and shipping weights both decreased slightly for the Under 100 bull category. For the Over 100 bull category, the purchase/retention weights were relatively constant over the 10-year project period, while the shipping weights increased over the same time frame.

Under 100 Background Bull Enterprise Purchase/Retention & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Retained Wt	593	514	518	509	476	468	460	466	497	499	500
Shipping Wt	862	797	808	822	800	775	796	815	837	859	817

Over 100 Background Bull Enterprises Purchase/Retention & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Retained Wt	494	441	443	485	435	442	472	477	460	504	465
Shipping Wt	721	769	800	832	808	838	848	874	858	827	818

Purchase/Retention and Shipping Weights – Background Heifers

For the Under 100 heifer enterprise, over the 10-year benchmark project period the purchase/retention weights declined, while the shipping weights increased. Note that this is an inverse relationship compared to the Under 100 background bull enterprise. For the Over 100 heifer enterprise, the purchase/retention both the purchase/retention weights and shipping weights increased over the project period. This trend was more similar to the Over 100 bull enterprise.

In summary, then, overall shipping weights from backgrounding enterprises increased. Thus, this suggests that the producers in the benchmark project demonstrated improved production performance for this part of their bison operations.

Under 100 Background Heifer Enterprise Purchase/Retention & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

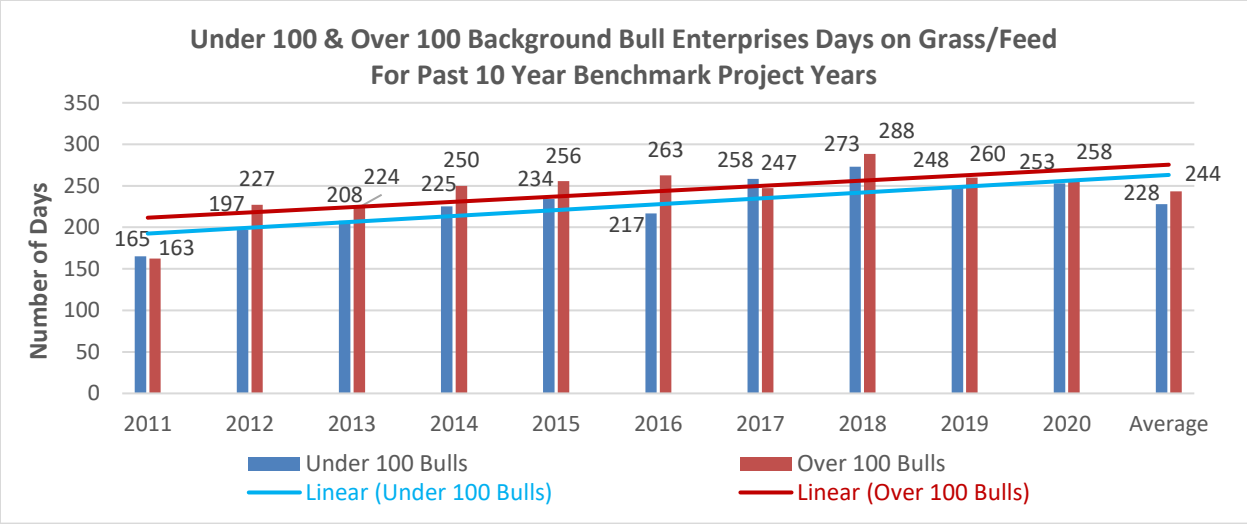
Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Retained Wt	467	455	446	464	428	425	414	427	447	442	441
Shipping Wt	717	656	690	706	680	705	699	712	717	739	702

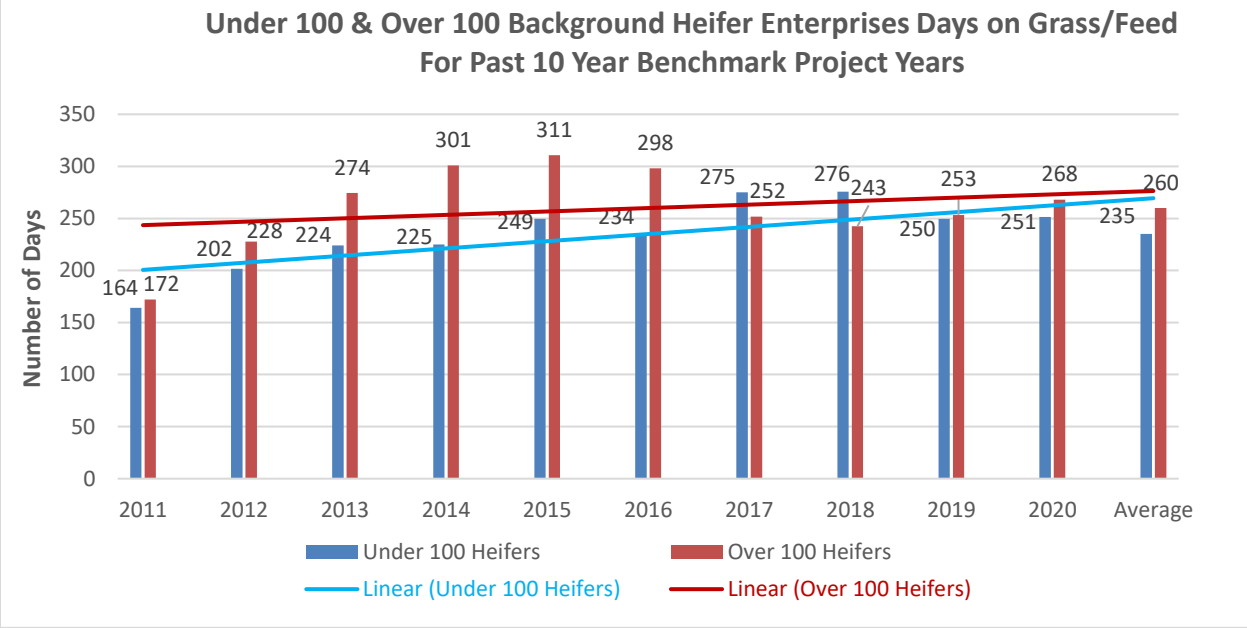
Over 100 Background Heifer Enterprises Purchase/Retention & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Retained Wt	470	422	407	455	426	383	416	438	472	461	435
Shipping Wt	667	701	778	761	771	742	728	725	775	745	739

Days on Grass/Feed

In this performance production factor, the charts below demonstrate the days on grass/feed increased for all the backgrounding enterprises. This suggests support for the increased shipping weights for backgrounders over the project period, as discussed above.





Average Daily Gain

Over the 10-year project period, the average daily gain declined for all the backgrounding bull and heifer enterprises. In comparison, the overall average daily gain for backgrounding bull enterprises was around 25% higher than the backgrounding heifer enterprises.

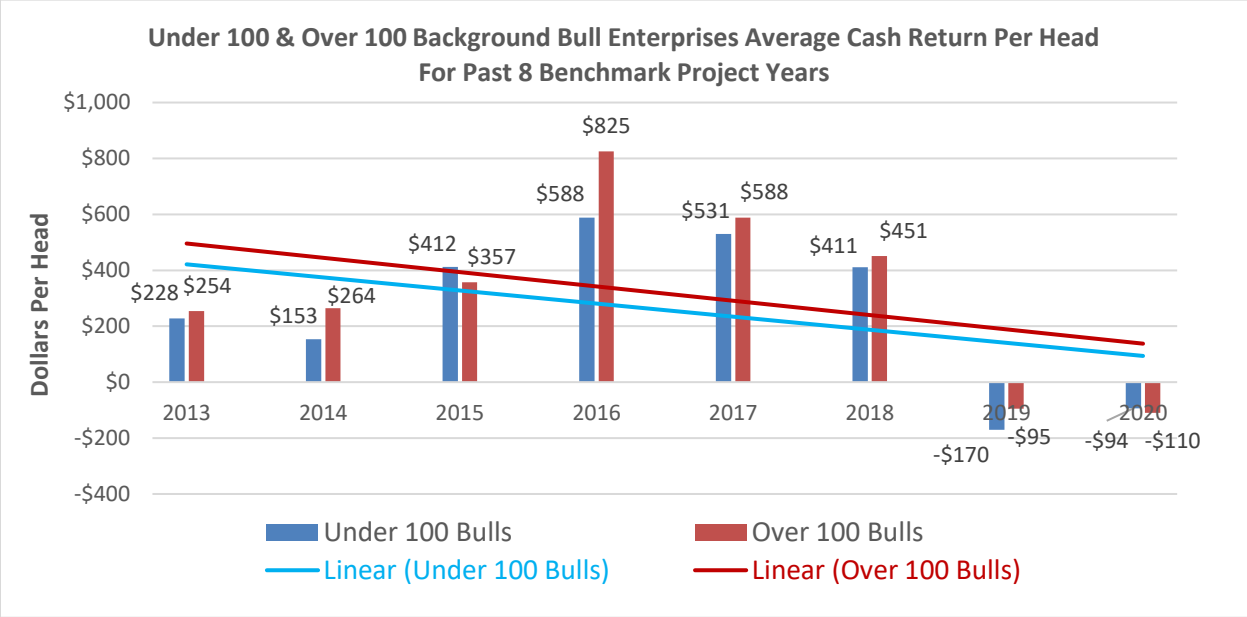
Under 100 & Over 100 Background Bull & Heifer Entreprises Average Daily Gain (Lbs)
For Past 10 Benchmark Project Years

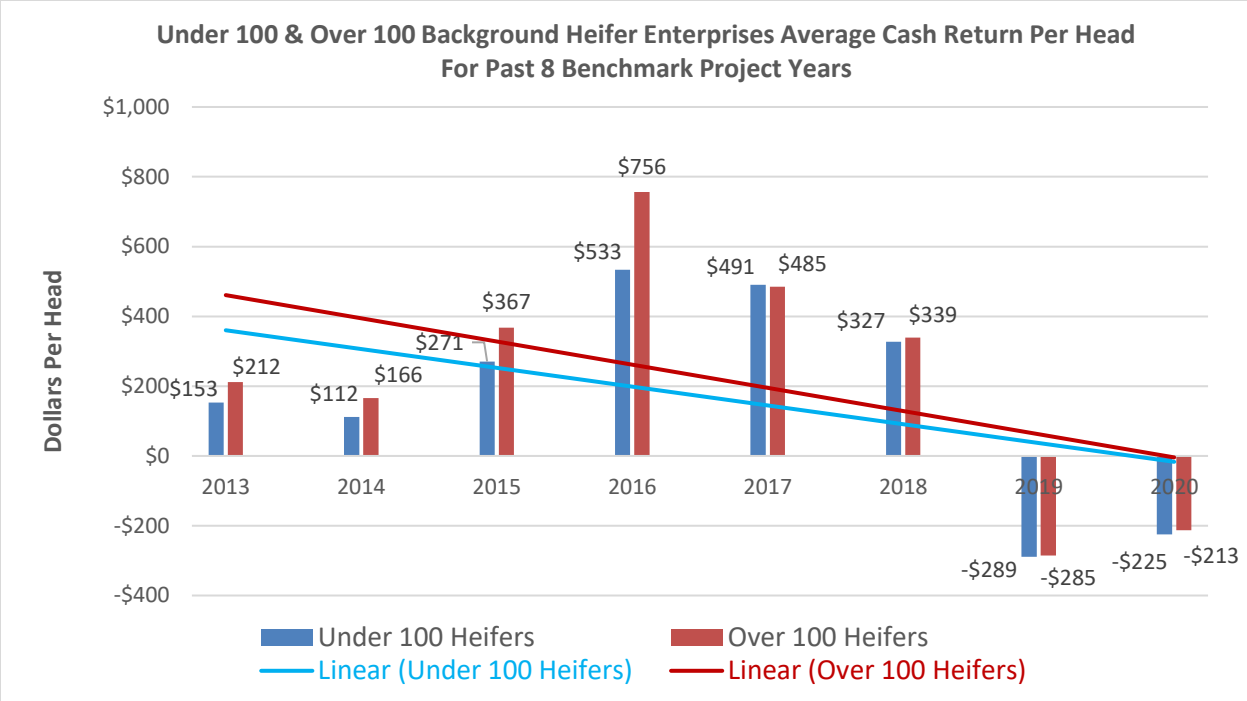
Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	1.65	1.44	1.42	1.47	1.43	1.43	1.32	1.28	1.36	1.43	1.42
Over 100 Bulls	1.36	1.48	1.63	1.36	1.48	1.51	1.54	1.38	1.54	1.28	1.46
Under 100 Heifers	1.24	1.08	1.15	1.13	1.06	1.22	1.05	1.06	1.09	1.19	1.13
Over 100 Heifers	1.10	1.27	1.38	1.03	1.11	1.23	1.24	1.18	1.21	1.07	1.18

Financial Performance Factors

Average Cash Return

The data collection for this financial performance factor began in project year 2013. Over the 8-year period of review, the overall trend of the average cash return per head decreased for all backgrounding bull and heifer enterprises. However, during the price spikes of the 2015 to 2018, cash returns were higher than the average. Also, the overall average cash returns for the backgrounding bull enterprises were higher than those of the backgrounding heifer enterprises.





Cost of Production

Over the 10-year benchmark project period this financial performance factor increased for all the backgrounding bull and heifer enterprises.

Cost of production increased around 110% in both the Under 100 backgrounding bull and Under 100 backgrounding heifer enterprises. In comparison, the cost of production in the Over 100 backgrounding bull enterprise increased by 135%, while the Over 100 backgrounding heifer enterprise increased by approximately 115%.

It is interesting to note that the average cost of production over the 10-year project period was $100 per head more for the Under 100 category compared to the Over 100 head category in the backgrounding bull enterprise. While for the backgrounding heifer enterprise, the average cost of production was $10 per head higher in the Under 100 head category.

Under 100 & Over 100 Background Bull & Heifer Entreprises Total Cost of Production
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	$1117	$1287	$1595	$1503	$1485	$2161	$2537	$2769	$2826	$2536	$1964
Over 100 Bulls	$923	$1406	$1412	$1398	$1302	$2021	$2633	$2798	$2599	$2167	$1866
Under 100 Heifers	$881	$1100	$1292	$1208	$1169	$1851	$2133	$2395	$2407	$1866	$1630
Over 100 Heifers	$822	$1187	$1282	$1263	$1190	$1661	$2221	$2378	$2474	$1725	$1620

Finishing Enterprises

Production Performance Factors

Average Purchase and Shipping Weights – Finish Bulls & Heifers

This production performance factor reflects the relationship of average purchase or transfer weights from background enterprises moving into the finish enterprises, as well as finishing shipping weights of a finishing bison operation.

Over the 10-year project period, the average purchase and shipping weights increased for the Under 100 bull and Over 100 bull categories. Like the finishing bull enterprises, the average purchase and shipping weights increased for the Under 100 and Over 100 heifer enterprises.

These trends suggest that the producers in the benchmark project demonstrated improved production performance for the finishing enterprises of their bison operations.

Under 100 Finish Bull Enterprise Purchase/Transfer & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Transfer Wt	636	688	780	791	799	758	782	797	786	792	756
Shipping Wt	1066	1092	1125	1158	1120	1123	1176	1183	1203	1224	1147

Over 100 Finish Bull Enterprises Purchase/Transfer & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Transfer Wt	685	761	779	828	824	814	816	894	808	821	803
Shipping Wt	1037	1088	1088	1114	1129	1157	1179	1248	1194	1188	1142

Under 100 Finish Heifer Enterprise Purchase/Transfer & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Transfer Wt	566	625	633	687	663	633	669	700	701	702	658
Shipping Wt	874	933	934	946	920	908	932	967	998	1013	942

Over 100 Finish Heifer Enterprises Purchase/Transfer & Shipping Weights (Lbs)
For Past 10 Benchmark Project Years

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Purchase/ Transfer Wt	n/a	681	713	718	751	714	708	664	669	708	703
Shipping Wt	n/a	917	910	927	962	968	962	974	954	985	951

Mortality Percentage

In this production performance factor, over the 10-year project period, the mortality rates generally increased in all finishing bull and finishing heifer enterprises. It is interesting to note that the overall average of mortality rates was higher in the finishing bull enterprises (0.55 to 0.58%), compared to those in the finishing heifer enterprises (0.31 to 0.35%).

Under 100 & Over 100 Finishing Bulls & Heifers Enterprises Mortality Percentage
For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	0.70%	0.95%	0.0%	0.13%	0.75%	0.54%	0.50%	0.45%	0.45%	0.97%	0.55%
Over 100 Bulls	1.50%	0.46%	0.46%	0.11%	0.50%	0.37%	0.10%	0.29%	0.82%	1.29%	0.58%
Under 100 Heifers	0.80%	0.0%	0.36%	0.36%	0.07%	0.27%	0.29%	0.12%	0.40%	0.82%	0.35%
Over 100 Heifers	n/a	0.05%	0.05%	0.29%	0.64%	0.68%	0.17%	0.29%	0.24%	0.39%	0.31%

Shrinkage Percentage

Over the 10-year project period, the shrinkage percentage increased in the Over 100 bull enterprise, while in the Over 100 heifer finishing enterprise the shrinkage percentage remained relatively constant. For the Over 100 bull category, the percentage went from an average of 4.6% to 7.4%. For the Over 100 heifer enterprise category, the percentage remained around an average of 7.2% (2012 to 2020 project years). The overall shrinkage percentage for the 10-year project period was 6.3% in the Over 100 bull enterprise category.

For the Under 100 bull and Under 100 heifer finishing enterprise categories the percent shrinkage remained constant during the project period 2012 to 2020.

Under 100 & Over 100 Finishing Bulls & Heifers Enterprises Shrinkage Percentage For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	4.5%	6.3%	8.2%	6.4%	6.5%	7.2%	6.6%	7.5%	6.8%	6.2%	6.6%
Over 100 Bulls	3.0%	6.8%	5.9%	5.3%	6.9%	7.0%	6.6%	7.3%	6.6%	7.4%	6.3%
Under 100 Heifers	4.6%	9.7%	7.9%	6.9%	7.1%	7.4%	6.4%	7.5%	6.8%	6.4%	7.1%
Over 100 Heifers	n/a	7.1%	4.8%	6.0%	8.6%	7.1%	7.8%	8.9%	7.7%	7.1%	7.2%

Dressing Percentage: Feedlot to Carcass

For the finishing bull enterprises, the feedlot to carcass dressing percentage increased slightly in the Over 100 bull category during the 10-year project period. In comparison, for the Under 100 bull category, the dressing percentage decreased over the same time frame.

It is interesting to note that the overall average feedlot to carcass dressing percentage was similar for the Over 100 and Under 100 bull enterprises (56.6%), over the 10-year project period.

For the finishing Under 100 heifer enterprises, the feedlot to carcass dressing percentage decreased slightly for the 10-year project period (58.5% to 57.7%). In the Over 100 heifer enterprise, from 2012 to 2020 project years, the percentage increased very slightly from 56.8% to 57.3%.

For the project period, the overall average feedlot to carcass dressing percentage was relatively close, 57.5% for Under 100 heifer category and 57.8% for Over 100 heifer category.

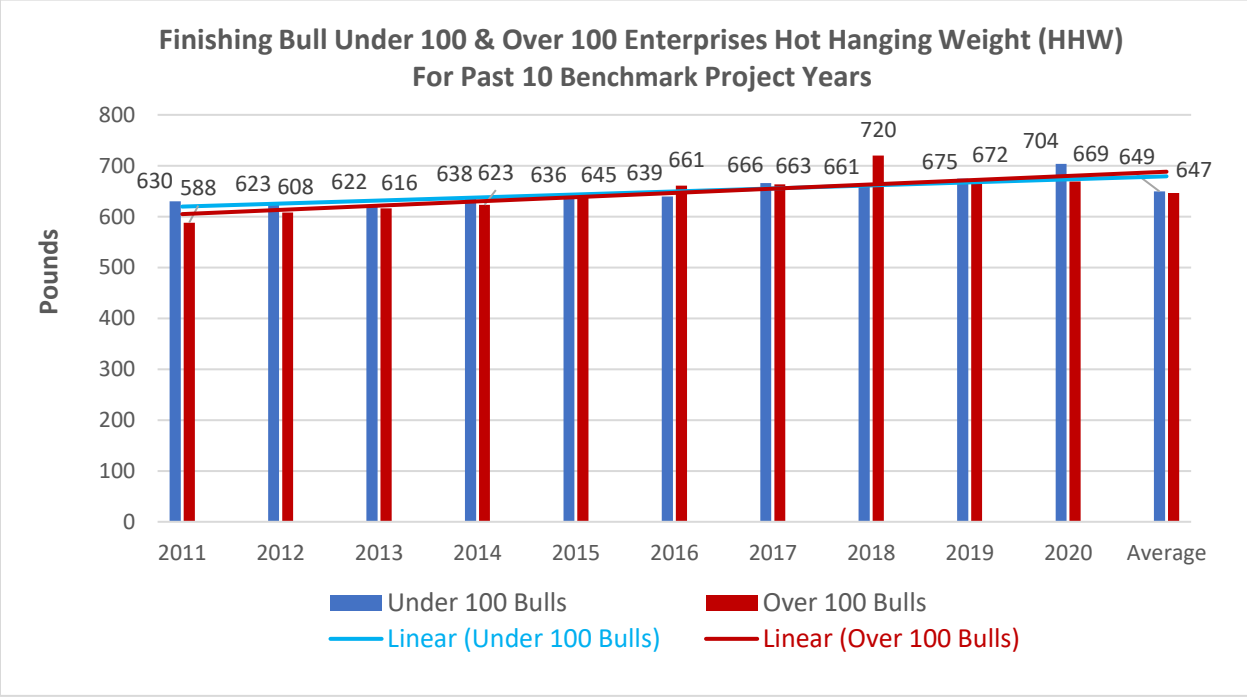
Under 100 & Over 100 Finishing Bulls & Heifers Enterprises Dressing % Feedlot to Carcass For Past 10-Year Benchmarking Project

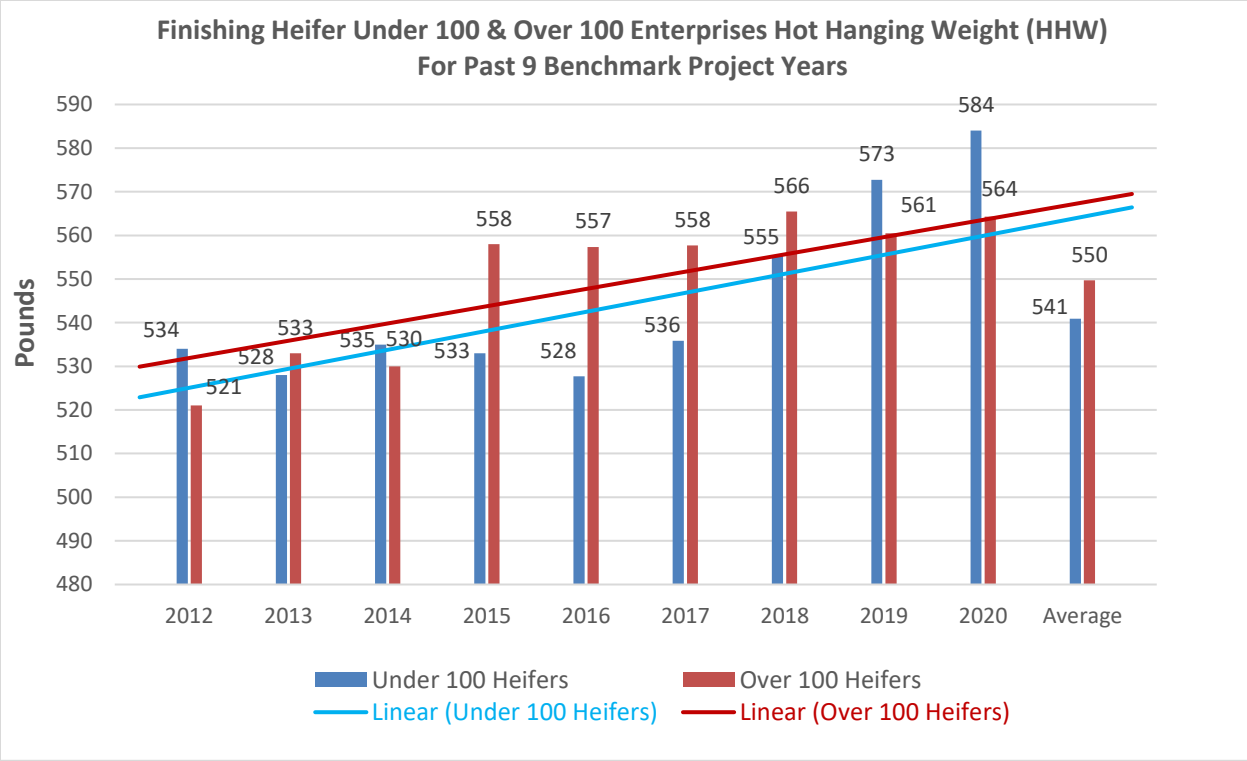
Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	59.2%	57.0%	55.2%	55.1%	56.8%	56.9%	56.5%	55.7%	56.2%	57.5%	56.8%
Over 100 Bulls	56.7%	55.9%	56.6%	56.0%	57.1%	57.1%	56.3%	57.7%	56.3%	56.3%	56.6%
Under 100 Heifers	58.5%	57.2%	56.5%	56.5%	57.9%	58.2%	57.5%	57.4%	57.5%	57.7%	57.5%
Over 100 Heifers	n/a	56.8%	58.5%	57.1%	58.0%	57.7%	58.0%	58.1%	58.8%	57.3%	57.8%

Hot Hanging Weight (HHW)

This is an important production performance factor in finishing enterprises, as it supports success in financial performance of finishing components of bison operations. Over the 10-year benchmark project period, the hot hanging weights increased for all finishing bull and finishing heifer enterprises. For the Under 100 bulls category, HHW increased by 12%, while in the Over 100 bulls category HHW increased 14%.

For the Under 100 heifers category, HHW increased by 9%, whereas in the Over 100 heifers category HHW increased 8% (2012 to 2020 project period). The increases of hot hanging weights over the benchmark project suggested that the production performance of finishing operations improved through the years.





Average Daily Gain

This is another key production factor in finishing enterprises as it provides evidence of performance success in bison operations. Over the 10-year project period, the average daily gains increased in the Over 100 bull enterprise category, from 1.80 lbs/day to 2.08 lbs/day with an overall average of 1.87 lbs/day. In comparison, for the Over 100 heifer enterpise the average daily gains went from 1.47 lbs/day to 1.32 lbs/day (2012 to 2020 project years), with an overall average of 1.26 lbs/day. However, for the 2013 to 2020 project years, it is interesting to note that the average daily gains ranged from 1.02 lbs per day to 1.32 lbs/day, demonstrating an increasing trend.

For the Under 100 bull and Under 100 heifer enterprises, the average daily gains decreased for these finishing categories through the 10-year project period. The average daily gain went from 1.76 lbs/day to 1.57 lbs/day, although the overall average daily gain was 1.76 lbs/day, for the Under 100 bull category. In comparison, for the Under 100 heifer category the average daily gain went from 1.51 lbs/day to 1.12 lbs/day, with an overall average of 1.28 lbs/day.

Under 100 & Over 100 Finishing Bulls & Heifers Enterprises Average Daily Gain For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Under 100 Bulls	1.76	2.00	1.91	1.81	1.81	1.68	1.61	1.65	1.75	1.57	1.76
Over 100 Bulls	1.80	1.86	1.67	1.84	1.90	1.76	1.83	2.04	1.89	2.08	1.87
Under 100 Heifers	1.51	1.67	1.25	1.31	1.44	1.27	1.07	1.06	1.10	1.12	1.28
Over 100 Heifers	n/a	1.47	1.02	1.16	1.35	1.33	1.13	1.30	1.31	1.32	1.26

Financial Performance Factors

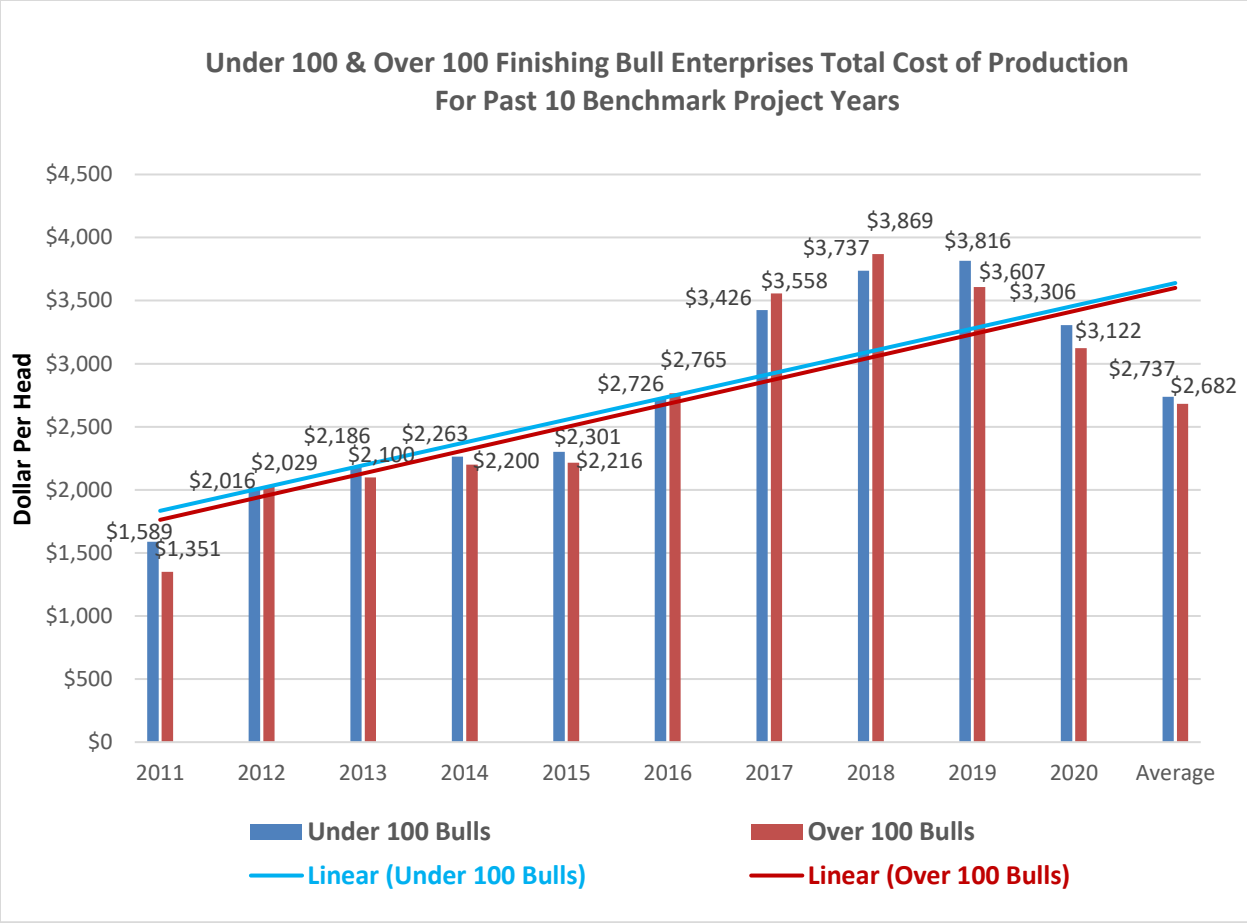
Total Cost of Production

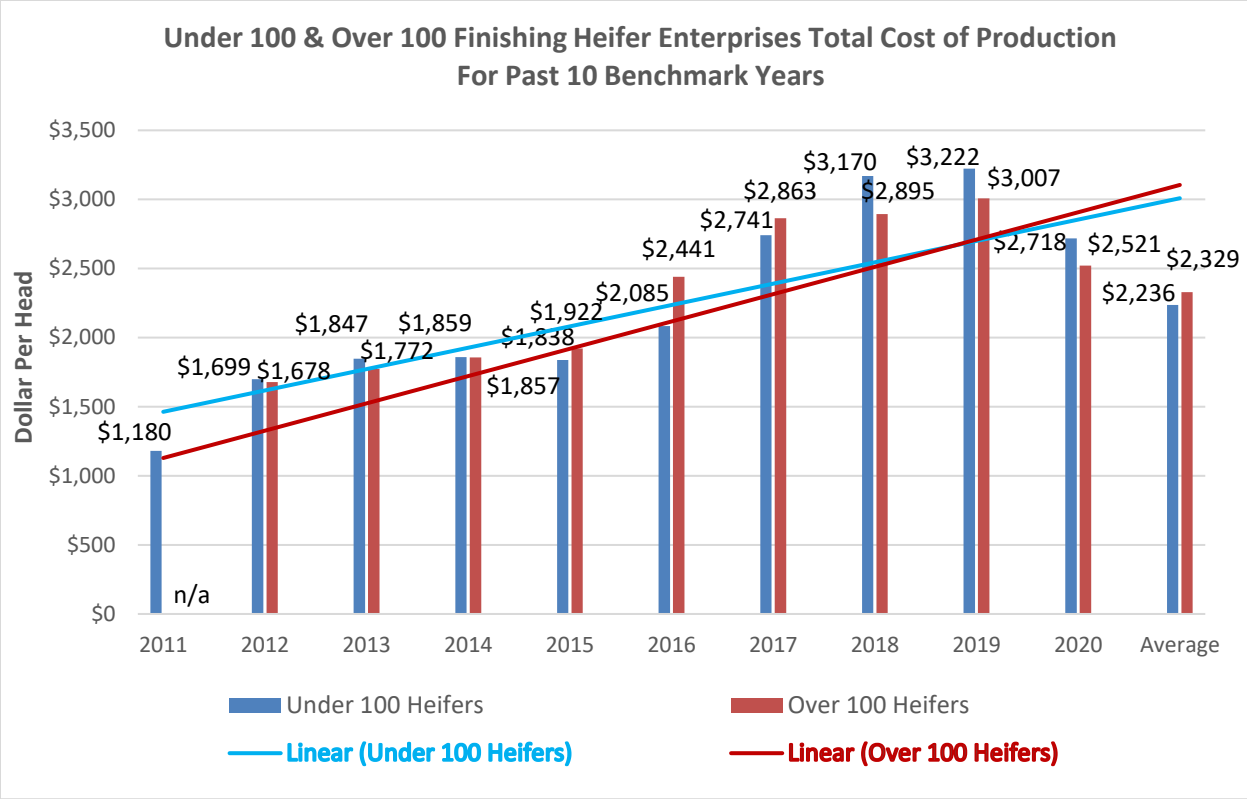
Over the 10-year benchmark project period this financial performance factor increased for all the finishing bull and heifer enterprises.

Cost of production increased 108% in the Under 100 finishing bull enterprise category and 130% in the Over 100 finishing bull enterprise category. In comparison, the cost of production in the Under 100 finishing heifer enterprise category increased by 130% for the 10-year project period.

Over the 9-year period 2012 to 2020 of the benchmark project, the Over 100 finishing heifer enterprise category increased by 51%, while the Under 100 finishing heifer category increased by 60%.

A worthy note is that the average total cost of production over the 10-year project period was $55 per head higher for the Under 100 head category compared to the Over 100 head category in the finishing bull enterprises. While for the finishing heifer enterprises, the average total cost of production was around $90 per head higher in the Over 100 head category compared to the Under 100 head category.


Under 100 & Over 100 Finishing Bull Enterprises Total Cost of Production
For Past 10 Benchmark Project Years
Dollar Per Head
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$0
$1,589
$1,351
$2,016
$2,029
$2,186
$2,100
$2,263
$2,200
$2,301
$2,216
$2,726
$2,765
$3,426
$3,558
$3,737
$3,869
$3,816
$3,607
$3,306
$3,122
$2,737
$2,682
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Average
Under 100 Bulls
Over 100 Bulls
Linear (Under 100 Bulls)
Linear (Over 100 Bulls)



Average Feed Cost Per Lb. Gain

Over the 10-year benchmarking project period, the average feed cost per lb. gain increased in all finishing bull and heifer enterprises. In the finishing bull enterprises, the average feed cost per lb. gain for the Under 100 category increased from $0.84 to $1.35 (a 60% increase). For the Over 100 category, the average feed cost increased from $0.92 to $1.21 per lb. gain (a 32% increase).

In comparison, in the finishing heifer enterprises, the average feed cost per lb. gain for the Under 100 category increased from $0.76 to $1.51 (a 99% increase). For the Over 100 category, the average feed cost increased from $0.95 to $1.52 per lb. gain (a 60% increase over a 9-year period).

Average Total Cost Per Lb. Gained

Similar to the trends of the average feed cost per lb. gain, the average total cost per lb. gain increased in all finishing bull and heifer enterprises over the 10-year project period. This should be no surprise as the feed costs for the bull enterprises represent a range of 51 to 57% of total cost of production. In comparison, for the heifer enterprises, the average feed costs represented 48 to 51% of total cost of production.

Under 100 Finishing Bulls Enterprises Feed Cost Per Lb. Gain & Total Cost Per Lb. Gain
For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Feed Cost Per Lb Gain	$0.84	$0.77	$0.87	$1.11	$1.10	$1.02	$1.05	$0.96	$1.19	$135	$1.03
Total Cost Per Lb Gain	$1.51	$1.53	$1.80	$2.07	$2.36	$2.24	$2.02	$2.10	$2.37	$2.35	$2.03

Over 100 Finishing Bulls Enterprises Feed Cost Per Lb. Gain & Total Cost Per Lb. Gain
For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Feed Cost Per Lb Gain	$0.92	$0.79	$1.27	$1.46	$1.14	$1.29	$1.13	$0.98	$1.09	$1.21	$1.13
Total Cost Per Lb Gain	$1.45	$1.40	$1.86	$2.29	$2.20	$2.32	$2.13	$1.91	$2.05	$2.26	$1.99

Under 100 Finishing Heifers Enterprises Feed Cost Per Lb. Gain & Total Cost Per Lb. Gain
For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Feed Cost Per Lb Gain	$0.76	$0.73	$1.12	$1.35	$1.10	$1.32	$1.30	$1.25	$1.47	$1.51	$1.19
Total Cost Per Lb Gain	$1.51	$1.52	$2.31	$2.64	$2.74	$2.76	$2.71	$2.65	$2.93	$2.92	$2.47

Over 100 Finishing Heifers Enterprises Feed Cost Per Lb. Gain & Total Cost Per Lb. Gain
For Past 10-Year Benchmarking Project

Benchmark Project Yr	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Feed Cost Per Lb Gain	n/a	$0.95	$1.48	$1.58	$1.45	$1.29	$1.35	$0.94	$1.23	$1.52	$1.31
Total Cost Per Lb Gain	n/a	$1.61	$2.53	$3.24	$2.88	$2.85	$2.95	$1.86	$2.57	$2.71	$2.58

Average Cash Return

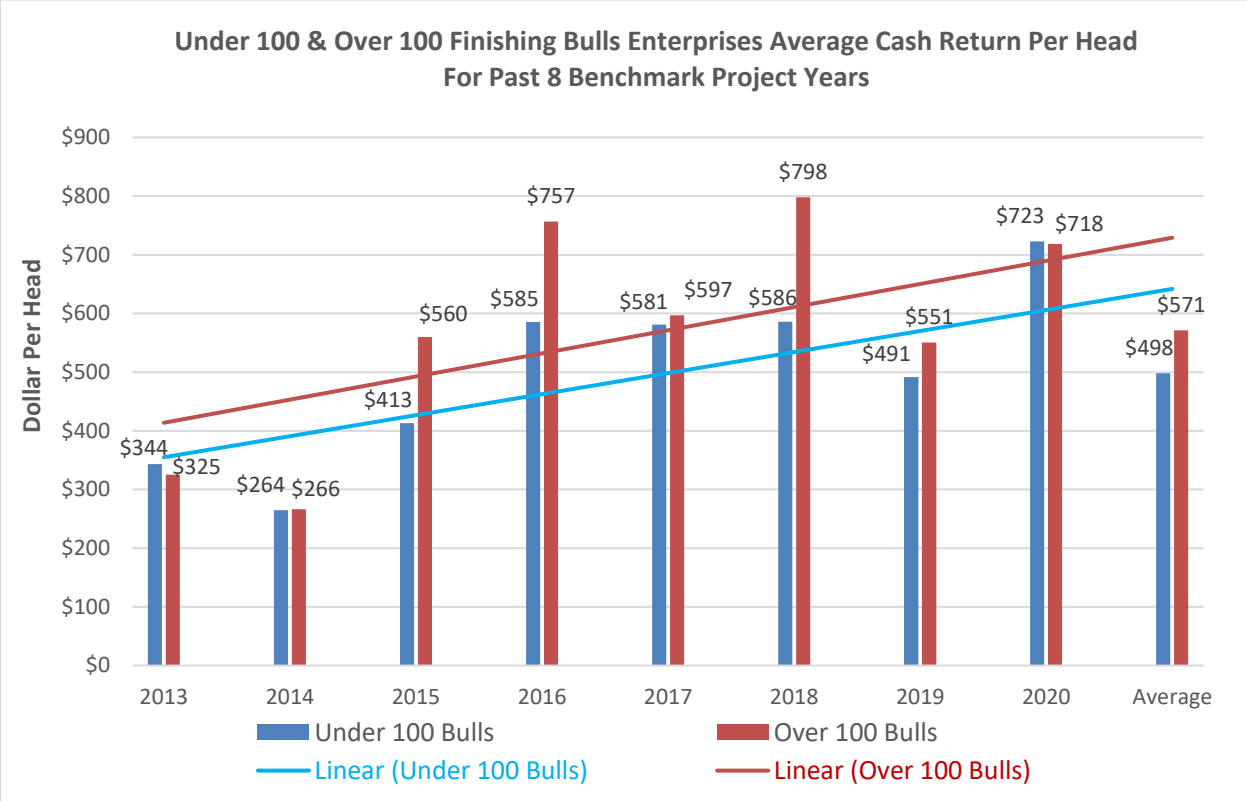
The data collection for this financial performance factor began in project year 2013. Over the 8-year period of review, the overall trend of the average cash return per head increased for all finishing bull and heifer enterprises.

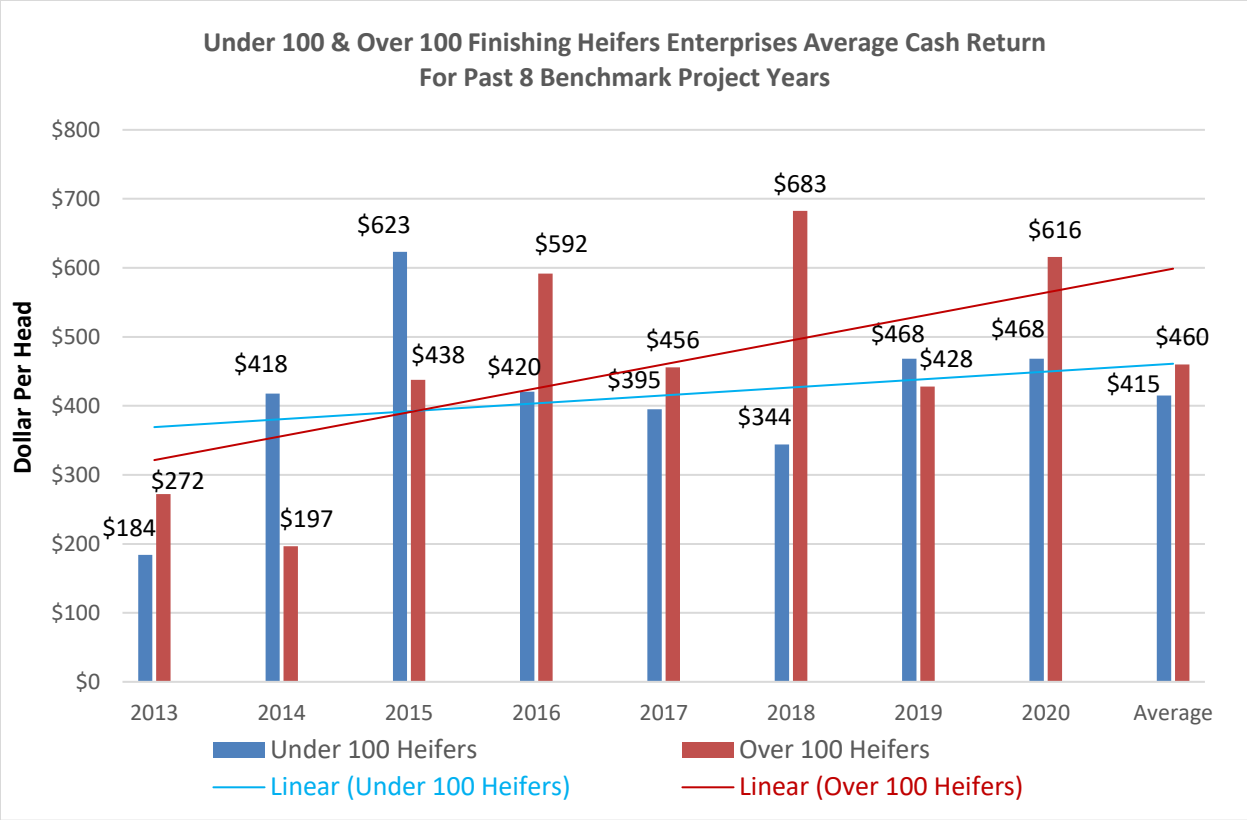
For the Under 100 finishing bull enterprise category, the average cash return increased by 110%, compared to a 121% increased in the Over 100 finishing bull category. For

the Under 100 finishing heifer enterprise category, the average cash return increased by %155, whereas in the Over 100 finishing heifer category, the average cash return increased by 126%.

Over the 8-year period, in the finishing bull enterprises, the overall average cash return of the Over 100 head category was $73 per head higher. In comparison, for the finishing heifer enterprises, in the Over 100 head category the overall average cash return was $45 per head higher.

The above trends indicated that the Over 100 head categories in both the bull and heifer finishing enterprises were more profitable than the Under 100 head categories.





Conclusion

The benchmark project provided benefits for bison producers and, ultimately, the bison industry.

Understanding and knowing how production and financial factors impact performance is key to bison operations. To properly assess the performance factors, it is important for producers to maintain good records.

Cow-calf, backgrounding and finish bison operations are the backbone of the industry and having good information is critical for making financial and production decisions. Even though the information obtained from the benchmark project is not perfect, having this information can assist the industry and producers themselves improve. Improvement in one's particular operation and the industry, as a whole, is critical to short and long term success.