MCDONALD'S SUSTAINABLE BEEF PILOT

Information Sharing Initiative Report | April 7, 2016

TABLE OF CONTENTS

02 INTRODUCTION

04 KEY TAKEAWAYS

06 RESULTS

15 CONCLUSION

17 APPENDIX

INTRODUCTION

INTRODUCTION

The third criteria for the Food Principle of the Global Roundtable for Sustainable Beef (GRSB) is, "Information[1] should be shared both up and down the value chain to provide opportunities for participants to improve their businesses, while respecting confidentiality."

As part of the Pilot, McDonald's supported an initiative to evaluate the potential usefulness of data sharing with stakeholders in the Canadian beef community. To that end, McDonald's partnered with Beefbooster and BIXS to enlist the help of two professionals[2] from Livestock Gentec. Together, they analyzed the nearly two million records packing plants entered into the Beef Information Exchange System (BIXS) from 2012 to 2014 as part of a federally sponsored project. They then cross-referenced those records with a proprietary set of data linking individual RFIDs from Beefbooster cattle to their sires and dams.

This initiative created the first opportunity for a specific group of producers to analyze a subset of their raw data within BIXS and transform it into meaningful information. The analysis was intended to be a high level examination without multiple scenarios and sensitivities being run. It was not intended to be a comprehensive analysis of potential impacts on individual ranches, feedlots and packers' particular business models and relationships in the market. It is hoped to serve as a catalyst for future information sharing opportunities for any interested members of the Canadian beef community.

The professionals looked at the data two ways:

1. **Macro-analysis** – A high level analysis using a specific set of cattle feeding assumptions (See Appendix on page 18) on all the available records with good quality carcass data and birth dates.

2. **Micro-analysis** – A deeper analysis on a subset of those records where genomic technology was used to identify the specific Beefbooster sires of 813 calves.

[1] Specific information related to sustainability principles and criteria should be determined by the local, national and regional roundtables as they establish their indicators.

[2] Michael MacNeil, MS, PhD. and John Basarab, PhD.

KEY TAKEAWAYS

KEY TAKEAWAYS

Macro-analysis (industry)

1. **Missing birth dates in CCIA records resulted in culling 87% of the records:** Significant need for more cow-calf ranches to be in BIXS and upload calf birth dates

2. **Data must be transformed to create value:** Data needs to be transformed into usable information, then into shared knowledge to make informed decisions and create value.

3. **Cattle harvested before 19 months of age had the best profit opportunity under the market conditions and assumptions used in this initiative**: ~41% of Canadian cattle in the database were harvested before 20 months of age.

4. **Reduced Carbon Footprint:** Cattle harvested at 18 months instead of 24 months have the potential to reduce GHG intensity of beef production by 1.2 tonnes CO2e /youthful animal harvested.

Micro-analysis (Beefbooster)

5. **$219 higher carcass value for the average TX (terminal cross) line Beefbooster calf compared to the industry average**

6. **Opportunity to select bulls for carcass value:** There is an opportunity to improve carcass value by selecting yearling bulls using a multi-trait carcass value index.

Data Sources: Only three data sources were used for this initiative

1. **Carcass data from packers** – Nearly two million records with RFIDs and carcass data from packing plants sent to BIXS during 2012 to 2014 as part of a federally sponsored project.

2. **Birth dates from ranchers** – Several hundred thousand births with RFIDs entered into BIXS by cow-calf ranchers.

3. **Beefbooster data set** – Sire and source identified harvest data (N=813) subset of BIXS data set.

NO DATA was sourced from any feedlots participating in BIXS.

Caution: This was a high-level analysis. It was NOT intended to be a comprehensive analysis, nor an analysis of potential impacts on individual ranches, feedlots and packers' particular business models and relationships in the market.

RESULTS

RESULTS

Macro-analysis of carcass data in BIXS

1,909,787 records were submitted to BIXS by packers as part of a federally funded project from January, 1, 2012 to April 30, 2014. BIXS cross-referenced these carcass records with several hundred thousand records from BIXS cow-calf ranchers entered into BIXS by cow-calf ranchers. NO DATA was sourced from any feedlots participating in BIXS for the purpose of this trial. Livestock Gentec's analysis excluded:

- 87% of the records for lack of date of birth because the producers associated with these records were not BIXS members so associated birth dates were not available.

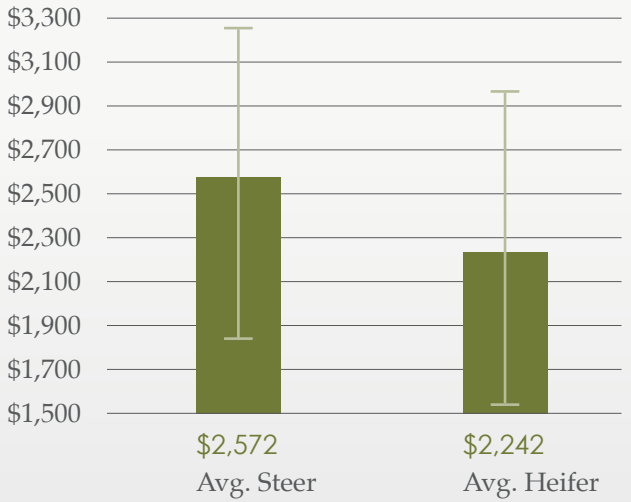
- 6% of the records for unreasonable outliers in the following fields: over-age, ribeye area, sub-cutaneous back fat, marbling or records were missing: sex, harvest date, hot carcass weight, longissimus muscle area, fat depth, marbling score, quality grade or yield grade.

Bear Trap Feeders | Nanton, AB

RESULTS

Macro-Analysis Area 1

Benchmarking Canadian Beef Industry Carcass Value



Methodology

Investigators used the Cargill, High River grid to calculate individual carcass values for each of the animals within the population of (n = 1,834,267) and then analyzed the distribution of the carcass value within the population (Standard deviation $233.50). About 50% of the carcasses had back fat measurement of greater than 0.5 inch.

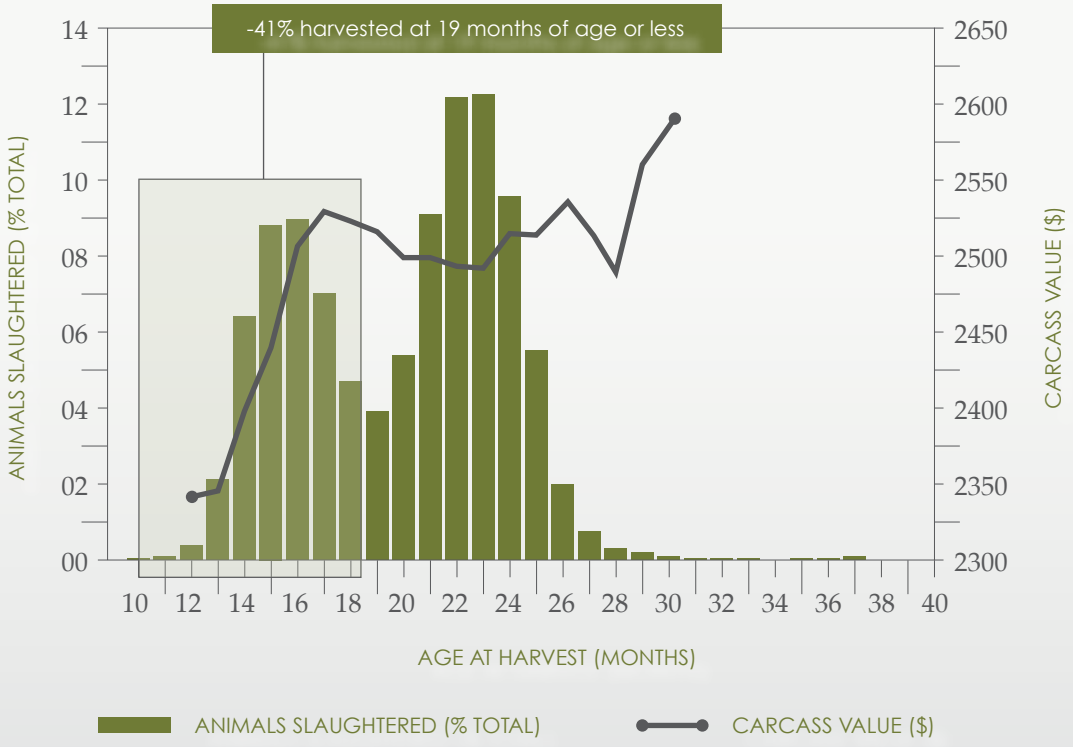
Carcass discount information:

- 40% discounted for quality grade
- 13% discounted for yield grade
- 1.6% discounted for carcass weight

RESULTS

Macro-Analysis Area 2

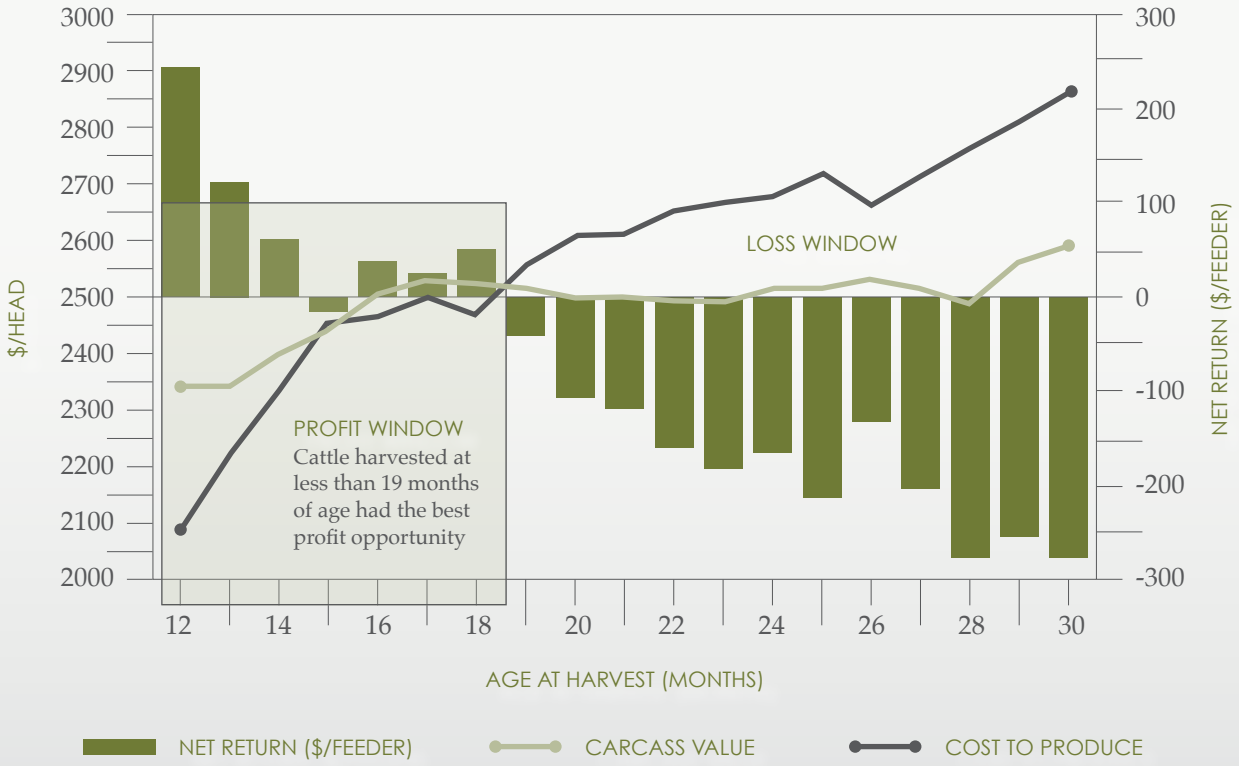
Distribution of age, carcass weight and value at harvest (n=126,870)



RESULTS

Macro-Analysis Area 3

Cost to Produce, Carcass Value and Net Return Estimate

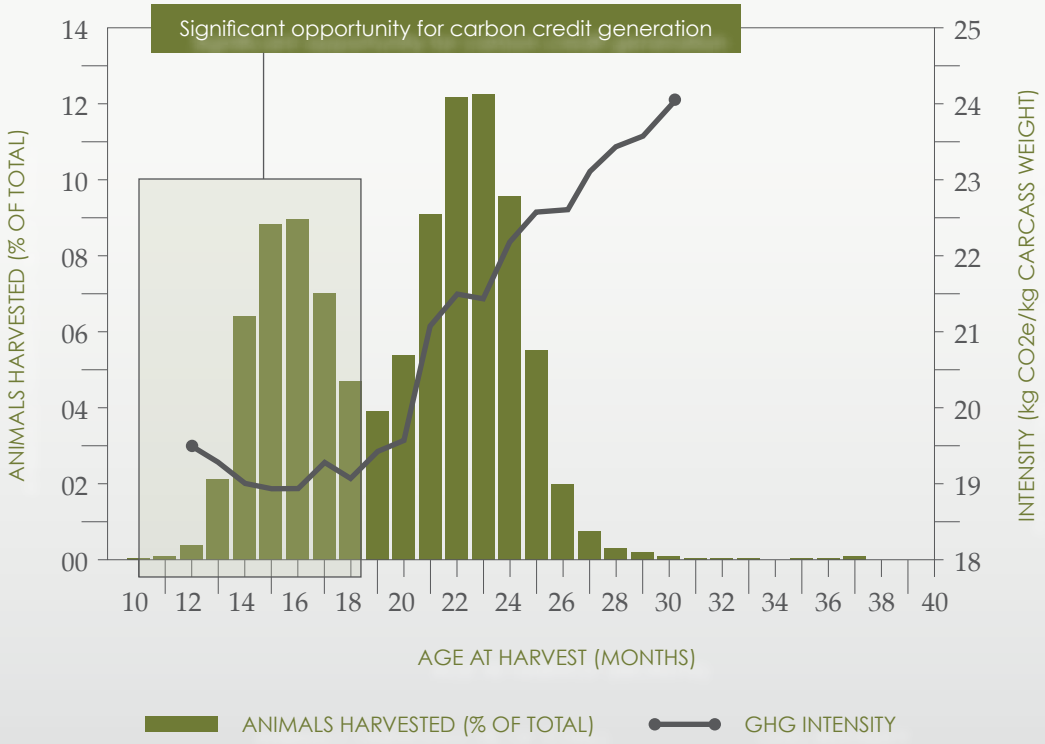


RESULTS

Macro-Analysis Area 4

Greenhouse Gas Emissions Intensity and Age at Harvest

Reducing age at harvest from 24 to 18 months of age reduces GHG intensity by 1.2 tonnes CO2e/head (Assume 850 lb. carcass)



RESULTS

Micro-economic analysis of Beefbooster data set

Livestock Gentec analyzed a subset of Canadian Cattle Identification Agency (CCIA) and BIXS records linked to 813 calves where genomic technology was used to identify their specific Beefbooster sire and dam lines.

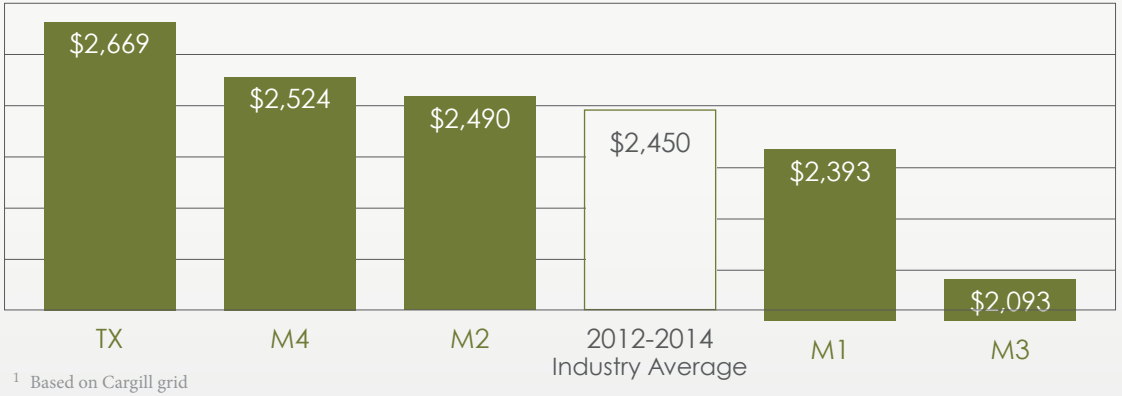
M4 Cow-calfs pairs | Beefbooster

RESULTS

Micro-Analysis Area 1

Beefbooster Line Carcass Value Calculation

Livestock Gentec determined the individual carcass value for each individual animal determined by weight, quality and yield grades through the Cargill, High River, Alberta grid. These results are portrayed in the following two charts:



[1] Based on Cargill grid

[2] 63% steers and 37% heifers - source CanFax Research Services

Carcass Value Variance Within Beefbooster Lines

	TX	M4	M2	2012-2014 Industry Average	M1	M3
Highest Value	$255	$108	$121	0	$(7)	$(322)
Average Value	$219	$74	$40		$(57)	$(357)
Lowest Value	$183	$40	$(41)		$(107)	$(392)

RESULTS

Micro-Analysis Area 2

Carcass Value Expected Progeny Difference (EPD) by Sire Line

Livestock Gentec then performed mixed model analysis considering harvest date, sex, strain, sire within strain to determine Carcass Value EPDs for each sire within each line.

SIRE LINE	M1 (N=28)	M2 (N=5)	M3 (N=29)	M4 (N=48)	TX (N=15)
Highest EPD	+$61	+$33	($19)	+$95	+$169
Lowest EPD	-$87	-$9	-$186	-$22	+$4

Based on these results, there is an opportunity to improve carcass value by selecting yearling bulls using a multi-trait carcass value index.

TX Bull | Beefbooster

CONCLUSION

CONCLUSION

1. Collaboration, information sharing and analysis of data have the potential to create significant value for the Canadian beef community.

2. There is a significant need for more cow-calf ranches to participate in BIXS and upload their calf birth dates.

Antelope Butte Ranch | Lundbreck, AB

APPENDIX

APPENDIX

Cost Assumptions

1. $Cost_a$ (feeder*) = multiply steer live weight (500-600 lb) by buying price ($3.00/lb) plus $11.50/hd for marketing and transportation [$0.15/lb slide when >500 lb]
2. $Cost_i$ (induction) = 3% of feeder cost based on CanFax Trends for 2015) processing, vaccination, medicines and veterinary services
3. $Cost_f$ (feed) = $1.00/day for backgrounding diets, $0.83/day for pasture ($25/animal unit month) and $2.26/day for finishing diets
4. $Cost_y$ (yardage) = multiplying days on feed (DOF) by $0.45/head/day
5. $Cost_{int}$ (interest) = The sum of the feeder value and half the total feed costs multiplied by the proportion of the year in drylot and pasture (DOF/365) and by 0.03 (3% interest
6. $Cost_d$ (death loss) = 1.5% of feeder costs
7. $Cost_m$ (marketing costs) = $5/hd
8. $Cost_g$ (growth promotants) = $1.05 per implant with 200 mg progesterone and 20 mg estradiol benzoate and $4.50 per implant with 120 mg trenbolone acetate and 24 mg estradiol

Greenhouse Gas Reference Sources

1. On-farm emissions of CH4 from enteric fermentation and manure
2. On-farm emissions of N2O from manure,
3. Off-farm emissions of N2O from N leaching, run-off and volatilization
4. On-farm emissions of N2O from cropping due to soils, fertilizer, roots and residue (11.2% in calf-fed systems; 11.4% in yearling-fed systems)
5. CO2 emissions from energy use (9.0% in calf-fed systems; 9.5% in yearling fed systems
   - GHG emissions for cowherd were taken from Basarab et al., animals, 2012
   - Conversion of CH4 to CO2e = x 25
   - Conversion of N20 to CO2e = x 298

*Feeder cost does not include costs associated with cow purchase and maintenance

RECOGNITION

Lead

Beefbooster

Support

BIXS and McDonald's

Funding

McDonald's and Alberta Livestock Meat Agency

Analysts

Michael MacNeil, MS, PhD.
Livestock Gentec,
Miles City, MT, USA

John Basarab, PhD.
Livestock Gentec
Lacombe, AB, Canada