

LIVESTOCK AND FORAGE CENTRE OF EXCELLENCE

PROGRESS REPORT

MAY 1, 2018, TO APRIL 30, 2021



UNIVERSITY OF SASKATCHEWAN

Livestock and Forage
Centre of Excellence

LFCE.USASK.CA



BE WHAT THE WORLD NEEDS

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CONTENTS

PAGE 1

FROM THE DEANS

PAGE 2

FROM THE INTERIM DIRECTOR

PAGE 3

FROM THE CHAIR OF THE STRATEGIC ADVISORY BOARD

PAGE 4

OUR ORGANIZATION

PAGE 6

OUR HISTORY

PAGE 8

OUR FACILITIES

PAGE 10

OUR NUMBERS

PAGE 11

PROVIDING EDUCATIONAL EXPERIENCES

PAGE 12

SUPPORTING RESEARCH

PAGE 16

REACHING OUT TO THE COMMUNITY

PAGE 19

FINANCIAL STATEMENTS

PAGE 20

INVESTING IN EXCELLENCE

Front cover photograph:
Beef Cattle Research and Teaching Unit

Back cover photograph:
Forage and Cow-Calf Research and Teaching Unit

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FROM THE DEANS

To say that 2020-2021 has been a year of new leadership for the Livestock and Forage Centre of Excellence would be an understatement. As we stepped into our respective roles as dean for the College of Agriculture and Bioresources (AgBio) and interim dean for the Western College of Veterinary Medicine (WCVM) in the fall of 2020, we jointly took over the responsibility for the LFCE from LFCE founding deans Dr. Mary Buhr (PhD) in AgBio and Dr. Doug Freeman (DVM, PhD) at the WCVM.

Getting up to speed on all the aspects of the LFCE was a challenging and stimulating venture! Thankfully, we were able to rely on the strong vision and passion that is evident at all levels of the organization. We were lucky to have had Dr. Kris Ringwall (PhD) as first director of the LFCE, who managed the synthesis of three separate operations into a single centre that became the LFCE. When Kris made the decision in the fall of 2020 to step down from the director position and move closer to his family in the United States, we were ready for the next phase.

Dr. Bruce Coulman (PhD), professor emeritus in plant sciences and well-known forage breeder, agreed to step in as interim director and his steady guidance steered the LFCE adeptly through the winter months and into our second spring of new calves. Meanwhile, an international search led us to Dr. Scott Wright (PhD), who joined the LFCE as our new director on May 19, 2021. Completing the leadership changes at all levels for the LFCE, Dr. Baljit Singh (DVM, PhD) took over in February 2021 as the new USask vice-president of research, replacing Dr. Karen Chad (PhD).

Throughout all this, the LFCE continued to move forward, fulfilling its mission to bring together scientists, industry and students to support innovative research and training for sustainable livestock production.

In March 2021, WCVM researcher Dr. Gregg Adams (DVM, PhD) and his team were awarded \$6.76 million from the Canada Foundation for Innovation (CFI) to contribute toward the build of new state-of-the-art infrastructure at the LFCE Goodale Farm, to support research into the genetic conservation of bison species and to address multiple

challenges facing the beef cattle industry. In September 2020, we signed an MOU with SaskTel to work on “smart farm” solutions for the agriculture industry using the LFCE as its living laboratory. And just earlier this spring, the LFCE’s associate director Dr. Colin Palmer (DVM) developed and ran spring calving rotations for senior veterinary students, one of the many advantages of having the LFCE’s cow-calf operation located 20 minutes from USask. These are just a few examples, of course.

Nearly 40 research projects have continued to take place at the centre over the past year, following the whole production cycle from genetics to breeding, from calving to finishing and encompassing all aspects of animal health and physiology along the way. One of the real strengths of the LFCE is that these questions have been examined in the context of the surrounding environment as well, through studies ranging from below ground assessments of water quality, soil carbon and biology through to forage production and precision manure management to greenhouse gas emissions.

And all this in a year of pandemic-related restrictions. Needless to say, we are looking forward to the months and years ahead, when we can once again welcome our partners and the public in person to the centre to showcase the breadth of activities at the LFCE.



Dr. Angela Bedard-Haughn (PhD)
Dean
College of Agriculture and Bioresources



Dr. Gillian Muir (DVM, PhD)
Interim dean
Western College of Veterinary Medicine

FROM THE INTERIM DIRECTOR

It is a pleasure to provide this message for the first progress report of the Livestock and Forage Centre of Excellence (LFCE). The centre provides world-class state-of-the-art facilities to support research that is primarily focused on the beef and forage industries. There is also bison and equine research conducted at the centre.

It has been almost three years since the first research project started at the LFCE. However, the idea to create this integrated centre originated seven years ago when a steering committee with members from industry, government and university was created to review livestock and forage facilities in Saskatchewan. The committee's proposal was to bring together into one centre three existing independent units, the USask Beef Cattle Research Unit located on the main university campus in Saskatoon, the Western Beef Development Centre located at the Termuende Farm near Lanigan and the USask Goodale Farm located southeast of Saskatoon.

Despite being in its infancy, most of the facilities at the LFCE are being heavily used. In 2020, there were close to 40 research projects in progress or completed. Research projects covered a range of areas in beef production from the soil to the production of forage and feed through to the finished animal. Projects involved 20 USask professors as principal investigators and included

numerous collaborators from across Canada. Most studies were interdisciplinary in nature supporting the economic and environmental sustainability of the livestock sector. This research will make a major contribution to the achievement of the ambitious goals for the growth of Saskatchewan agricultural production and exports.

It has been an honour to serve as interim director of the LFCE for a seven-month period. I commend the excellent efforts of the first two centre directors, Kathy Larson (interim) and Dr. Kris Ringwall (PhD), in establishing a new organizational structure, transforming three units into one integrated centre. With excellent facilities, dedicated staff members and world-class researchers, the LFCE has a bright future.



Dr. Bruce Coulman (PhD)
Interim director
Livestock and Forage Centre of Excellence



A steer characterized as bold-tempered approaches grad student Cassidy Sim as she prepares to take a photo while the other steers stay behind.

FROM THE CHAIR OF THE STRATEGIC ADVISORY BOARD

Since March 2018, I have been the chair of the Strategic Advisory Board. This has been a very stimulating and challenging position. The people I have had the privilege of working with have certainly made the position rewarding. The board consists of industry, government, university and international members. We have worked to find our stride and role in this exciting venture.

Our structure is not that of a typical board. With the help of Vince Bruni-Bossio from the Edwards School of Business, we have drafted a governance manual to help guide the board.

The diverse wealth of knowledge around the table makes the Strategic Advisory Board a powerful tool and barometer to help the deans of the Western College of Veterinary Medicine and the College of Agriculture and Bioresources, LFCE managers and university researchers, and to aid in fundraising. I have enjoyed the

engagement and communication with the AgBio and WCVM deans. They are very busy people and their commitment to the LFCE is greatly appreciated. The work Kathy Larson, Dr. Kris Ringwall (PhD) and Dr. Bruce Coulman (PhD) have done as centre directors in the first years getting things going has set the stage for our new director, Dr. Scott Wright (PhD), who has come back to beef and forage research after a successful career with many experiences that will be a great asset to the LFCE.

In its inception the dream for the LFCE was a world-class research centre that encompassed the entire forage and beef production system, paying close attention to producer profitability and sustainability, forage development and application, animal welfare, husbandry and production, and environmental responsibility. The tremendous researchers and support staff have come

together to get the LFCE well on its way to fruition of this dream.

I thank the past and present board members for their contributions and commitment and look forward to continuing to work with them.

Finally, I thank the investing partners and contributors that have helped bring the LFCE to this point. Without you, there would be no LFCE.



Duane Thompson
Chair
LFCE Strategic Advisory Board

STRATEGIC ADVISORY BOARD

(AS OF APRIL 30, 2021)

CHAIR

Duane Thompson, producer

INDUSTRY REPRESENTATIVES

Neil Block, producer

Tamara Carter, producer

Robert Johnson, producer

Lance Leachman, producer

GOVERNMENT REPRESENTATIVES

Grant Zalinko, executive director, Livestock Branch, Sask. Ministry of Agriculture

Lee Auten, assistant deputy minister (programs), Sask. Ministry of Agriculture

Abdul Jalil, assistant deputy minister, Western Economic Diversification, Government of Canada

UNIVERSITY REPRESENTATIVES

Dr. Suzanne Kresta (PhD), dean, College of Engineering, USask

Dr. Dion Martens (PhD), director, Research Excellence and Innovation, USask

NATIONAL REPRESENTATIVE

Andrea Brocklebank, executive director, Beef Cattle Research Council

INTERNATIONAL REPRESENTATIVE

Dr. Daniel Thomson (DVM, PhD), chair, Department of Animal Science, Iowa State University

EX-OFFICIO

Dr. Angela Bedard-Haughn (PhD), dean, College of Agriculture and Bioresources

Dr. Bruce Coulman (PhD), interim director, LFCE

Dr. Gillian Muir (DVM, PhD), interim dean, Western College of Veterinary Medicine

FORMER SAB MEMBERS

Dena McMartin, associate provost, Institutional Planning and Assessment, USask (March 2018 to March 2019)

Brad Wildeman, producer (March 2018 to March 2020)

Tim Oleksyn, producer (March 2018 to March 2020)

Kevin France, executive director, Regional Services Branch, Sask. Ministry of Agriculture (March 2018 to December 2020)

Irena Creed, associate vice-president, Research, USask (November 2019 to April 2021)

OUR ORGANIZATION

In 2014, the Saskatchewan Ministry of Agriculture consulted with leaders in the livestock and forage industries and those at the University of Saskatchewan on the future of research and training in the province in support of industry and the provincial economy. The Livestock and Forage Steering Committee was struck with the mandate to review research, training and outreach capacity of the livestock and forage facilities within the province.

Previously, livestock and forage research in Saskatchewan had been conducted in separate facilities, operating independently and geographically dispersed:

- Western Beef Development Centre was located at the USask-owned **Termuende Ranch**, near Lanigan, Sask., but funded mainly by the Saskatchewan Ministry of Agriculture. Prairie Agricultural Machinery Institute (PAMI) operated the centre from 2005 to 2018.
- The USask Beef Cattle Research Unit was located on land along the banks of the South Saskatchewan River and within the limits of the City of Saskatoon. Built in the 1950s and owned by the university, the university

needed to relocate the aging feedlot. It was decommissioned during the spring and summer of 2018.

- Goodale Farm, located southeast of Saskatoon and owned by the university, was primarily serving the needs of researchers and students at the Western College of Veterinary Medicine. It was in need of upgrades, some of which occurred in the summer of 2019.

In 2011 and 2017, the university purchased 15 quarters of farmland south of Clavet, Sask., to bring together under “one roof” these three research and teaching facilities. The transition has been gradual, beginning in the summer of 2018 with the opening of the Beef Cattle Teaching and Research Unit to replace the feedlot. The final piece was completed in the winter of 2020 when the bred cows and heifers at Termuende Ranch and Goodale Farm were moved for calving to the Forage Cow-Calf Research and Teaching Unit. Goodale Farm remains an important unit at the LFCE, housing bulls, horses and bison for teaching and research. We continue to use Termuende and Goodale land for pasture.

With this transition complete, all aspects of beef cattle and forage work at the university are now conducted at the LFCE, providing researchers, faculty, students, industry and producers with a broad-based platform for research, teaching and outreach activities. The centre is also home to the Specialized Livestock Research Facility at Goodale, where world-class bison research focuses on reproduction, vaccine development and disease control, and nutrition.

The LFCE resources, including the animals, land and laboratories, exist to answer industry questions. This is where scientists conduct research to provide producers with science-based answers addressing animal welfare, environmental sustainability and increased profitability. Scientists focus on real-life problems under controlled settings by exploring environmental engineering, soil and plant science, animal science, veterinary medicine and agricultural economics.

The LFCE supports research, teaching and outreach related to:

- Cow-calf production,
- Beef cattle production,
- Forage breeding and production,
- Grazing and pasture management and
- Bison reproduction, herd management, disease control and nutrition.



While we don't brand cattle at the LFCE, we registered a new livestock brand – RAFTER L BACKWARD F – to honour our past as we look to the future.

The “rafter” represents bringing three research facilities together “under one roof,” while the “L” and “F” represent our primary research areas: livestock and forage.

Designed by Kathy Larson, our first interim director. Handcrafted by Keith Hogemann, one of our animal technicians.

VISION

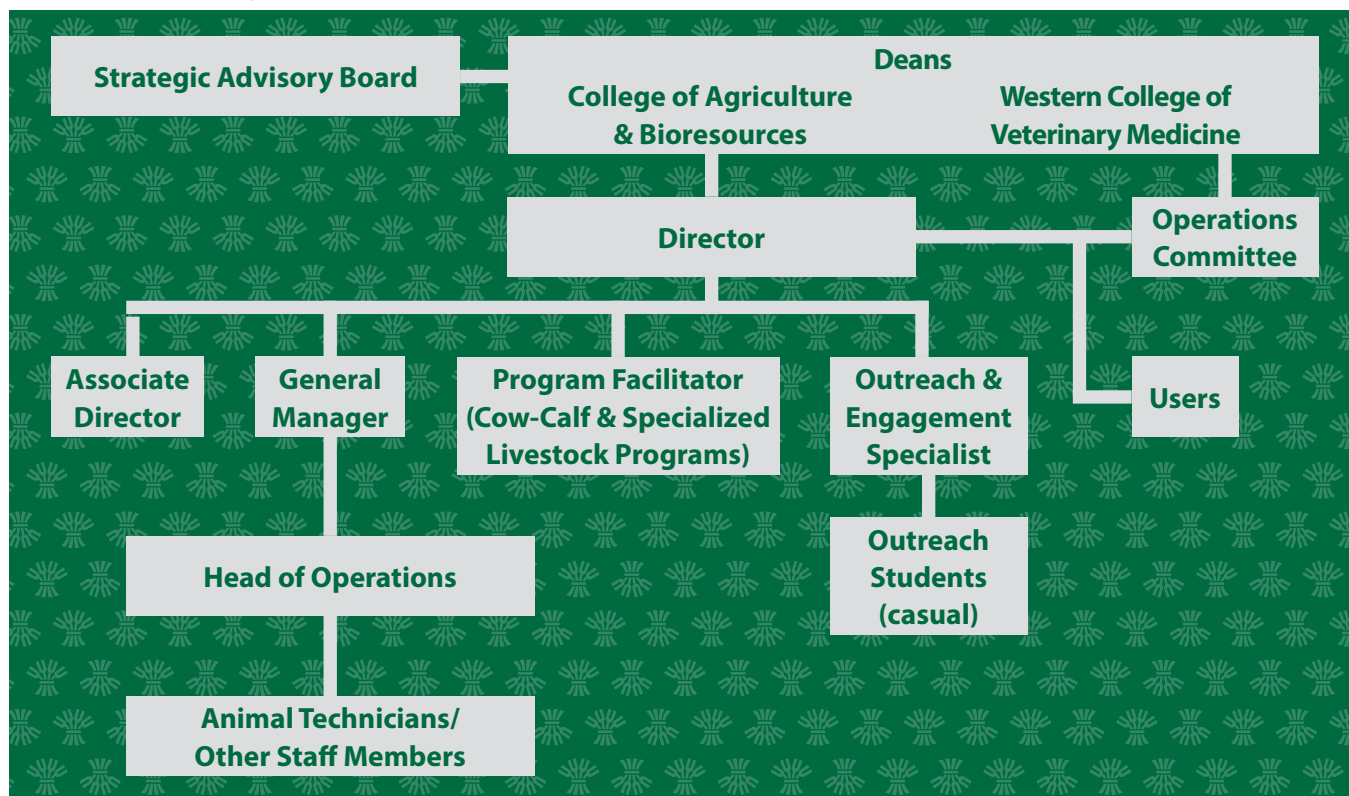
To facilitate innovative change in the livestock and forage industries that promotes sustainability, quality, profitability and environmental stewardship – from soil to forage to animals to people.

MISSION

The LFCE is an internationally recognized collaborative research facility that brings together scientists and stakeholders across multiple sectors to facilitate and support innovative livestock and forage research, student training and extension, and knowledge mobilization.

LIVESTOCK AND FORAGE CENTRE OF EXCELLENCE ORGANIZATIONAL CHART

AT APRIL 30, 2021



STAFF MEMBERS AS OF APRIL 30, 2021

Dr. Bruce Coulman (PhD),
interim director

Dr. Colin Palmer (DVM),
associate director

Teresa Binetruy, general manager

Brad Blackmore, program facilitator
(cow-calf and specialized livestock programs)

Lana Haight, outreach and engagement specialist

Brian Klassen, head of operations

ANIMAL TECHNICIANS

Gary Berggren
Keith Hogemann
Roger Janzen
Roland Klaassen
Dan Olson
Trent Presnell
David Reimer

Brian Symington
Roger Johnson
Chris Quam
James Prouse
Patrick Lynch
Hunter Shmon, casual
Darren Chabot, casual
Leonard Koop, casual
Sharon McFarlane, caretaker, part time

OUTREACH STUDENTS, CASUAL

Rachel Carey
David MacTaggart
Jenna Sarich

FORMER LEADERSHIP

Kathy Larson, interim director
(Feb. 1, 2018, to Nov. 15, 2018)
Dr. Kris Ringwall, director
(Nov. 1, 2018, to Oct. 31, 2020)
Krystal Savenkoff, program facilitator
(to March 2020)

FORMER ANIMAL TECHNICIANS

Jelissa Edison (to Feb. 28, 2021)
John Giles (to Sept. 21, 2020)
Nikki Grant (to Jan. 31, 2020)
Anne Orchard (to Jan. 31, 2020)
Jason Wilton (to Jan. 31, 2020)
Brittany Krause (to Dec. 14, 2019)
Jason Leffler (to Dec. 18, 2020)

FORMER OUTREACH STUDENTS, CASUAL

Caleb Eidsvik
(Oct. 1, 2019, to Aug. 31, 2020)
Jordan Johnson
(Oct. 1, 2019, to Dec. 31, 2019)
Dan Malamura
(Sept. 16, 2019, to Aug. 31, 2020)
Tess Mills
(Sept. 16, 2019, to Aug. 31, 2020)
Brittany Ross
(Sept. 16, 2019, to Aug. 31, 2020)
Cassidy Sim
(Sept. 16, 2019, to Aug. 31, 2020)
Janelle Smith
Sept. 16, 2019, to Nov. 30, 2019)

OUR HISTORY

2011-2017

September 2011:

11 quarters of farmland south of Clavet, Sask., purchased from the Loraas family



October 2016:

Construction began at Beef Cattle Research and Teaching Unit



2018

February 2018:

Kathy Larson appointed as interim director

March 2018:

Strategic Advisory Board members held first meeting



Spring 2018:

First forage research test plots seeded



Nov. 1, 2018:

Dr. Kris Ringwall (PhD) appointed as director

December 2018:

First feeding trial began at Forage Cow-Calf Research and Teaching Unit



June 2019:

First summer field day for producers held with researchers presenting their projects at the forage plots, at the feedlot, in the metabolism barn and in pastures

Summer 2019:

Outdoor cattle pens at Goodale Farm rebuilt



2020



January, March 2020:

Breeding herds moved from Termuende Ranch and Goodale Farm to the FCCRTU

March 2020:

First calves born at the FCCRTU

March 2020:

USask closed due to the COVID-19 pandemic – LFCE closed to the public, all tours cancelled, several research projects suspended



June 2017:

Construction began on Forage Cow-Calf Research and Teaching Unit

October 2017:

Four quarters of farmland south of Clavet, Sask., purchased from the Patkau family



July 2018:

First animals arrived at BCRTU

August 2018:

First research trial began at BCRTU

Oct. 9, 2018:

Grand opening held with representatives from federal and provincial governments, industry partners and USask



2019

January 2019:

First research trial began in the metabolism barn at the BCRTU

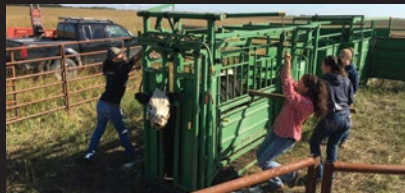
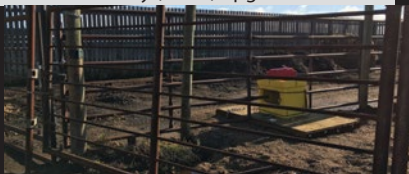


March 2019:

First payment received from the Canadian Beef Sustainability Acceleration pilot project

Summer 2019:

Outdoor bison pens at Specialized Livestock Facility (bison) upgraded



Summer 2019:

First grazing trials conducted on LFCE land



August 2019:

Membership in the Canadian Roundtable for Sustainable Beef approved

2021

Oct. 19, 2020:

Dr. Bruce Coulman (PhD) appointed as interim director



March, April 2021:

Fourth-year veterinary students completed calving rotations for the first time at the LFCE



OUR FACILITIES

The LFCE is a capacity powerhouse for innovative research, teaching and industry engagement. In addition to its specialized bison facility, the centre brings together under “one roof” all aspects of raising beef cattle with a forage-based cow-calf operation, a feedlot and a specialized metabolism barn.



The BCRTU feedlot, with large and small pens, has capacity for 1,500 head of cattle and can accommodate several research projects at the same time.



The 24-stall metabolism barn is equipped to track individual feed and water consumption of cattle, making this highly specialized research unit one-of-a-kind.



Animal science research technician Jordan Johnson brushes one of the animals in the metabolism barn.

BEEF CATTLE RESEARCH AND TEACHING UNIT

This unit is located nine km south of Clavet, Sask., on Bentley Road. The first animals arrived at the BCRTU feedlot in July 2018. This unit replaces the USask Beef Cattle Research Unit located in city limits and on the banks of the South Saskatchewan River. We doubled our feedlot pen capacity from 700 head to 1,500 head. We began operating the metabolism barn in January 2019. The BCRTU is certified as a Verified Beef Production Plus operation.

The 1,500-head feedlot includes:

- 44 small pens for up to 15 animals each;
- Four large pens for up to 200 animals each, similar in size to actual feedlots. The larger pens are also equipped with a state-of-the-art GrowSafe Beef watering system that will weigh an animal, and record when it is drinking and how much it has consumed. We can divide the large pens into eight 100-head pens; and
- Several small and large pens equipped with GrowSafe feeding bunks that measure the amount of feed consumed on an individual basis.

We purchase beef cattle as they are required for feedlot studies and sell those animals when researchers are finished their particular studies. As such, the feedlot does not run at 100 per cent capacity for 365 days of the year. Some studies run for weeks and others for months.

The indoor metabolism barn includes:

- 24 stalls each equipped with a feeding trough and a water bowl for tracking individual feed and water consumption. The water system sets the LFCE apart from other research facilities, allowing for specialized studies involving water quality and consumption;
- The stalls are designed for easy access to collect each animal's waste separately;
- Infrared video cameras installed in the ceiling allow researchers to study animal behaviour day and night; and
- The animals have access to outdoor exercise pens.

Our two laboratories house sample preparation areas, sample grinders and industrial drying ovens as well as sample storage including an ultra-low temperature freezer, a walk-in freezer and a walk-in refrigerator.

Environmental monitoring equipment is stationed throughout the feedlot and surrounding fields, allowing a deeper understanding of the groundwater and how plants and animals interact with that groundwater. We also have our own meteorological equipment to record temperature, barometric pressure, rainfall, as well as wind speed and direction.

FORAGE COW-CALF RESEARCH AND TEACHING UNIT

Located 9 km south of Clavet, Sask., on Bentley Road, the FCCRTU is also certified as a Verified Beef Production Plus operation.

The unit includes:

- 10 stalls in the indoor calving barn;
- Five 60-head capacity outdoor calving pens;
- 12 20-head capacity outdoor research pens; and
- Six large paddocks adjacent to outdoor pens.

In December 2018, we used the outdoor research pens for steers in a feed study. The unit was ready for the 2020 calving season. We moved the bred cows that had been swath grazing at Termuende to the new unit on Jan. 29, 2020. On March 9 and 20, 2020, we transferred the bred heifers from Goodale to their new home.

The first calf at the FCCRTU was born on March 20, 2020. The 2020 calf crop from 419 cows and first-calf heifers included 214 bull calves, 199 heifer calves and 12 sets of twins. To date in 2021, 406 cows and first-calf heifers have calves. We have 396 calves including eight sets of twins.

GOODALE FARM

Goodale Farm, 10 km southeast of Saskatoon, Sask., includes two yard-sites where we support research and teaching. This unit is 20 km northwest of the BCRTU/FCCRTU.

- The main yard is on Floral Road and has 18 30-head capacity outdoor pens for beef cattle plus indoor handling facilities.
- The Specialized Livestock Research Facility/Native Hoofstock Centre (bison) is located on Winmill Road, one grid road east of Floral. Twelve grazing pastures occupy about 500 acres. We also have six holding paddocks and 18 sorting/holding reinforced outdoor pens. The indoor handling facility has a reinforced chute system and a laboratory for analyzing samples.

In the summer of 2019, we completed significant upgrades at both sites providing an enhanced safe work environment for employees and for the animals.

At the main yard, we built a new lagoon for the barns, upgraded the outdoor pens with new drainage ditches and wider feed alleys as well as a new livestock alley to the barn, and added new fill dirt and new steel fencing to accommodate bulls and other animals. The cost was approximately \$1.8 million.

At the bison facility, we replaced the wood fencing in the main handling alley with new steel fencing and gates. We added two new water bowls to be shared by animals in four pens. We are replaced every other fence in the eight pens to improve the movement of the animals. The cost was approximately \$60,000.

We house two genetically distinct bison herds. At present, our Plains bison herd includes 46 females, four calves and three bulls, while our Wood bison herd includes 40 females, two calves and five bulls.

In March 2019, we received 24 bred female Plains bison and one male Plains bison from Elk Island National Park. All 24 females birthed calves in the summer of 2019. Those same females were successfully bred and calved again in the summer of 2020. Our bison herd increased again in March 2020 when we received 22 bred and one open females from Grasslands National Park. Those combined with the Elk Island females produced 40 Calves in the summer of 2020.

In July 2020, two Wood bison calves were born, the first to be born from frozen *in vitro* embryos produced from immature eggs that were collected from live bison. We are expecting three more calves this summer.

LAND RESOURCES

The **LFCE Geographical Information Systems** map identifies all the land allocated to the Livestock and Forage Centre of Excellence and details land usage in the past, present and future.

- **BCRTU/FCCRTU:** 15 quarters of land owned by USask for annual and perennial crops, and grazing research
- **Goodale Farm:** 12 quarters of land owned by USask for annual and perennial crops, and grazing research, along with two quarters of pasture owned by USask known as Kernan Praire.
- **Termuende Ranch:** 12 quarters of land owned by USask plus six quarters of land leased by USask used for summer grazing known as Pathlow pasture.



Tess Mills

Each spring, we move our 400 cow-calf pairs to pasture soon after the animals calve at the FCCRTU.



Christina Weese

A beef cow and her calf enjoy the morning sunshine in one of our outdoor calving pens.



Dr. Colin Palmer (DVM)

Cull cows spend the summer at Goodale Farm where we invested \$1.8 million to upgrade the pens and feed alleys, and to build a new lagoon.



Rigel Smith

Wood bison cows and calves graze at our Specialized Livestock Facility. In addition to a Wood bison herd, we also have a Plains bison herd.

OUR NUMBERS

FCCRTU CALF CROP

	2020	2021
# cows calved	419	395
# sets of twins	12	9
Total # calves born	431	404
# calves alive	413	389
# calves dead at/during birth	13	7
# calves dead since birth	5	8
Current # bull calves alive	214	203
Current # heifer calves alive	199	186
Live calves as % of total cows calved	98.57	98.48
% calf death loss at time of birth	3.02	1.73
% calf death loss since birth	1.16	1.98
Overall % calf death loss	4.18	3.71
% twinning in herd	2.86	2.28
% of live calves – males	51.82	52.19
% of live calves - females	48.18	47.81



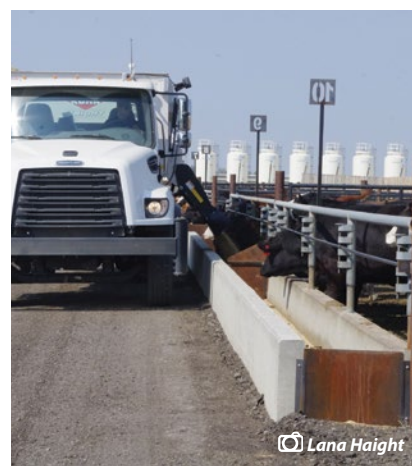
Time of day of calving	2020		2021	
	# head	% of total born	# head	% of total born
12:01 a.m. - 5:59 a.m.	22	5.1	3	0.7
6:00 a.m. - 11:59 a.m.	173	40.1	221	54.7
Noon - 5:59 p.m.	139	32.3	111	27.5
6:00 p.m. - midnight	97	22.5	69	17.1



Birth weight averages	2020			2021		
	Overall (lbs)	Females (lbs)	Males (lbs)	Overall (lbs)	Females (lbs)	Males (lbs)
Forage-efficient cows	85	80	89	NA	NA	NA
Black heifers	78	77	79	76	73	77
Red heifers	84	78	89	74	68	79
Black cows	87	81	93	84	79	86
Red cows	96	93	100	93	91	96
All cows/heifers	87	83	92	86	81	86

BCRTU RESEARCH PROJECTS

	2018-2019	2019-2020	2020-2021
Feedlot research	3	6	2
Metabolism barn research	1	3	4



PROVIDING EDUCATIONAL EXPERIENCES

At the Livestock and Forage Centre of Excellence, University of Saskatchewan students and professors have access to the newest technologies, advanced handling facilities, hundreds of animals and thousands of acres of land where they can participate in clinical rotations, access laboratories and attend hands-on workshops.

Professors from the College of Agriculture and Bioresources and from the Western College of Veterinary Medicine conduct these educational experiences to supplement in-class instruction and ensure students are graduating with applied knowledge as they head into their respective careers.

Throughout 2019 and up to mid-March 2020, when the university cancelled all in-person classes due to the COVID-19 pandemic, 303 university students attended eight different classes, laboratories or animal handling workshops at the LFCE.

In the interest of safety for both staff members and students during the COVID-19 pandemic, the university also limited access to the LFCE facilities. As tours were not permitted, we prepared a virtual tour video for a first-year AgBio class. It was viewed more than 320 times.

Because practical teaching is so important, the university granted special permission despite the pandemic for two programs offered by the Western College of Veterinary Medicine during the 2020-2021 academic year.

Under the direction of Dr. Diego Moya (DVM, PhD), the Cattle Handling II lab was conducted during the fall of 2020 at the LFCE Goodale Farm as part of the

VLAC 215 Animal Behaviour and Welfare course. To accommodate an entire class of more than 80 first-year DVM students the lab was repeated four times. Students learned how to use the chute to restrain cattle, how to place a halter and immobilize head movement, and how to collect a blood sample from the jugular and tail veins. Students also gained experience moving cattle through pens, alleys, and the chute system using low-stress handling techniques.

Two calving rotations were held at the LFCE's Forage Cow-Calf Research and Teaching Unit under the direction of Dr. Colin Palmer (DVM). During the final year of the DVM program, veterinary students choose their clinical rotations based on interest. The first rotation was March 29, 2021, to April 11, 2021, with four students; the second rotation was April 12, 2021, to April 25, 2021, with six students. Students worked closely with LFCE staff monitoring the herd and providing obstetrical, medical and surgical treatment when needed. All students were present at the FCCRTU every weekday and developed a shift schedule with one or two staying for evening and weekend shifts. Students participated in research and their practical experiences were supplemented with wet labs and rounds to strengthen the learning experience.

The LFCE also plays a teaching role in hosting the MSc or PhD thesis research of graduate students supervised by professors conducting research projects at the centre. A total of 39 graduate students supervised by 11 faculty members were involved in projects at the LFCE since its inception.



Dr. Nathan Erickson (DVM) demonstrates proper location for ear tags to fourth year students in the College of Agriculture and Bioresources.



Senior veterinary students Willow Burnes (left) and Dani England assess a newborn calf at the LFCE's Forage Cow-Calf Research and Teaching Unit.

Principal investigator	Graduate student(s)
Gregg Adams	Rodrigo Carroscó Dominic Olver Steve Yang Eric Zwiefelhofer Miranda Zwiefelhofer
Mika Asai-Coakwell	Hailey Bolen
Bill Biligetu	Chaowei Han Seth Lundal David McTaggart Hu Wang
Dinesh Dadarwal	Mohanathas Gobikrushanth Navjeet Singh
Terry Fonstad	Dave Cook Eliza Meldrum
Bart Lardner	Tess Mills Brittany Ross Cassidy Sim Janelle Smith Megan Wasden
Diego Moya	Mustaq Ahmad
Greg Penner	Rachel Carey Justin Delver Caleb Eidsvik Coleman Nixdorff Murillo Pereira
Gabriel Ribeiro	Tyen Paterson Jenilee Peters Tarasoff Jenna Sarich
Jeff Schoenau	Deborah Ayanwale Gazali Issah Jocelyn Thresher Gravel Wang
Cheryl Waldner	Jennifer Abi Younes Emmanuel Donbraye Jayce Fossen Tara Funk Paisley Johnson Dana Ramsay Anatoliy Trokhymchuk

SUPPORTING RESEARCH

DATA COLLECTION COMPLETED IN 2019

While research began at the LFCE in the summer of 2018, the data collection for the projects continued into 2019.

Barley/triticale silage project – backgrounding

Principal Investigator:
Dr. John McKinnon (PhD)

Economics of extended forage backgrounding in conventional and non-conventional beef production systems

Principal Investigator:
Dr. John McKinnon (PhD)

Use of plant extracts to alter insulin resistance in finishing cattle

Principal Investigator:
Dr. Greg Penner (PhD)

Optimizing the use of steam-flaked barley grain in finishing diets for feedlot cattle

Principal Investigator:
Dr. Greg Penner (PhD)

The effects of sulphates in water on beef cattle performance and feed intake

Principal Investigator:
Dr. Greg Penner (PhD)

***Research report available at [www.https://lfce.usask.ca/research.php](https://lfce.usask.ca/research.php)**

Integrated management approach to optimize red clover seed production in Saskatchewan

Principal Investigator:
Dr. Sean Prager (PLD)

DATA COLLECTION COMPLETED IN 2020

*Aromatase inhibitor-based synchronization for fixed-time AI in cattle: Field trial

Principal Investigator:
Dr. Greg Adams (DVM, PhD)

Cryopreservation of bovine semen – evaluation of Semen Extenders

Principal Investigator:
Dr. Muhammad Anzar (DVM, PhD)

*Quantifying greenhouse gas emissions from beef cattle urine and dung in grazed pasture sod-seeded with non-bloat legumes

Principal Investigator:
Dr. Richard Farrell (PhD)

*Agricultural Water Futures: Quantifying crop water use and water use productivity under future climates

Principal Investigator:
Dr. Warren Helgason (PhD)

*Enhancing the use of wheat grain in feedlot diets

Principal Investigator:
Dr. Pierre Hucl (PhD)

*Investigating the role of flooring in the development of Toe Tip Necrosis Syndrome

Principal Investigator:
Dr. Murray Jelinski (DVM)

*Investigating the use of a probiotic to control Mycoplasma bovis infections

Principal Investigator:
Dr. Murray Jelinski (DVM)

*Proof of concept study for the delivery of a respiratory probiotic to feedlot cattle via the feed

Principal Investigator:
Dr. Murray Jelinski (DVM)

Characterization of clinical signs indicative of chronicity or recovery process from bovine respiratory disease in feedlot cattle

Principal Investigator:
Dr. Diego Moya (DVM, PhD)

*The use of sensory additives to boost feed intake and immune function of newly arrived feedlot cattle

Principal Investigator:
Dr. Diego Moya (DVM, PhD)

*Does local anesthetic improve pain control in beef calves undergoing castration?

Principal Investigator:
Dr. Diego Moya (DVM, PhD)

*Determining the minimum fibre requirement for feedlot cattle

Principal Investigator:
Dr. Greg Penner (PhD)



Animal science graduate student Jenna Sarich practises drawing blood from a steer for a study into the feeding ergot-infected rye to cattle.



Animal science graduate student Coleman Nixdorff is comparing different ways of processing barley for finishing cattle at the LFCE's BCRTU.



Animal science graduate student Janelle Smith cleans out a feed bunk to determine how much feed the animals in this pen didn't eat as she looks at the economics of extended forage backgrounding in conventional and non-conventional beef production systems.



Animal science post-doctoral researcher Murillo Pereira collects rumen fluid samples as part of his work into determining the minimum fiber requirement for feedlot cattle.

DATA COLLECTION ONGOING IN 2021

***Development of germplasm biobank for Canadian bison**

Principal Investigator:
Dr. Greg Adams (DVM, PhD)

Bacterial load of bull semen

Principal Investigator:
Dr. Muhammad Anzar (DVM, PhD)

***Genetic and genomic factors influencing gestational length in beef cattle**

Principal Investigator:
Dr. Mika Asai-Coakwell (PhD)

***Development of native and tame forage varieties and mixtures for improved forage and environmental productivity and resilience.**

Principal Investigator:
Dr. Bill Biligetu (PhD)

***Novel sainfoin cultivars for enhancing production efficiencies of pasture and beef cattle and building capacity in forage breeding**

Principal Investigator:
Dr. Bill Biligetu (PhD)

Development of meadow brome and cicer milkvetch varieties for stockpiled grazing in western Canada

Principal Investigator:
Dr. Bill Biligetu (PhD)

Development of forage wheat lines with high biomass yield and high quality

Principal Investigator:
Dr. Bill Biligetu (PhD)

Perennial forage seed production demonstration

Principal Investigator:
Dr. Bill Biligetu (PhD)

Increasing the production and utilization of alfalfa forages in Canada

Principal Investigator:
Dr. Bill Biligetu (PhD)

Do novel neonatal calf prime and boost vaccine programs improve immunity and decrease respiratory disease at weaning?

Principal Investigator:
Dr. Nathan Erickson (DVM)

Saskatchewan soft soil subgrade stabilisation study site

Principal Investigator:
Dr. Ian Fleming (PhD)

***Hydrogeology of a cattle feedlot in Saskatchewan**

Principal Investigator:
Dr. Terry Fonstad (PhD)

***Performance, environmental and economic benefits of biochar supplementation in beef cattle grazing systems**

Principal Investigator:
Dr. Bart Lardner (PhD)

***Field backgrounding of beef calves**

Principal Investigator:
Dr. Bart Lardner (PhD)

***Evaluation of alfalfa and grass species in binary and multi mixtures on performance under soil salinity conditions**

Principal Investigator:
Dr. Bart Lardner (PhD)

***Evaluating preference grazing and persistence of new forage varieties, and the effect of animal temperament on grazing behavior**

Principal Investigator:
Dr. Bart Lardner (PhD)

Performance of new fall rye cultivar as a double cropping forage

Principal Investigator:
Dr. Bart Lardner (PhD)



This meadow brome grass nursery is part of the stockpile grazing project and the targets in the foreground help plant science graduate student David MacTaggart as he orients the drone photos during analysis. Scientists have planted hundreds of small plots on 40 acres of land, south of Clavet, dedicated to forage breeding research.



Tara Funk with the Western College of Veterinary Medicine inserts a swab to collect nasal discharge from a heifer. This is an initial stage of the game-changing research to sequence microbes with the goal of improving the use of antimicrobials in cattle.



Animal science graduate student Rachel Carey is addressing the old adage “waste not, want not” with her whole-systems study for feeding pregnant beef cows.

***Effects of annual and perennial forage systems on plant, soil and water parameters, grazing animal performance and system economics**

Principal Investigator:
Dr. Bart Lardner (PhD)



At our forage research plots south of Clavet, crossing tents are used to generate the seed for the next generation of the forage breeding process by crossing sainfoin plants with desirable characteristics for future varieties.

***Effects of environmental and pollution stressors on avian cognition and migratory behaviour**

Principal Investigator:
Dr. Christy Morrissey (PhD)

***Use of high-moisture corn products for finishing cattle and corn residue to extend the grazing season for pregnant beef cattle**

Principal Investigator:
Dr. Greg Penner (PhD)

Developing hybrid bromegrass with improved neutral detergent fibre digestibility

Principal Investigator:
Dr. Greg Penner (PhD)

***The forage-efficient beef cow: investigating the underlying physiology**

Principal Investigator:
Dr. Greg Penner (PhD)

Effect of feeding ergot alkaloids on ruminal metabolism, growth performance, health and welfare of beef cattle: How much is too much?

Principal Investigator:
Dr. Gabriel Ribeiro (PhD)

Predicting intake, digestibility of nutrients, and performance in grazing cattle using near infrared spectroscopy (NIRS) of the feces

Principal Investigator:
Dr. Gabriel Ribeiro (PhD)

***Precision Cattle Manure Management For Agronomic and Environmental Benefit at the U of S Beef Cattle Research Unit**

Principal Investigator:
Dr. Jeff Schoenau (PhD)

***Bovine tuberculosis diagnostics and vaccines to assist with future conservation efforts from diseased populations in bison in northern Canada**

Principal Investigator:
Dr. Todd Shury (DVM)

American foulbrood (AFB)

Principal Investigator:
Dr. Elemir Simko (DVM)

***Optimization of a novel catalytic seed treatment inducing higher germination rates and nodulation in a Cicer milkvetch cultivar**

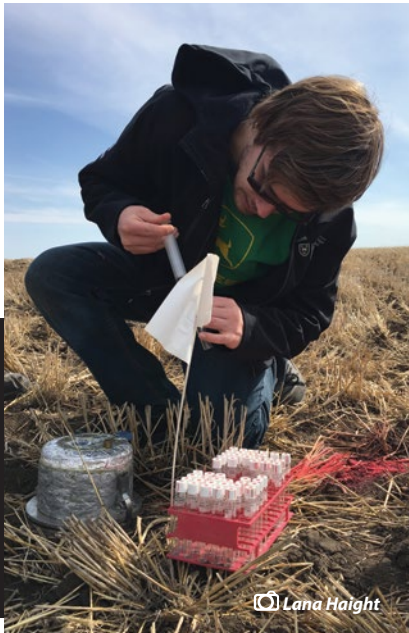
Principal Investigator:
Dr. Karen Tanino (PhD)

Evolution of the Environmental Microbiome and Resistome in large feedlot pens

Principal Investigator:
Anatoliy Trokhymchuk

***Genomic ASSETS (Antimicrobial Stewardship Systems from Evidence-Based Treatment Strategies) for Livestock**

Principal Investigator:
Dr. Cheryl Waldner (DVM, PhD)



AgBio researcher Stephen Froese extracts greenhouse gas from the soil in one of our barley fields for a study that compares the spreading manure at a variable rate and a constant rate with commercial fertilizer and how they impact the soil and the barley crop.



NEW PROJECTS IN 2021

Integrated Genomics for Sustainable Animal Agriculture and Environmental Stewardship

Principal Investigator:
Dr. Greg Adams (DVM, PhD)

Investigating the Role of GDF11 in muscle and fat deposition in Beef Cattle

Principal Investigator:
Dr. Mika Asai-Coakwell (PhD)

Development of salt tolerant alfalfa cultivar adapted to western Canada

Principal Investigator:
Dr. Bill Biligetu (PhD)

Iodine supplementation for pregnant mares

Principal Investigator:
Dr. Claire Card (DVM, PhD)

Alternative trace mineral supplementation strategies for improved cow performance

Principal Investigator:
Dr. Bart Lardner (PhD)

Stocking density and feed bunk space as a risk factor for liver abscesses

Principal Investigator:
Dr. Diego Moya (DVM, PhD)

Comprehensive evaluation of the effect of extended-term delivery of local anesthetic on mitigating the pain caused by castration

Principal Investigator:
Dr. Diego Moya (DVM, PhD)

Strategies to address mineral nutrition in the face of poor water quality

Principal Investigator:
Dr. Greg Penner (PhD)

The practical effects of high sulphates and TDS in water on beef heifer performance and trace-mineral status

Principal Investigator:
Dr. Greg Penner (PhD)

Hybrid fall rye (HR) as a new forage and grain source for cattle

Principal Investigator:
Dr. Greg Penner (PhD)

Effect of forage inclusion strategy on finishing beef cattle performance and liver abscess

Principal Investigator:
Dr. Gabriel Ribeiro (PhD)

Fixed-time artificial insemination using sexed semen in bison

Principal Investigator:
Dr. Eric Zwiefelhofer (PhD)

- Animal Health (14)
- Bulls (1)
- Equine (1)
- Backgrounding (4)
- Cow-Calf (12)
- Feedlot (11)
- Bison (3)
- Environment (7)
- Forages (13)

Several of the 60 research projects conducted at the LFCE are listed under more than one category.



LFCE employee Roger Janzen spreads manure from our feedlot on a barley field, south of Clavet. Equipped with GPS and continuous load weighing, the precision spreader applies the manure at known and variable rates, based on soil fertility and crop yield data.



These bison calves, affectionately named Skeeter and Mo by Western College of Veterinary Medicine graduate student Miranda Zwiefelhofer, are the first to be born from frozen *in vitro* embryos produced from immature eggs that were collected from live bison.

REACHING OUT TO THE COMMUNITY

The Livestock and Forage Centre of Excellence is a meeting place for interactive outreach programs – field days, demonstrations, industry engagement and presentations as well as seminars – to help introduce new techniques and technologies to producers. The centre is also a hub for public awareness, helping to bridge the communications gap between the agriculture industry and consumers, by offering tours, participating in community events and seeking news media coverage.

The outreach and engagement program began in the summer of 2018 with the hiring of the outreach and engagement specialist.

OPENING OUR DOORS

We have hosted a variety of groups including 4-H clubs, university students, provincial and federal government departments, the Saskatoon Regional Economic Development Authority and international guests of Global Affairs Canada. In March 2020, we cancelled all tours and events because of the COVID-19 pandemic, aligning with the USask COVID-19 protocols. The LFCE was closed to the public.

An annual highlight for us and our stakeholders is our summer field day. On June 18, 2019, **Under One Roof: Summer Field Day for Producers** drew 250 people from across Saskatchewan. The afternoon Pens, Plots and Paddocks tour provided opportunities for producers as well as industry and government folks to learn about advances being made through research. Topics ranged from soil and environmental research to



Producers, industry and government representatives, and USask students and faculty members attended our first annual summer field day in 2019.

animal behaviour and welfare to forage and feed options.

While we had to cancel our 2020 summer field day because of the COVID-19 pandemic, we won't be cancelling the 2021 LFCE Field Day presented by Canadian Western Agribition. Planning for the July 20, 2021, field day is in full swing.

Other extension events included 2018 ADOPT winter field day (40 participants), 2019 Western Canadian Feedlot Management School (115 participants), 2019 Saskatchewan Ministry of Agriculture Range Management Forum (46 participants) and 2019 Feeding for the Future Field Day with Highline Manufacturing (44 participants).

The annual Beef and Forage Research Forum is one way we facilitate a

connection between scientists and producers. We partner with the Saskatchewan Cattlemen's Association, the Government of Saskatchewan and the Government of Canada as well as the University of Saskatchewan's College of Agriculture and Bioresources and the Western College of Veterinary Medicine. In March 2019, more than 60 people including farmers, ranchers, scientists and government and funding agency representatives attended the forum. Our attendance was up to 80 in February 2020. And with the moving to a virtual platform in February 2021, attendance fluctuated between 120 and 150 people.

In the fall of 2019, we hired eight graduate students as outreach ambassadors, on a casual basis, to assist with tours and events at the LFCE and at tradeshows. To work as one of our ambassadors, the students either have a research project at the LFCE or are supervised by a USask faculty member conducting research at the LFCE. This program enhances the awareness of research across the centre for both students and public alike!

The LFCE participated in several key industry events with a tradeshow booth and, in many cases, as a sponsor. Sponsorships offer the additional benefits of giving us presence on the events' promotional material and programs.



We hosted 4-H club members from across Saskatchewan who attended the 2019 4-H Beef Symposium at USask.

2018 - 2019

- Agribition – tradeshow booth and Hospitality sponsor – 126,972 attendees
- Farm & Food Care Saskatchewan’s Farms at the Table Conference – Bronze sponsor – 134 attendees
- Saskatchewan Beef Industry Conference – tradeshow booth and Platinum sponsor – 250 attendees

2019 - 2020

- Saskatchewan Stock Growers Association Annual Convention – tradeshow booth and Silver sponsor – 200 attendees
- Ag in Motion – tradeshow booth – 30,474 attendees
- Canadian Beef Industry Conference – tradeshow booth and Hot Iron Plus sponsor – 640 attendees
- Agribition – tradeshow booth and Hospitality sponsor – 121,326 attendees
- Canadian Centre for Food Integrity’s Canadian Public Trust Summit - Provincial sponsor – 230 people
- Saskatchewan Beef Industry Conference – tradeshow booth and Platinum sponsor – 300 attendees

2020 - 2021

- Farm & Food Care Saskatchewan’s 2020 Cultivating Trust Conference (virtual) – Bronze sponsors – 407 registrants
- Saskatchewan Beef Industry Conference (virtual) – Platinum sponsor – 312 registrants

CELEBRATING CANADA’S AGRICULTURE DAY

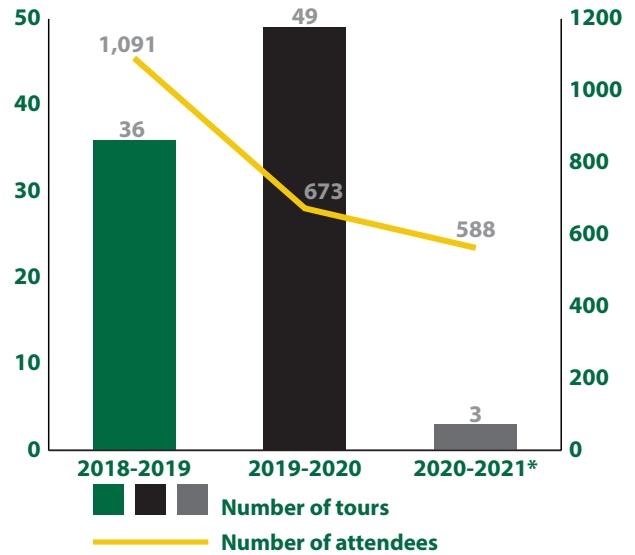
We have much to celebrate in Canada’s agriculture industries and we were involved in two fabulous events in 2020 and 2021.

On Feb. 11, 2020, we hosted a screening of *Guardians of the Grasslands* followed by a discussion with panelists LFCE Strategic Advisory Board member and producer Tamara Carter, her son and producer Brandt Carter, Saskatchewan Cattlemen’s Association CEO Ryder Lee, Canadian Bison Association president and producer Les Kroeger, and Ducks Unlimited Canada agrologist Jeremy Brown. The noon-hour event at Convocation Hall attracted 138 students, faculty members and community people. A Saskatoon high school teacher that leads a program focused on environmental and social sustainability brought 23 grade nine students. When asked, half of those in attendance said they were not from a farming background.



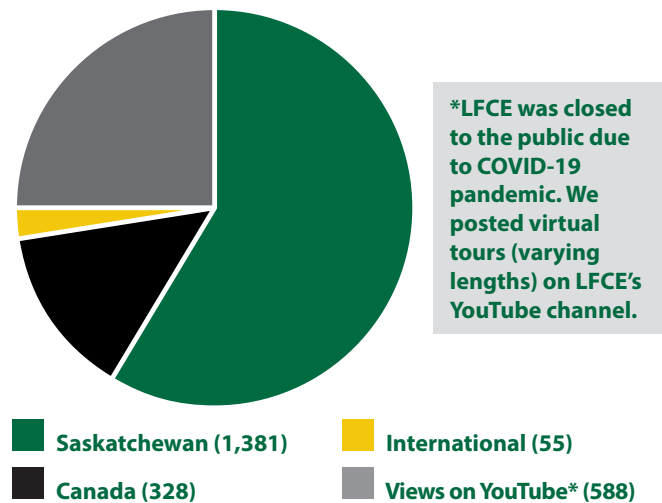
LFCE program facilitator, Brad Blackmore, chatted with Marianne Possberg with Saskatchewan Cattlemen’s Association at our Ag in Motion tradeshow booth in the summer of 2019.

TOURS



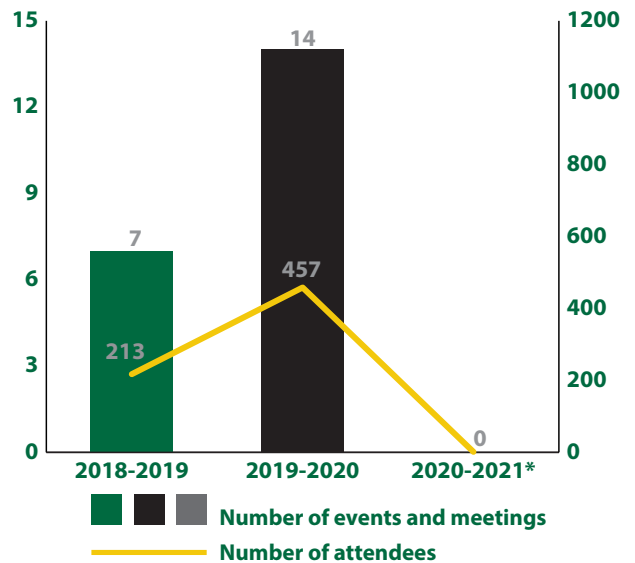
TOUR ATTENDANCE

OCTOBER 2018 TO APRIL 30, 2021



*LFCE was closed to the public due to COVID-19 pandemic. We posted virtual tours (varying lengths) on LFCE’s YouTube channel.

EVENTS AND MEETINGS





Dr. Terry Fonstad (PhD) explained to reporter Gabriela Panza-Beltrandi the environmental research he’s conducting at our BCRTU. Fonstad’s interview was one of three live interviews during Global News Morning on Feb. 14, 2020.

On Feb. 23, 2021, LFCE associate director Dr. Colin Palmer (DVM) and outreach and engagement specialist Lana Haight were guests of **Farm and Food Care Saskatchewan’s virtual event** that the organization and Canadian Food Focus promoted to schools, university students and the community. We started the hour with a video tour of the LFCE and then moved to a live online Q&A about beef production and research. We had 60 live audience views and 390 post-event views on the Farm and Food Care’s Facebook and YouTube channels. After the live event, we posted the tour and Q&A on the LFCE’s YouTube channel where we’ve posted an additional 19 views. Analytics are limited to “views,” indicating the number of

devices. Each view could represent several people. For example, a classroom of 30 students is counted as one view.

CASTING A SPOTLIGHT ON THE LFCE

We initiated media coverage, responded to media requests and cultivated collaborative working relationships with journalists. As a result, we have reached audiences throughout rural and urban Canada. Stories about the LFCE appeared in newspapers, on radio and television newscasts, and on news media websites.

We invested in editorial content in the 2018 and 2019 Agricultural Innovation inserts in the National Post with the goal of reaching a primarily urban reader.

Dec. 20, 2018: **Researchers collaborate to empower a new breed of cattle producer** (page 5)

- National Post readership: 650,000
- Targeted distribution to agricultural conferences: 77,900
- Digital reach: 555,000

Dec. 5, 2019: **Canada’s prairies are leaders in sustainable beef farming**

- National Post readership: 581,000
- Targeted distribution to agricultural conferences: 20,000
- Digital reach: 1.4 million

KEEPING CURRENT WITH @LFCE_USASK

The **LFCE Twitter account** has grown significantly. In Sept. 2018, we had 493 followers. By the end of April 2021, our followers had increased to 1,672. Many of these followers are producers, industry and government leaders, and university faculty and students.

We also have a YouTube account, **USaskLivestockandForage**, where we post videos of the researchers conducting their work. We embed these videos in stories posted on the LFCE website and promote the videos on social media. Between 2018 and April 30, 2021, we produced and posted 29 videos.

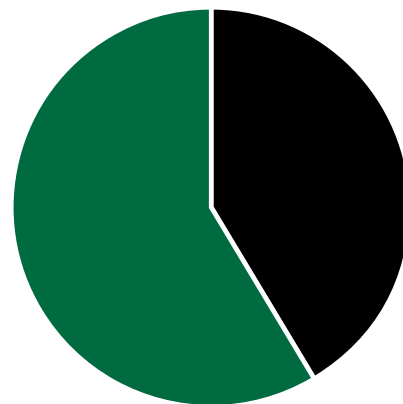
While the LFCE does not have accounts on Facebook and LinkedIn, the outreach and engagement specialist does have accounts on these platforms (**Facebook, LinkedIn**) and posts some of the same content as posted on the LFCE Twitter feed. Many of her Facebook and LinkedIn followers are from outside the livestock and forage industries and include journalists, communications specialists, scientists and health-care professionals.

NEWS STORIES

OCTOBER 2018 TO APRIL 30, 2021



■ Broadcast (43) ■ Print (91) ■ Online only (124)



■ Ag Media (111) ■ Popular Media (156)

FINANCIAL STATEMENTS

Livestock & Forage Centre of Excellence

OPERATING BUDGET

in \$ CDN	For year ending April 30, 2019	For year ending April 30, 2020	For year ending April 30, 2021
Revenue			
Govt of Sask – Other Dept/Agencies	1,100,000	900,000	1,073,000
External Recoveries	2,829,354	2,859,275	1,607,704
Real Estate Income	5,800	2,200	2,700
Allocation of Operating Revenue & Misc. Income	1,108,759	1,038,720	1,053,415
Internal Recoveries – Research	603,868	1,892,861	1,619,849
Total Revenue	5,647,781	6,693,056	5,356,668
Salary Expenditures			
Salaries	1,254,157	1,450,448	1,484,202
Employee Benefits	222,868	216,949	219,867
Total Labour	1,477,025	1,667,397	1,704,069
Non-Salary Expenditures			
Operational Supplies & Expenses	3,772,121	3,890,143	4,505,084
Travel	43,834	9,572	8,180
Maintenance, Rental, and Renovations	498,616	386,333	344,901
Utilities	178,884	148,418	138,921
Capital Assets	138,809	46,721	83,768
Total Non-Salary Expenditures	4,632,264	4,481,187	5,080,854
Total All Expenses	6,109,289	6,148,584	6,784,923
Total Revenues Less Expenses and Transfers	-461,508	544,473	-1,428,255
Inventory – Starting Animal Value	2,102,894	2,267,877	1,642,003
Inventory – Ending Animal Value	2,267,877	1,642,003	3,024,773
Inventory – Starting Seed/Feed Value	217,431	425,200	432,356
Inventory – Ending Seed/Feed Value	425,200	432,356	514,925
Total as of Year - End	-88,756	-74,246	37,085

Livestock & Forage Centre of Excellence

OUTREACH & ENGAGEMENT BUDGET

in \$ CDN		For year ending April 30, 2019	For year ending April 30, 2020	For year ending April 30, 2021
Revenue				
	Recpt – Business Enterprises (A&W)	200,000.00	50,000.00	50,000.00
	Interest	11,630.55	10,024.33	4,850.22
	Total Revenue	211,630.55	60,024.33	54,850.22
Expenditures				
Salaries and benefits	Outreach and engagement specialist, outreach students (casual)	62,246.00	94,651.15	94,259.09
	Total labour	62,246.00	94,651.15	94,259.09
Non-salary expenditures	Office supplies, computer, equipment	8,360.36	2,454.85	1,472.79
	Field day, events, promotion, advertising	14,446.50	30,407.84	535.19
	Tradeshows, sponsorships	3,116.59	18,927.52	1,146.94
	Total non-salary expenditures	25,923.45	51,790.21	3,154.92
	Total all expenses	88,169.45	146,441.36	97,414.01
	Total revenues less expenses and transfers	123,461.10	-86,417.03	-42,563.79

A&W DONATION SCHEDULE

in \$ CDN	2018	2019	2020	2021	Total
Donation per agreement	125,000	125,000	125,000	125,000	500,000
Actuals – donations	200,000	200,000	50,000	50,000	500,000
Difference	75,000	75,000	-75,000	-75,000	0

Note 1 The years 2020 and 2021 are showing deficits because of the amounts A&W has been allocating have decreased from \$200,000 to \$50,000 annually. In years 2018 and 2019, the company allocated \$75,000 more than its agreement with the University of Saskatchewan. The fund has continued to operate at a budget of \$125,000 and as a result is using the fund balance that has been accrued since 2018. It can be assumed that the allocation for 2022 should be \$125,000 now that the payments equal the agreement annual allocations year to date.

INVESTING IN EXCELLENCE



Consumers are more conscious and more curious about their food selections today than ever before, putting pressure on producers to manage competing demands: to be stewards of their native pasture and rangelands; to produce beef in an environmentally sensitive and economically sustainable manner; to respond to consumer concerns; and to enhance animal nutrition, health and welfare. Producers have questions, lots of them, and the University of Saskatchewan's Livestock and Forage Centre of Excellence provides researchers, students, and industry the resources to discover science-based solutions to real-world challenges.

Encompassing everything from forage development, grazing management and environmental sustainability, to cattle reproduction, cow-calf management and feedlot health, growth and productivity, the LFCE is a multi-disciplinary research centre that brings every link of the livestock production chain under one roof, the only research institute in Canada that brings partners together in this way. Modelling all aspects of raising livestock on the Canadian Prairies, the LFCE is a powerhouse for innovative research, teaching and industry engagement. Building on a strong network of partnerships, USask is positioned as a global leader in innovation while

promoting increased profitability and sustainability for livestock and forage industries across Canada and around the globe.

The LFCE is the first and only Canadian research institution to consider the whole production chain "from farm to fork" in its research programs. This holistic approach benefits the Canadian cattle industry by providing opportunities to deepen learning, build real-world solutions to issues that affect producers every day, and help Saskatchewan, Canadian and international producers improve their operations.

Researchers from various disciplines and institutions work collaboratively to find new synergies in the livestock and forage production chain that addresses key concerns in nutritional quality and food safety, as well as environmental sustainability and animal health care and management. At the LFCE, our goal is to support livestock industry members through research, teaching and extension. By focusing on these key aspects, we will:

- Support scientists as they develop and improve new ways to care for and handle animals that minimize stress,
- Help farmers, ranchers, feedlot managers, and local and provincial leaders make sound production management decisions,

- Provide ranchers and industry partners with practical, hands-on learning in modern facilities that improves their practices,
- Develop practical solutions to animal care,
- Explore new solutions with beef producers to help them tailor their feeding and management practices so cattle meet the producers' end goals, and
- Research solutions to meet food safety, sustainability and security challenges as the world faces a growing population.

"The LFCE is a unique centre that researches and models all aspects of raising livestock on the Prairies, helping to meet the needs of producers and consumers in Canada, while also helping to sustainably produce food for a growing world population. It will break down barriers between academics and livestock and forage producers and bring scientists from across disciplines together to promote an integrated approach to solving industry issues."

Peter Stoicheff, President,
University of Saskatchewan

The LFCE benefits the Canadian cattle industry as well as our future generations by providing opportunities to deepen learning, build real-world solutions to issues that impact producers every day while helping Canadian producers improve their operations. The LFCE's cutting-edge research facilities and initiatives influence livestock and land management practices in Canada and throughout the Northern Plains region, a global ecosystem extending into Siberia and further abroad.

THANK YOU!

We acknowledge and thank these special individuals, organizations, corporations and businesses for their extraordinary commitment towards the development of the Livestock and Forage Centre of Excellence since its inception to April 30, 2021.

\$1M+

A&W Food Services of Canada Ltd.

Growing Forward 2

Saskatchewan Cattlemen's Association

Western Economic Diversification Canada

\$100K – \$1M

Boehringer Ingelheim (Canada) Ltd.

Canadian Western Agribition

Farm Credit Canada

Merck Animal Health

\$1K - \$100K

Katherine Arney

Ernest Barber

Andrea Brocklebank

Mary Buhr

Katherine Larson

Ryder Lee

Manitoba Beef Producers

McGillivray Cattle Company Inc.

Dorothy Murrell

Tru-Test Inc.

Robert Tyler

UP TO \$1K

Chad Bruynooghe

Bruce Coulman

Douglas Freeman

Edward Myers

Elisabeth Snead

Duane Thompson

GIFTS OF EQUIPMENT

GrowSafe Systems

We are currently developing infrastructure worth more than \$37-million. Through funding from the provincial and federal governments, as well as the university and industry, we are more than two-thirds of the way toward funding this initiative. While our doors at the LFCE are open, the need for funding remains. Consider partnering with us in our ongoing pursuit to transform the Canadian cattle industry with a contribution to the capital development of the LFCE. With your support, the LFCE will make a significant and positive difference in the way producers sustainably raise livestock and forage in Western Canada.

Make a positive impact and join us in making the Canadian beef industry even more profitable and successful with a gift to the LFCE. With your support, we will realize our vision of becoming a global leader in innovation while increasing profitability and sustainability for livestock and forage industries across Canada and around the globe.



WAYS TO GIVE

- Online
- Phone
- Mail
- Pre-authorized debit
- Securities and mutual funds traded on the major Canadian and US stock exchanges
- Gifts-in-kind
- Matching gifts
- Charitable estate gift

For information on how to support the LFCE, please contact:

Miren Luczka, development officer
Livestock and Forage Centre of Excellence
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