



UNIVERSITY OF SASKATCHEWAN

Livestock and Forage
Centre of Excellence

LFCE.USASK.CA

LIVESTOCK AND FORAGE CENTRE OF EXCELLENCE

Progress Report

May 1, 2021, to April 30, 2023



BE WHAT THE WORLD NEEDS

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USask • Livestock and Forage Centre of Excellence • Progress Report 2023

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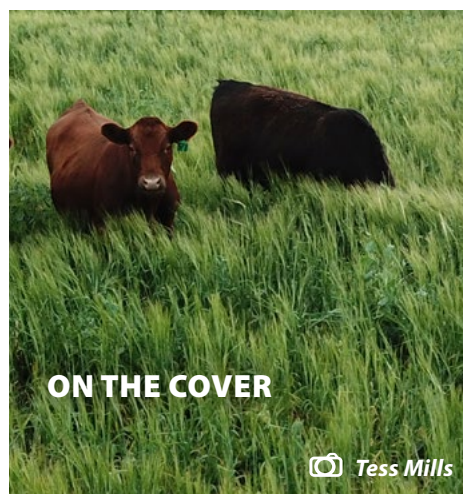
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The Livestock and Forage Centre of Excellence is situated on Treaty 6 Territory and the Homeland of the Métis.



Dr. Angela Bedard-Haughn (PhD)



Dr. Gillian Muir (DVM, PhD)

As we look back over the past two years, we are thankful for the stability that has come to the Livestock and Forage Centre of Excellence. The centre, established in 2018, was still in its infancy when we stepped into our roles as deans of our respective colleges in the fall of 2020. The LFCE is now well on its way to establishing its reputation as a centre of excellence at the University of Saskatchewan.

As LFCE director, Dr. Scott Wright (PhD) has spearheaded much of that growth. He provides exceptional leadership as he uses his vast experience and extensive network to advance the research, teaching and outreach mandates of the LFCE. Internally, he is working intentionally and deliberately to foster a culture of teamwork. Externally, he is strengthening relationships with members of the Strategic Advisory Board and other industry partners. He has connections with other researchers and producers, provincially and nationally, that are proving to be invaluable as we seek to collaborate beyond the university itself.

It's easy to take the LFCE and its state-of-the-art educational facilities for granted.

However, we only need to look at other agriculture and veterinary post-secondary institutions to realize the advantages of the LFCE. Having access to a 400-plus cow herd and a 1,500-head feedlot within a half-hour drive from the main campus makes us the envy of other institutions. It's critical for students to have hands-on experiences with animals in a production setting and the LFCE provides that.

Our faculty members and students are collaborating on various fronts to improve the livestock and forage sectors. We are thrilled to see them collaborate across departments within our colleges as well as across colleges throughout the university and beyond. This is possible because the LFCE provides these scientists with the resources they need: from groundwater monitoring to the soil and its microbiome to the forages and other feed and eventually to the beef cattle and specialized livestock. The work our researchers do at the LFCE to improve animal wellbeing, production efficiencies and environmental stewardship will continue to be critical to maintain public

trust in beef and bison production.

As we consider the future, we anticipate great advances to the way we work at the LFCE. It's exciting to think of how the use of genetics and genomics will address some of the biggest challenges in the areas of sustainability and climate change. And then there's the development of smart farm technology to assist producers optimizing their operational efficiencies.

On behalf of the faculty and students of AgBio and WCVM, we thank the staff members at the LFCE for supporting our scientists, the members of the Strategic Advisory Board for your insight and our industry and government partners for your support.

FROM THE DIRECTOR



Dr. Scott Wright (PhD)

I am thrilled to provide comments on the progress of the University of Saskatchewan's Livestock and Forage Centre of Excellence for the May 2021 through April 2023 period. Building on the leadership provided by the first three centre directors – Kathy Larson (MSc), Dr. Kris Ringwall (PhD) and Dr. Bruce Coulman (PhD) – as well as the Strategic Advisory Board, the research community and the LFCE operations team, the centre continues to progress towards being the state-of-the-art facility for integrated forage and livestock research envisioned by the industry founders.

The LFCE provides the opportunity for not only the conventional “single question” focussed research, but an ever-expanding focus on the integration of research across the forage-beef value chain and across science disciplines to provide solutions around complex questions such as environmental impacts, microbiome impacts and regenerative agriculture solutions. Work continues on the Canada Foundation for Innovation Integromes project that will develop facilities to

enable the development and application of genomics tools for the beef industry, taking advantage of the large volumes of data generated in working at the integration of “omics” approaches. These tools will contribute to animal production, health and wellness, and the long-term sustainability and preservation of both bison and bovine genetics and traits.

The LFCE joined the Pan Canadian Smart Farm Network and between the network and the LFCE Innovation Farm node partnerships, the centre is moving forward on the concept of bringing together the sensor measurements available from sources such as farm machinery, weather and environmental data, animal tracking and performance data, and animal health parameters into a “single pane of glass” where the integration of relevant information can alert and support better farm and ranch decisions. Conceptually this can link multiple information sources to save dollars, steps and time while allowing for better farm management decisions. We continue to seek ways of better integrating the research realms

of discovery, innovation, research and technology with teaching, training and the translation of science into implementable best practices, enhancing outreach into the agricultural community and more broadly to the Canadian public. The work with Elder Roland Duquette on the connections between the land, the bison and people has been a powerful journey that is forging a deeper connection with Indigenous ways of knowing and being.

To build on Bruce Coulman's words: with the resilience and leadership of the industry and producers, excellent facilities, dedicated and talented staff members, world class researchers at a world class university and the continued support and investment by industry, producers, governments and the university, the future looks bright indeed.

FROM THE STRATEGIC ADVISORY BOARD CHAIR

Since the spring of 2020, I have had the honour of serving on the Strategic Advisory Board. That edition of the advisory board represented the "handoff" from the original steering committee, which was tasked with bringing the LFCE's vision to life.

Advisory board members have been active in providing all the partners involved the opportunity to share their ideas to build a successful pathway for the University of Saskatchewan to follow to promote research, extension work and continued advocacy of the livestock and forage industries as the LFCE has grown and matured.

We have been able to bring ideas, opinions and concerns from our industry and government partners to the table because we have remained faithful to the original vision. This collaborative effort has been made possible by the participation of the employees and faculty from the Western College of Veterinary Medicine as well as the College of Agriculture and Bioresources.

Our past SAB chairs, Duane Thompson and Tamara Carter, had an impact on our group's performance. Their initiative, knowledge and honesty set the groundwork for future boards to contribute value to the LFCE. Many thanks to Neil Block and Lee Auten for serving on the advisory board; Neil has an amazing enthusiasm for cattle and natural grasslands. Lee has been an integral part of our board structure by representing the Ministry of Agriculture and brought forward many great thoughts. Additionally, the advisory board has benefited from the constant trust and guidance provided by the deans, Dr. Gillian Muir (DVM, PhD) and Dr. Angela Bedard-Haughn (PhD), and Dr. Scott Wright (PhD).

I was elected to serve as chair of the Strategic Advisory Board at our meeting in March 2023. My experience as a bison producer offers the board a distinctive viewpoint. I am thankful to have the opportunity to forge connections with and gather viewpoints from the diverse range of groups that are invested in the development and advancement of the research being done at the LFCE.



Robert Johnson, producer

Over the last two years, attending numerous field days across the prairies, the research forums, and the Canadian Western Agribition has allowed many people to directly get to know and connect with many of the LFCE's researchers, which has led to a lot very encouraging feedback. Putting a face and a name to the staff, students and researchers is hugely important in building and maintaining public trust. As we discuss and visit about the ongoing research, it is a wonderful opportunity to support outreach efforts, engage the public and foster relationships among all those who call the LFCE home.

As research and technology both continue to advance at such a rapid rate, we must constantly be aware of the equilibrium that must exist to achieve the balance between producer productivity, sustainability, a changing climate, and the evolving nutritional, social and ethical needs of the consumers who are the ultimate end users of the goods and services that each of us produces while also providing a vibrant learning environment for the students who have chosen to continue their education at USask.

We must, in other words, "be what the world needs."

STRATEGIC ADVISORY BOARD

CHAIR

Robert Johnson, producer

INDUSTRY REPRESENTATIVES

Calvin Gavelin, producer

Lance Leachman, producer

Kyron Manske, producer

Dr. Leigh Rosengren (DMV, PhD), industry

Tamara Carter, producer (past chair, ex-officio)

GOVERNMENT REPRESENTATIVES

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

Kathryn Tonita, director, Livestock Development, Sask. Ministry of Agriculture

NATIONAL REPRESENTATIVE

Andrea Brocklebank, executive director, Beef Cattle Research Council

INTERNATIONAL REPRESENTATIVE

vacant

UNIVERSITY REPRESENTATIVES (EX-OFFICIO)

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

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

Dr. Scott Wright (PhD), director, Livestock and Forage Centre of Excellence, USask

OUR ORGANIZATION

OUR VISION

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.

OUR MISSION

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.

Established in 2018, the LFCE is a relatively new organization representing the coming together of researchers from the College of Agriculture and Bioresources, the Western College of Veterinary Medicine and the Western Beef Development Centre. Scientists from the College of Engineering and the School of Environment and Sustainability have joined forces with these researchers, enabling wide-ranging and integrated research:

- The bison and equine research conducted at the LFCE is currently targeted at research activities requiring more intensive use of the animals across a smaller footprint.
- The beef cattle focus encompasses nutrition, reproductive physiology, feedlot management, animal health from breeding and pre-calving through to harvest, cow-calf management, genomics and genetics, animal behavior and welfare, and reproduction.
- The agronomy and management of perennial and annual forage crops as well as soil and water studies are interrelated with the other disciplines.
- Economics, the environment, and ecological goods and services (EG&S) round out the research conducted at the centre.
- Teaching, training and the translation of science into extendable information as well as outreach are important elements of the centre's focus.
- Supporting indigenization at the University of Saskatchewan and in the beef and forage industries is key to the future.

In its short history of five years, the LFCE has supported more than 40 researchers and their graduate students in their quest to advance the livestock and forage industries. They have presented their research findings at LFCE and industry events, and at scientific conferences, in Saskatchewan, throughout Canada and in the United States.

LFCE director, Dr. Scott Wright (PhD), is accountable for all

aspects of the LFCE, reporting to the deans of the Western College of Veterinary Medicine and the College of Agriculture and Bioresources at the University of Saskatchewan. The director is an ex-officio member of and takes strategic direction from the LFCE Strategic Advisory Board. He also engages stakeholders in government, industry, academia and other interest groups. Wright was appointed director at the end of May 2021, replacing interim director Dr. Bruce Coulman (PhD).

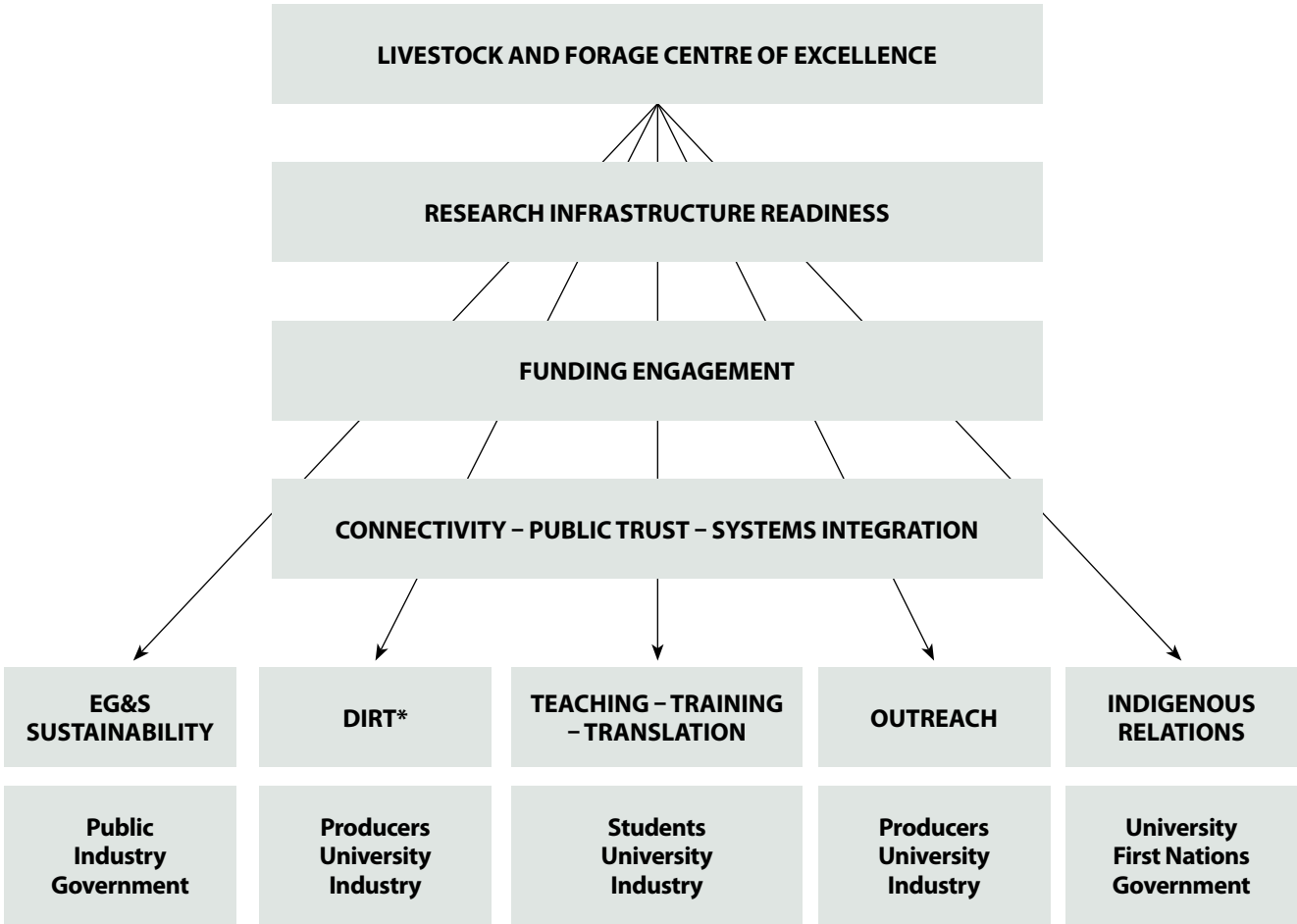
The general manager and the outreach and engagement specialist report directly to the director. The associate director position was discontinued July 1, 2022.

General manager Teresa Binetruy is responsible for LFCE operations, finances and human resources. The head of operations, the research facilitator, the lab and feedlot facilitator, and the reproduction and data coordinator all report to the general manager.

- The head of operations, Brian Klassen, supervises the 12 animal technicians employed at the LFCE.
- Program facilitator Brad Blackmore coordinates bison studies at the specialized livestock facility at the Goodale Farm and the forage and cow-calf programs at Goodale and the Forage Cow-Calf Research and Teaching Unit (FCCRTU).
- Reproduction and data facilitator Jose Alcvor de Lucca is focused on the cow-calf herd reproduction, pasture management and record-keeping.
- Lab and feedlot facilitator Kristen Hunter and Binetruy coordinate feedlot research and the research conducted in the metabolism barn at the Beef Cattle Research and Teaching Unit (BCRTU).
- Goodale Farm, the FCCRTU and the BCRTU are staffed seven days a week year-round. The technicians are deployed across the units according to workload.

The current organizational structure replaces one from 2021.

OUR ORGANIZATION



*DIRT: discovery, innovation, research, technology

STAFF MEMBERS (AS OF APRIL 30, 2023)

Dr. Scott Wright (PhD), director
 Teresa Binetruy, general manager
 Brian Klassen, head of operations
 Brad Blackmore, program facilitator
 Kristen Hunter, lab and feedlot facilitator
 Jose Alcivar de Lucca, reproduction and data facilitator
 Lana Haight, outreach and engagement specialist

ANIMAL TECHNICIANS

Gary Berggren
 Nelanka Daya Pathirana
 Roger Janzen
 Roland Klaassen
 Jackie Kroeger
 Patrick Lynch
 Peyton McPhee
 James Prouse (FCCRTU supervisor)
 Kelly Prouse
 David Reimer
 Hunter Shmon

OUR HIGHLIGHTS

May 2021



Vet students participate in first-ever calving rotations at FCCRTU

<https://lfce.usask.ca/news/on-site-calving-rotations-mark-a-first-for-usask.php>



Dr. Scott Wright (PhD) appointed as LFCE director

<https://lfce.usask.ca/news/usask-livestock-and-forage-centre-of-excellence-hires-new-director.php>

July 2021



Summer field day held with USask pandemic protocols

<https://lfce.usask.ca/news/lfce-summer-field-day-returns.php>

USask announces the establishment of Beef Industry Integrated Forage Management and Utilization Chair

<https://lfce.usask.ca/news/new-research-chair-at-usask-will-help-maximize-environmental-economic-benefits-of-forage-crops.php>

November 2021

USask and Olds College sign ag-tech agreement

<https://lfce.usask.ca/news/usask-and-olds-college-sign-agriculture-and-livestock-research-mou.php>

April 2022



Dr. Bree Kellin (PhD) appointed as Beef Industry Integrated Forage Management and Utilization (IFMU) Chair

<https://lfce.usask.ca/news/usask-selects-new-beef-industry-integrated-forage-management-and-utilization-chair.php>

To read stories about highlights, go to

<https://lfce.usask.ca/articles.php>.

June 2022

PrairiesCan invests in smart farm “living lab” at LFCE

<https://lfce.usask.ca/news/investment-in-usask-project-aims-to-give-ag-producers-better-access-to-data.php>



Cindy Wright

Third summer field day attended by close to 190 producers, researchers, industry and government representatives

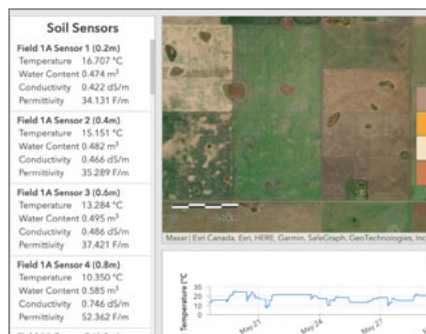
July 2022



Christina Weese

Genome Canada announces \$5.1 million to fund the Bison Integrated Genomics (BIG) project

<https://lfce.usask.ca/news/new-project-has-big-impact-on-bison-genome-biobanks-development-at-usask.php>



LFCE joins the Pan-Canadian Smart Farm Network

<https://lfce.usask.ca/news/livestock-and-forage-centre-of-excellence-joins-pan-canadian-smart-farm-network.php>

March 2023



Lana Haight

Beef and forage research forum meets in person after two years of virtual conferences

<https://lfce.usask.ca/news/cattle-producers-and-scientists-rub-shoulders-at-forum-with-the-goal-of-improving-research.php>




Lana Haight

New members join SAB with new chair elected

<https://lfce.usask.ca/documents/new-members-welcomed-to-the-strategic-advisory-board.php>

OUR FACILITIES

Beef Cattle Research and Teaching Unit

 Tess Mills

The BCRTU, located south of Clavet, houses the LFCE feedlot operation with a capacity of almost 1,500 head, including 44 small pens for up to 15 animals each and four large pens for up to 200 animals each. The feedlot's main cattle handling facilities, offices, the Farm Credit Canada Foyer, the Merck Animal Health Business and Teaching Room, laboratory facilities and the state-of-the-art Saskatchewan Cattlemen's Association Metabolism Barn are in the Livestock & Food Building.

The feedlot is heavily used for research projects with its research pens booked into 2025. Projects moving to the full proposal stage will task the current facilities. To accommodate the high demand for animals and pens, some projects will be moved to Goodale Farm and the FCCRTU where possible.

Forage Cow-Calf Research and Teaching Unit

The FCCRTU, also located south of Clavet, includes a calving barn, the Boehringer Ingelheim Cattle Handling and Teaching Unit, and five outdoor pens for calving as well as 12 small and six large outdoor pens for cow-calf research projects. The LFCE cow herd calves at the FCCRTU in March, April and May.

- 2021: 404 calves born, with 98.48% live calves of total cows calved
- 2022: 408 calves born, with 95.50% live calves of total cows calved
- 2023: 270 calves born, with 96.12% live calves of total cows calved; calving data incomplete with 144 cows/heifers still to calve as of April 30, 2023.

More data on the cow-calf herd can be found on pages 10 and 11.

Because sufficient grazing land is not available at the Clavet sites

and Goodale Farm, cow-calf pairs are moved to leased or owned pastures at Termuende Ranch near Lanigan and Pathlow near Melfort. Cows and calves are held on pasture for as long as possible with weaning in early October. After weaning, steer calves are moved to the feedlot for finishing and heifer calves to the Goodale Farm to be screened for replacement heifers. The bred cows return and overwinter at the FCCRTU.

LFCE Goodale Farm

Goodale facilities supporting research with cattle, horses and specialized livestock are located at two sites. The main yard on Floral Road/Township Road 360, southeast of Saskatoon, is designed primarily for cattle and includes 15 paddocks and shelters with various corrals and alleys, two handling barns and an office/shop. The second yard is nearby and located on Range Road 3042/Provincial Highway 663. Designed for bison and other specialized livestock, it includes six holding paddocks, 18 reinforced outdoor pens and indoor handling facilities with lab space.

A University of Saskatchewan team, led by Dr. Gregg Adams (DVM, PhD), was successful in its application for a major infrastructure grant to support cattle and bison integrated "omics" work.

The team's project is called IntegrOmes. The \$6.76-million contribution from the Canada Foundation for Innovation (CFI), announced in March 2021, will be used to build new infrastructure at the LFCE Goodale Farm and its Specialized Livestock Research Facility, starting with a focus on integrated "omics" tools for the livestock industry. The CFI funding constitutes 40 percent of total cost of construction.

We completed significant renovations at the main LFCE Goodale animal facilities in 2018. Beginning in the summer of 2023, we will be renovating LFCE Goodale's second yard used for diversified livestock.

The LFCE's heifers and bulls are kept at Goodale during the fall, winter and spring.

Two genetically distinct herds of bison are housed at the specialized livestock facility. Despite access to additional grazing



 Vanessa Cowan



land for the Plains and Wood bison since renovations in 2020, drought in 2021 and 2022 and the increasing cost of feed is triggering the need to limit the size of the herds. Currently, LFCE is aiming for 40 head in each of the Plains and Wood herds.

- 2021 – 47 Wood bison, 68 Plains bison
- 2022 – 40 Wood bison, 72 Plains bison
- 2023 – 36 Wood bison, 48 Plains bison

More data on the bison herds can be found on page 11.

Land base

The LFCE Geographical Information Systems map identifies all the land allocated to the LFCE and details land usage in the past, present and future. See <https://gis1test.usask.ca/lfce/>.

- BCRTU/FCCRTU (south of Clavet): 15 quarters of land owned by USask, including 40 acres of small plots for forage breeding research
- Goodale Farm (southeast of Saskatoon): 12 quarters of land, including 500 acres for the bison's year-round grazing, owned by USask
- Termuende Ranch (east of Lanigan): 12 quarters of land owned by USask
- Pathlow Pasture (near Melfort): six quarters of land leased by USask
- Hay land: 515 acres rented
- Crop land for feed: 300 acres rented

The drought in 2021-2022 significantly reduced the carrying capacity of Clavet and Goodale pastures, resulting in a heavy reliance on the Termuende and Pathlow locations. Despite these drought conditions, available water sources at Pathlow and Termuende were adequate with acceptable levels of sulphates throughout the season. In 2022, work began on reconstructing the handling facility at Pathlow. This will continue in 2023 as will work on controlling tansy, an invasive species, in one portion of the pasture.

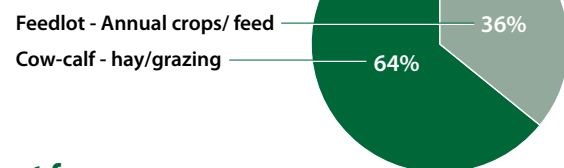
We signed an agreement with Pound-Maker Feedlot for its staff members to work alongside our staff and check on our cow-calf pairs grazing at Termuende, enhancing cattle wellness and herd management. Partnerships with the industry such as this enable research across a wider portion of Saskatchewan and provides important summer grazing for the LFCE cow herd.

In 2021, drought significantly impacted crop production as well. Silage and grain (barley, corn and rye) yields were 50 per cent below average. To meet our feeding and bedding requirements for 2021-2022, we purchased 2,450 straw bales, 850 hay bales, 380 mixed greenfeed bales as well as wheat, oat hulls, canola meal, specific research ingredients and close to 100 per cent of all the barley grain. The corn silage, snaplage and high moisture corn grown at

the LFCE were sufficient for the animals on research requiring those types of feed.

Again in 2022, starting in August, drought again reduced crop production. With little subsoil moisture, crop production was reliant on rainfall, which was minimal beyond Aug. 1. A field-scale dryland corn crop averaged 6.6 tons per acre (wet weight), under-seeding/co-cropping with forage peas reduced yields to 5.3 tons per acre, while a polycrop blend saw 8.6 tons per acre and the corn monocrop yielded 9.9 tons per acre. There was limited fall grazing on the corn-residue as the companion crops were droughted off and did not provide any spring grazing. Rental land under irrigation was secured for silage production and grain, providing an enhanced stability of supply during drought. We purchased standing crop: 330 acres of silage, 100 acres of greenfeed and 800 acres of straw.

LFCE-owned land



Smart farm

The LFCE seeks to be a leader in identifying and demonstrating the emerging opportunities for producers to adopt advanced technology in the livestock industry. The promise of a "smart farm" is that a producer will have unprecedented access to data, presented simply, that can enhance decision making to improve productivity and efficiency as well as increase profitability.

The LFCE Smart Farm will focus on developing a "single pane of glass" approach to data collection, management and presentation that is linked to ease of decision-making, saving time, steps, labour and dollars for the producer.

In the past two years, we have taken several significant steps to establish ourselves as a smart farm.

We are well on our way to becoming an Internet-of-Thing (IoT) Testbed for Digital Technologies in Agriculture. Through an agreement with SaskTel, a Long Range Wide Area Network (LoRaWAN®) was installed to enable connectivity between and among a multitude of sensors across our multiple sites. This technology will turn the LFCE into a living lab and platform that will connect producers with research and ag-tech start-ups, and will increase ag-tech development, viability and uptake – even in areas with little to no internet connectivity.

In 2022, the LFCE joined the Pan-Canadian Smart Farm Network, led by Olds College in Alberta. The network partners are committed to sharing data and expertise that will help farmers, industry and innovators better understand smart technologies with a goal to accelerate the development and adoption of ag-tech across Canada.

Also in 2022, the LFCE was awarded \$400,000 in funding from Prairie Economic Development Canada (PrairiesCan) to develop infrastructure enabling a more comprehensive ability to read and collect data from sensors on our livestock and equipment. This infrastructure will also provide insight for technology developers around the rhythm of activities on farms and ranches.

OUR FINANCIAL STATEMENTS

	May 1 2022 - Apr 30 2023	May 1 2021 - Apr 30 2022
Revenue		
Sales & User Fees	5,881,257	5,317,737
Government of Saskatchewan	1,099,000	1,073,000
University of Saskatchewan	1,016,411	1,016,411
Other	198,708	86,259
Total revenue	8,195,376	7,493,407
Expenditures		
Labour	2,026,444	1,839,471
Non-salary expenditures		
Operational supplies and expenses	5,406,853	5,158,696
Travel	18,047	8,445
Maintenance, rental and renovations	569,400	335,116
Utilities	164,549	157,555
Capital assets	89,005	201,542
Total expenses	8,274,298	7,700,825
Total revenue less expenses	(78,922)	(207,418)
Inventory		
Starting animal value	2,836,768	3,024,773
Ending animal value	2,764,553	2,836,768
Starting seed/feed value	1,026,108	514,925
Ending seed/feed value	1,044,207	1,026,108
Total inventory at year end	3,808,760	3,862,876

OUR PRODUCTION NUMBERS

COW HERD

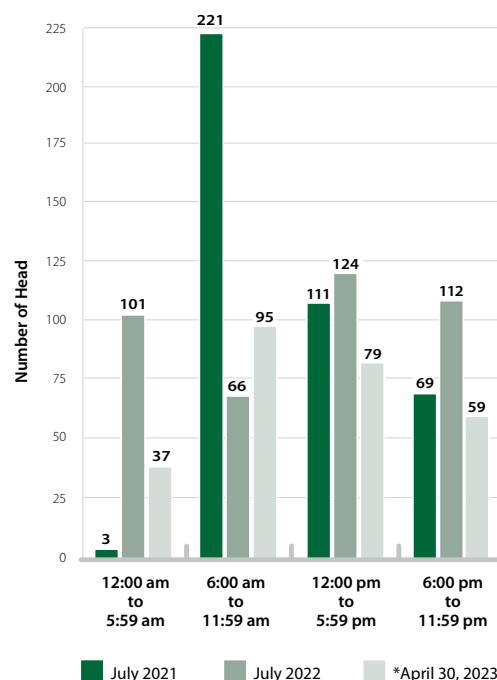
	July 2021	July 2022	*April 30, 2023
Cows calved	395	403	258
Sets of twins	9	5	11
Total calves born	404	408	270
Calves alive	389	385	248
Calves dead at/during birth	7	20	22
Calves dead since birth	8	3	2
Current bull calves alive	203	214	120
Current heifer calves alive	186	171	128

CALCULATED PERCENTAGES

	July 2021	July 2022	*April 30, 2023
Live calves of total cows calved	98.48	95.50	96.12
Calf death loss at time of birth	1.73	4.50	7.00
Calf death loss since birth	1.98	1.60	1.10
Overall calf death loss	3.71	3.70	8.10
Twinning in herd	2.28	1.20	4.00
Live calves - males	52.20	55.60	44.40
Live calves - females	47.80	44.40	55.60

*Data as of April 30, 2023. The 2023 calving season at the LFCE was not finished as 144 cows/heifers had not calved.

CALVING TIME-OF-DAY



OUR PRODUCTION NUMBERS

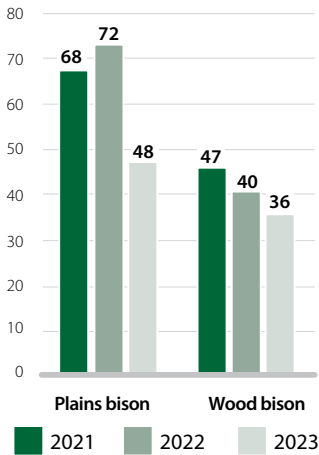
CALF BIRTH WEIGHT (averages, in pounds)

	July 2021			July 2022			*April 30, 2023		
	Overall (lbs)	Females (lbs)	Males (lbs)	Overall (lbs)	Females (lbs)	Males (lbs)	Overall (lbs)	Females (lbs)	Males (lbs)
Heifers	75	71	78	73	68	76	80	76	83
Cows	89	85	92	85	83	86	87	84	90
All cows/heifers	86	81	86	81	78	84	84	81	88

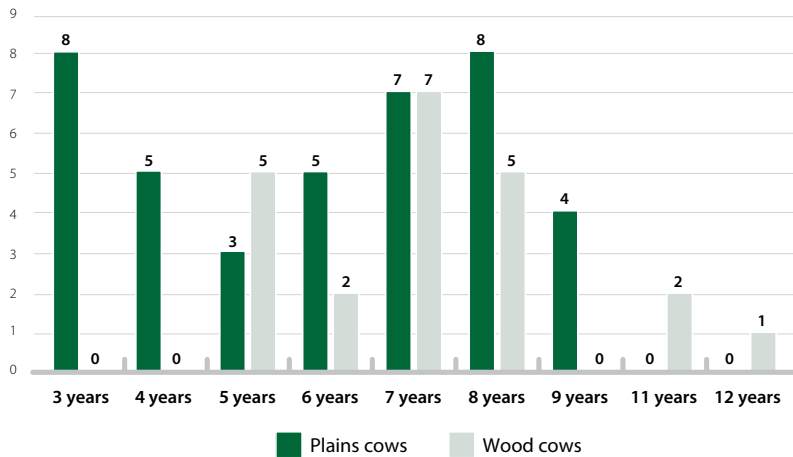


© Gord Waldner

BISON HERD



BISON COWS (by age, at April 30, 2023)



BISON HERD BREAKDOWN (at April 30, 2023)

	Open cows	Bred cows	Mature bulls	Two-year old males	Yearling males	Yearling females	Total number of animals
Plains	19	21	3	5	0	0	48
Wood	2	20	4	0	2	8	36

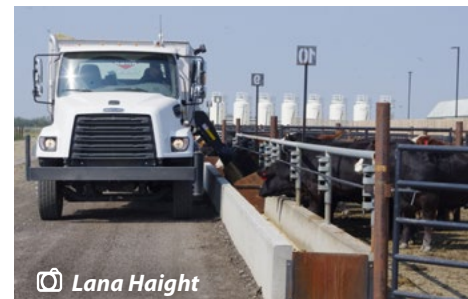


© Miranda Zwiefelhofer

BCRTU FEEDLOT PRODUCTION (2021 to 2023)

Average annual flow-through: 1,350 head

	Days on feed	Average daily gain (pounds)	Mortality (percentage)
Backgrounding	117	2.9	1.42
Finishing	121	4.3	1.14
Overall	119	3.6	1.28



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SUPPORTING RESEARCH

Every day of the year, scientists conduct research at the LFCE. Some projects require data collection over a few weeks while others are multi-year research projects. Between May 1, 2021, and April 30, 2023, 26 scientists and their graduate and undergraduate students accessed the resources at the LFCE to conduct 58 scientific studies.

Dr. Gregg Adams (DVM, PhD)

Development of germplasm biobank for Canadian bison

Improving cryopreservation of bovine sperm

Dr. Muhammad Anzar (DVM, PhD)

Development of germplasm biobank for Canadian bison

Improving cryopreservation of bovine sperm

Dr. Mika Asai-Coakwell (PhD)

Genetic and genomic factors influencing gestational length in beef cattle

Investigating the role of GDF11 in muscle and fat deposition in beef cattle

Dr. Bill Biligetu (PhD)

Development of salt tolerant alfalfa cultivar adapted to western Canada

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

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

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

Increasing the production and utilization of alfalfa forages in Canada

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

Perennial forage seed production demonstration

Dr. Maryse Bourgault (PhD)

Evaluating regenerative agriculture - exploring the opportunities between crop and animal agriculture

Dr. Claire Card (DVM, PhD)

Iodine supplementation for pregnant mares

Dr. Obioha Durunna (PhD)

A&W Visiting Fellowship One Health

Dr. Nathan Erickson (DVM)

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

Dr. Ian Fleming (PhD)

Saskatchewan soft soil subgrade stabilization study site

Dr. Terry Fonstad (PhD)

Hydrogeology of a cattle feedlot in Saskatchewan

Dr. Bart Lardner (PhD)

Mob grazing evaluation of new forage varieties

Alternative trace mineral supplementation strategies for improved cow performance

Canola supplementation of cows in late gestation leads to increased calf growth and modification of epigenetic, gene expression, and blood metabolite profiles

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

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

Evaluation of polycrop mixtures for swath grazing, soil health and economics

Exploring the potential of including chicory in pasture for beef cattle

Performance of new fall rye cultivar as a double cropping forage

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

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



Scientists conduct a wide range of feed and animal behaviour research at our feedlot, focusing on animal health and wellbeing and producer profitability.

Dr. Eric Micheels (PhD)

Identifying culling strategies to minimize cow depreciation on different types of cow-calf operations

Dr. Christy Morrissey (PhD)

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

Dr. Diego Moya (DVM, PhD)

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

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

Effects of dietary starch on behaviour, stress physiology, growth performance, and carcass and meat quality of finishing bison

Dr. Greg Penner (PhD)

Evaluation of forage-efficient heifers

Complex forage blends: reducing supplementation costs through strategic forage selection

Developing hybrid bromegrass with improved neutral detergent fibre digestibility

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

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

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

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

Dr. Gabriel Ribeiro (DVM, PhD)

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

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



Graduate student Jenna Sarich takes infrared thermography pictures of a steer as part of her assessment of the animal's health for her research project conducted at our BCRTU feedlot. Supervised by Dr. Gabriel Ribeiro, she is looking at how eating ergot-contaminated feed affects feedlot cattle.

Evaluation of animal variability in fibre digestion to improve forage use in beef cattle

Maximizing wheat straw use in the diets of feedlot cattle

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

Toxicity of ergot alkaloids to finishing cattle

Dr. Jeff Schoenau (PhD)

Precision cattle manure management for agronomic and environmental benefit at the USask Beef Cattle Research and Teaching Unit

Dr. Todd Shury (DVM)

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

Dr. Elemir Simko (PhD)

American foulbrood (AFB)

Dr. Jaswant Singh (BVSc, PhD)

IntegrOmics: Benchmarking imaging and sensor technologies for capturing novel phenotypes to improve sustainability of the beef industry

Dr. Emily Snyder (DVM, PhD)

Establishing baseline serum serotonin levels for cattle in the late feeding period finishing

Dr. Karen Tanino (PhD)

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

Dr. Anatoliy Trokhymchuk (DVM)

Evolution of the environmental microbiome and resistome in large feedlot pens

Dr. Cheryl Waldner (DVM, PhD)

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

Dr. Scott Wright (PhD)

Development and application of agricultural technology for the forage and livestock industries at the LFCE Innovation Farm

Pan-Canadian Smart Farm

Dr. Eric Zwielfhofer (PhD)

Fixed-time artificial insemination using sexed semen in bison

SUPPORTING RESEARCH



📷 David MacTaggart

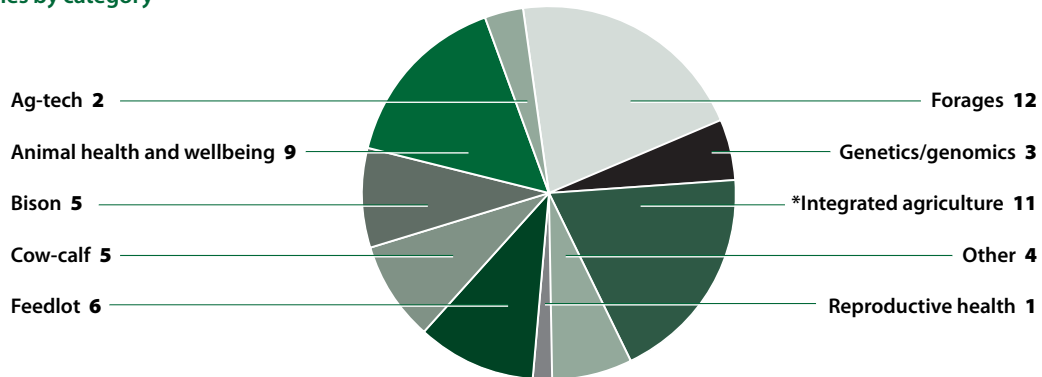
Forty acres of land north of our BCRTU is designated for research conducted by USask forage breeders. Hundreds of small plots includes one that alternates cicer milkvetch and meadow brome grass.



📷 Vanessa Cowan

When not on pasture during the breeding season, bulls are housed at LFCE Goodale Farm.

Scientific studies by category

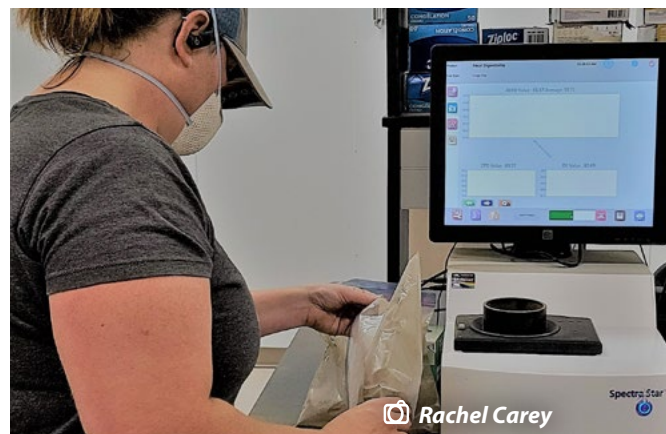


*Integrated agriculture is multi-disciplinary research that may include environmental impact, soil health, animal health, greenhouse gas emissions and forage development.



📷 Tess Mills

Cattle grazing in one of our pastures come for a treat while this equipment measures the amount of methane gas is being breathed out by the animal. It's part of Dr. Bart Lardner's (PhD) research program looking at how different annual and perennial forages consumed by the cattle affect their methane emissions.



📷 Rachel Carey

PhD candidate Rachel Carey uses our Near Infrared Spectrometer (NIRS) to analyze for fecal starch content, an important indicator of starch digestion by feedlot cattle. Supervised by Drs. Greg Penner (PhD, USask) and Tim McAllister (PhD, AAFC), Carey's research examines the use of high-moisture corn products in western Canadian beef cattle diets.

PROVIDING EDUCATIONAL EXPERIENCES

The LFCE facilities provide excellent meeting spaces for interactive programs, including experiential learning in educational demonstrations and classes for those in university and college. Translating science by teaching people from a variety of backgrounds and by training the next generation of industry leaders is a shared responsibility. We are proud to host a variety of groups and classes. In addition, students working for university professors assist with the research conducted at the LFCE. Between May 1, 2021, and April 30, 2023, 59 graduate students plus several undergraduate students collected data for research projects under the supervision of 17 faculty members.

CLASSES, PRACTICAL LABS AND STUDENT TOURS

2021-2022	Classes	Students	2022-2023	Classes	Students
USask College of Agriculture and Bioresources	4	245	USask College of Agriculture and Bioresources	4	208
USask Western College of Veterinary Medicine	2	10	USask Western College of Veterinary Medicine	5	218
USask livestock clubs	2	40	USask livestock clubs	0	0
Saskatchewan Polytechnic	1	20	Saskatchewan Polytechnic	1	20
TOTAL	9	315	TOTAL	10	446

GRADUATE STUDENTS AND THEIR SUPERVISORS May 1, 2021, to April 30, 2023

Faculty supervisors	Graduate students	Faculty supervisors	Graduate students	Faculty supervisors	Graduate students
Gregg Adams	Chris James* Nolan Kennedy* Ella Macquisten* Dominic Olver Sergio Pezo Steve Yang Miranda Zwiefelhofer	Ian Fleming	Ben Fox Adam Hammerlindl Kyle Howse Ethan Landry Justin Salandanan Chelsey Yesnik David Cook Eliza Meldrum Crystal Rinas	Diego Moya	Mustaq Ahmad Natalia Dee Josie Pugh
Mika Asai-Coakwell Bill Biligetu	Hailey Bolen Aabroo Ahmed Chaowei Han Seth Lundal David MacTaggart Alex Waldner Hu Wang	Terry Fonstad	Amelia Clements Erika Cornand Shelby Robinson Jourdyn Sammons Cassidy Sim Megan Wasden Corissa Wilcox	Greg Penner	Rachel Carey Mikaela Evans Frank Zhang Megan Dubois Tyen Paterson Nikita Payne Jenilee Peters Jenna Sarich
Jon Bennett	Yun Huang Runli Yuan	Bobbi Helgason Bart Lardner	Shelby Robinson Jourdyn Sammons Cassidy Sim Megan Wasden Corissa Wilcox	Gabriel Ribeiro	Quinn Hlus Landon Oreschuk Dylan Farmer Jennifer Abi Younes Emmanuel Donbraye Jayce Fossen Tara Funk Anatoliy Trokhymchuk
Claire Card	Laura Hanni Maria Jose Terol Monar	Matthew Links Christy Morrissey	Anatoliy Trokhymchuk Margaret Eng Biyao Han Shuqi Ren	Jeff Schoenau Jaswant Singh Cheryl Waldner	

*Undergrad veterinary medicine student



Erika McDonald (left) and Vanessa Cowan, fourth-year veterinary medicine students, bottle-feed a calf shortly after its birth.

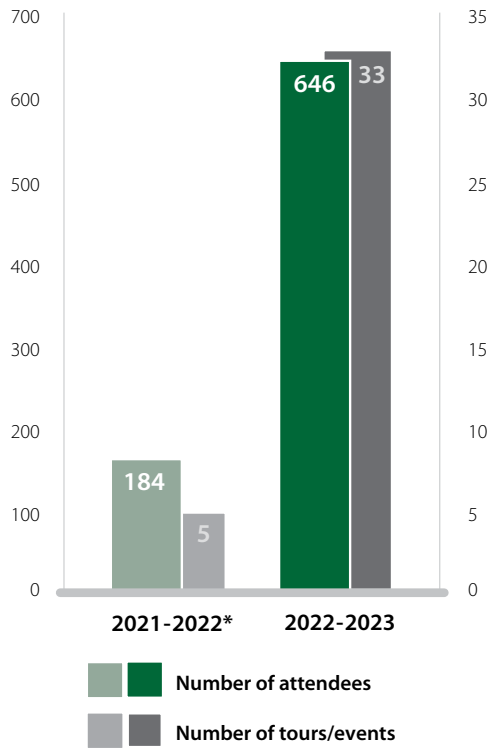


Dr. Gabriel Ribeiro (PhD) explains our animal handling system to AgBio students in a fourth-year animal science class.

REACHING OUT TO THE COMMUNITY

We hosted several interactive outreach programs — field days, demonstrations, industry presentations and seminars — to help introduce new techniques and technologies to producers. The centre is a hub for public awareness, helping to bridge the communications gap between the agriculture industry and consumers, by offering tours and participating in community events.

TOURS AND EVENTS AT THE LFCE



CLASSES, PRACTICAL LABS AND STUDENT TOURS

- 2021-2022** Canadian Western Agribition
- 2022-2023** Saskatchewan Stock Growers Association AGM
- International Bison Conference
- Ag in Motion
- Canadian Beef Industry Conference
- Saskatchewan Forage Council - advisory meeting
- Canadian Western Agribition
- Saskatchewan Beef Industry Conference
- APAS Livestock Summit

*Pandemic restrictions continued at USask facilities, limit



Great conversations happen at our Agribition booth.



Dr. Nathan Erickson teaches a workshop at the Western Canada Feedlot Management School, one of the many industry events at the LFCE.



Students from Kelvington High School check out the feedbunks while LFCE staff member Kristen Hunter discusses feedlot rations.

We acknowledge and thank these special individuals, organizations, corporations and businesses for their extraordinary commitment towards the development and operations of the Livestock and Forage Centre of Excellence.

\$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

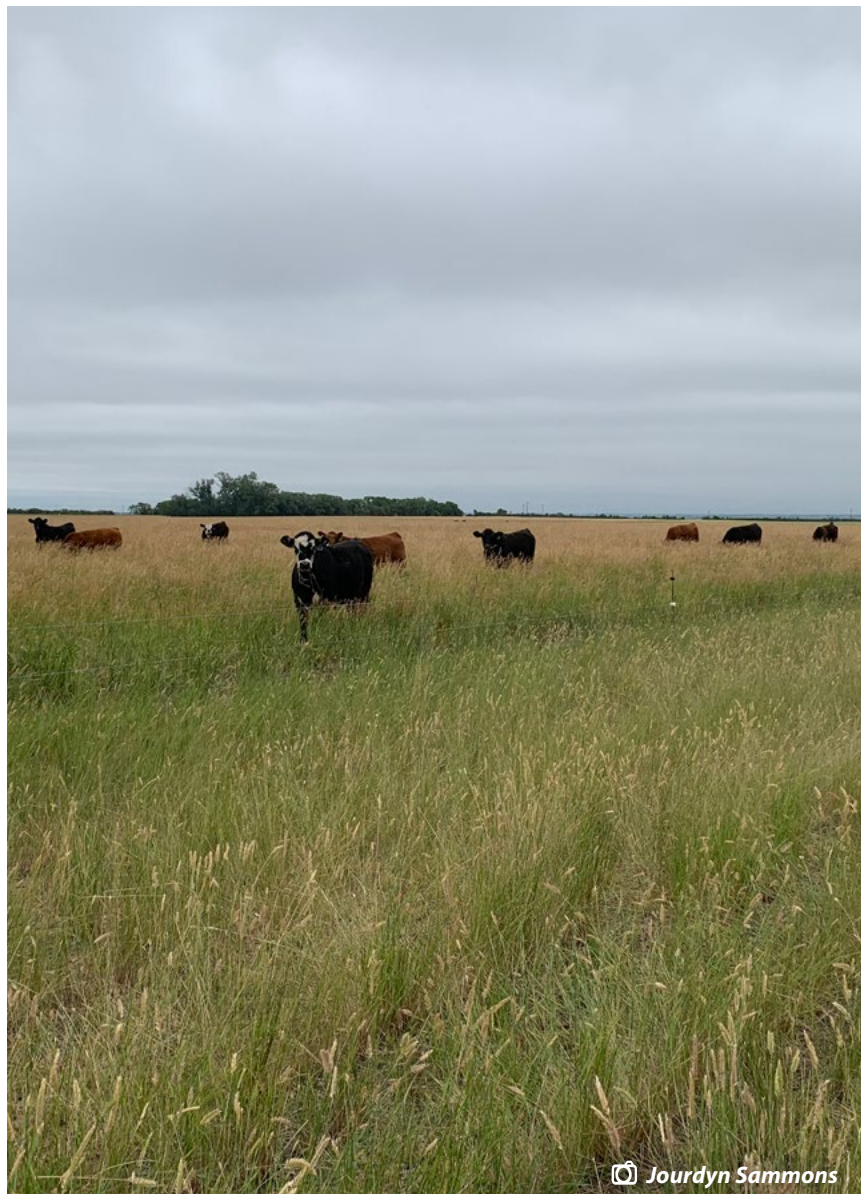
UP TO \$1K

Chad Bruynooghe
Bruce Coulman
Douglas Freeman
Edward Myers
Elisabeth Snead
Duane Thompson

GIFTS OF EQUIPMENT

GrowSafe Systems

**For more information on how to support the LFCE,
please contact:
Dr. Scott Wright (PhD), director
Livestock and Forage Centre of Excellence
306-260-6120
scott.wright@usask.ca**



 Jourdyn Sammons

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