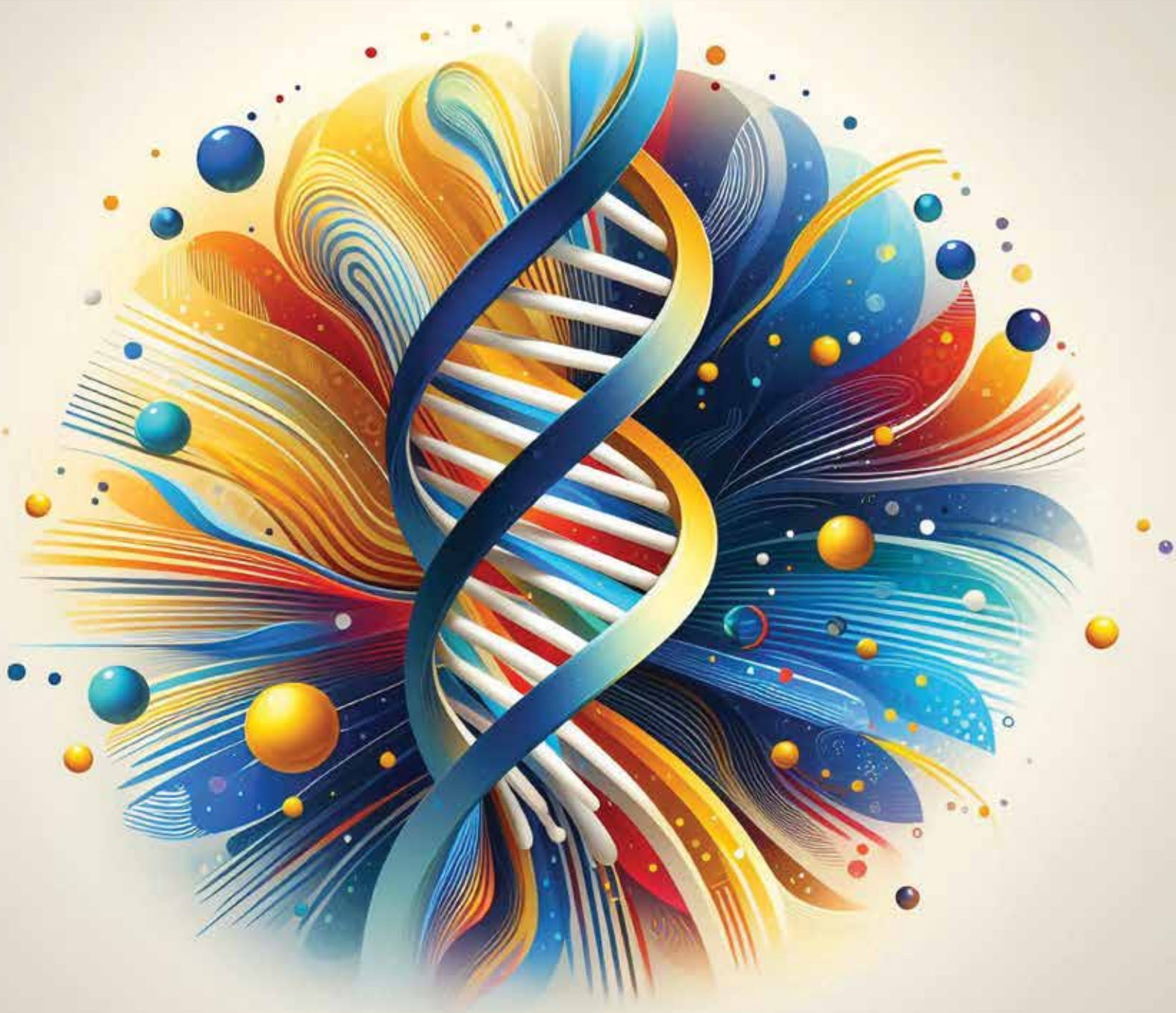
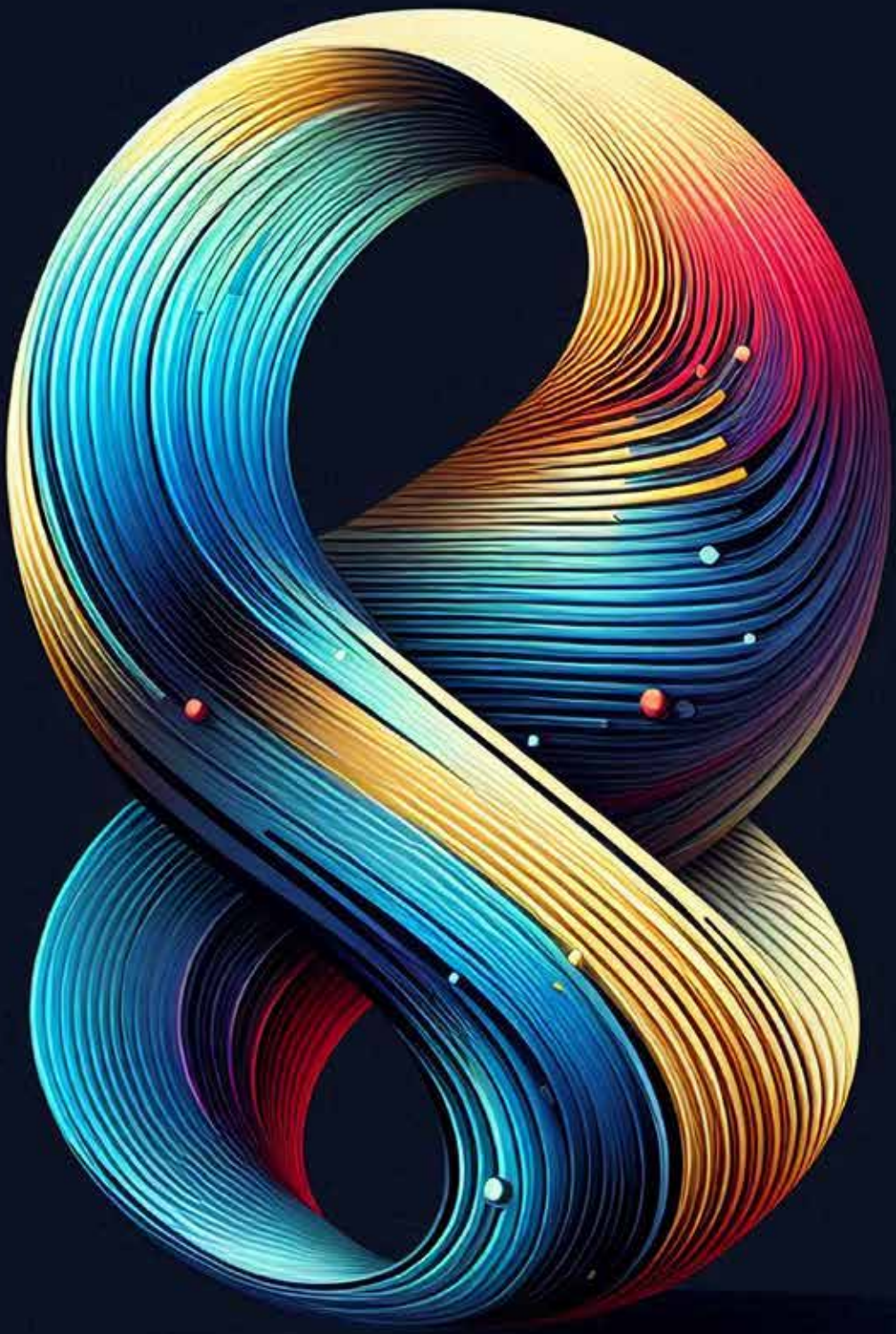
Genome Prairie



2023-24 ANNUAL REPORT



ACKNOWLEDGEMENT

We acknowledge we are on Treaty 1, 2, 4, 5, 6, and 8 Territories, and ancestral lands of the Anishininewuk, Cree, Dakota, Dene, Lakota, Nakota Anishinaabeg, Dakota Oyate, Dene, Denesuline, Lakota, Nakota Anishinaabeg, Nehethowuk, Saulteaux, and Métis nations.

We acknowledge northern Manitoba includes lands that were and are the ancestral lands of the Inuit.

We respect the spirit and intent of Treaties and Treaty Making and remain committed to working in partnership with First Nations, Inuit and Métis people in the spirit of truth, reconciliation and collaboration.

Cultivating Future Adaptation: Advancing Genomics in the Prairies

INSIDE

Genome Prairie

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Genome Prairie

GENOME PRAIRIE IMPACTS

the impact

Through collaboration, Genome Prairie's operational activities and project investments create economic and social contributions in Manitoba and Saskatchewan.

Some of the ways Genome Prairie has an impact include:

- Addressing regional and national issues
- Advancing local talent
- Building public and private sector partnerships
- Developing new technologies
- Contributing to training and employment opportunities
- Facilitating industry solutions
- Establishing expertise, capabilities and capacity
- Leveraging funding

5:1 leverage power

For every dollar that is invested by Genome Canada, another five dollars of near-term regional economic impact was generated (2012-23).

51
funded genome projects

$433M
total project investments

$338M
increase in total GDP in SK and MB

3,365
Full-time jobs created in SK and MB

From 2005-March, 2023. Estmated benefits based on updated MNP economic impact study.

THE GENOME PRAIRIE PATHWAY

Our Mission

Driving genomics research, development and knowledge translation to better protect, feed, heal and empower the people of Manitoba, Saskatchewan and beyond.

Our Vision

Building a healthier and more productive environment for everyone through genomics.

Project Development

Genome Prairie serves as an engine for economic development. With offices in Saskatoon and Winnipeg, Genome Prairie identifies and refines new project opportunities, facilitates national and international collaboration, and aligns partners and resources to ensure the success of selected research projects.

Research Management

Our projects are at the forefront of research and development in genomics and related biosciences. Genome Prairie's team strives to bring together significant expertise and resources from different academic institutions and industries across Canada. The scale and complexity of these initiatives requires strong project management to optimize successful completion of goals and objectives.

Community Engagement

Success in any scientific field often depends on factors beyond the lab bench. Relationship building and information sharing are critical activities that can lead to unexpected connections and innovation. Through communications and outreach activities, Genome Prairie helps strengthen the Prairie research community and the talent it attracts.

A MESSAGE FROM THE BOARD CHAIR

DR. PETER W.B. PHILLIPS

"Driving forward world-class genomics-based solutions."

As we reflect on the past year, my second as Chair of the Board of Directors, I am filled with immense pride in Genome Prairie's progress in driving forward world-class genomics-based solutions. Our commitment to addressing the most pressing challenges of our time—global food security, human health and environmental sustainability—remains steadfast. While funding for genomics research in Canada has been reviewed and recast in the past year, we see a positive future. Looking to the future, we recognize that innovation in genomics can and should go beyond research and discovery. We are actively working to harness the power of genomics to foster commercial activities and entrepreneurship that will lead to real-world applications and benefits.

The future of genomics is not just about breakthroughs in the lab; it is about translating those breakthroughs into tangible products, services, and technologies that can enhance our lives and grow our economy. An invigorated focus on commercialization of discoveries made in the laboratory is essential for driving economic growth and ensuring that the benefits of genomics are fully realized across Manitoba, Saskatchewan, and beyond.

To achieve this in the coming years, we are committed to strengthening our partnerships with industry and encouraging the development of start-ups and spin-offs that can bring genomics-based innovations to market. It will be critical for the current pan-Canadian genomics network to foster an ecosystem that supports entrepreneurial thinking among researchers, providing them with the tools and resources they need to navigate the path from discovery to commercialization. This will ensure that our society reaps the full benefits of the extraordinary research being conducted in our region.

The success of our future commercial ventures and the broader genomics field depends on the development of a highly skilled and knowledgeable workforce. We recognize that for Manitoba and Saskatchewan to remain at the forefront of genomics research, we must invest in our people. The next generation of genomics researchers, innovators, and leaders will be the ones to carry forward the legacy we are building today.

Genome Prairie is committed to accelerating knowledge capacities in our provinces. This means investing in education, training, and post-graduate support to equip individuals with the skills and expertise needed to lead in the genomics field. Genome Prairie works closely with academic institutions, industry partners, and government agencies in the Prairie region to create opportunities in our funded projects for students and early-career researchers to gain hands-on experience and develop the competencies necessary for success in this rapidly evolving field.

As we move forward, I am confident that Genome Prairie is well-positioned to continue leading the charge in genomics research. With a dedicated board, an agile and talented executive team, and strong partnerships across sectors, we are ready to tackle the challenges and seize the opportunities that lie ahead. Together, we will build a future where the power of genomics is fully realized for the betterment of our communities, our economy, and our world.

GENOME PRAIRIE BOARD OF DIRECTORS

AL SHPYTH (VICE-CHAIR)

JoANNE BUTH

DR. SUSAN BLUM

DR. ANNEMIEKE FARENHORST

GINA FEIST

DR. TERRY FONSTAD

DR. SHAWN GIBSON

KENDRA MUELLER

DR. CURTIS REMPEL

PATTY ROSHER

A MESSAGE FROM THE CHIEF EXECUTIVE OFFICER

MIKE CEY

Adaptation: the evolutionary process whereby an organism or organization becomes better able to thrive within its habitat or surroundings.

"Cultivating Future Adaptation: Advancing Genomics in the Prairies."

In 2023-24, Genome Prairie met significant new challenges and opportunities with an exceptional demonstration of our capacity for adaptation.

2023-24 yielded the funding results of our genomics enterprise's five-year proposal to the "Strategic Science Fund" competition led by the federal government via the Innovation, Science and Economic Development Ministry. We are grateful to be one of twenty-four organizations awarded funding within this competition. Our proposal is built to set the pace for Canada in a globally competitive marketplace of ideas and outcomes. We look forward to responding to our emerging opportunities as a nation with a demonstrated ability to adapt and thrive.

This year, Genome Prairie also embarked on an initiative to seek out and advance new research funding sources with genomics project submissions to opportunities beyond the Genome Canada enterprise, including the AAFC-led Sustainable Canadian Agricultural Partnership. In doing so, we will continue to serve the research and development needs of the communities we serve in Manitoba and Saskatchewan. While exciting opportunities will continue to be brought forward through Genome Canada, beginning with major investments in Precision Health in the coming year, our capacity to pivot to additional opportunities will both strengthen and diversify our abilities to advance genomics-led research in the coming years.

Genome Prairie has developed a visionary "whole of government" approach in engaging with our provincial governments in Manitoba and Saskatchewan to demonstrate the opportunity for both more commercialization and the further development of much sought-after highly qualified personnel (HQP) in the genomics space. Through these efforts, our researchers will take their place as leaders in agriculture, human health, the environment, and advanced education.

They will continue to make outsized contributions to the economies of our provinces and all of Canada. Genome Prairie has also taken an active role in evolving the business model of the national genomics enterprise in collaboration with Genome Canada and the other five regional centres across the country. Through this work, the governance, structure, and function of the collective genomics enterprise will be designed and adapted to best meet the country's challenges in the most efficient and economical way possible. This approach will help us continue to meet regional priorities through national effort and collaboration.

I want to take the opportunity to thank Dr. Annemieke Farenhorst of the University of Manitoba and Dr. Susan Blum of Sask Polytech for their exemplary service on the Board of Genome Prairie as they step away. I would further extend a warm welcome to Andrea Ladouceur, President of the Bioscience Association of Manitoba as she joins our Board.

Truly, we enter an era where the use of genomics tools, techniques and processes is becoming ubiquitous in serving the needs and priorities of society. We are so blessed to possess the people, infrastructure capacity and know-how, to bring brilliant ideas into reality in our space.

GENOME PRAIRIE EXECUTIVE & STAFF

MIKE CEY (Pag, EMBA)
President, Chief Executive Officer (CEO)

PATRICK PITKA (FCPA, FCA, Pro.dir)
Chief Financial Officer (CFO)

Dr. LESTER YOUNG (PhD)
Chief Scientific Officer (CSO)

Dr. JERLENE HALLIDAY
(PhD)
Manager of Sector Innovation

Dr. IFEOMA OKWOR
(DVM, PhD)
Programs Manager

JELENE PUGOY
(B.EnvD)
Program Coordinator

FAYE PAGDONSOLAN
Senior Manager, Administration and Board Relations

OYEWOLE OYEBANJI
CISA

Senior Accountant

TONY BASSETT
(BA, MA)

Manager, Communications and Stakeholder Relations Manager

A MESSAGE FROM THE CHIEF SCIENTIFIC OFFICER

DR. LESTER YOUNG

"The vast opportunities for future successes."

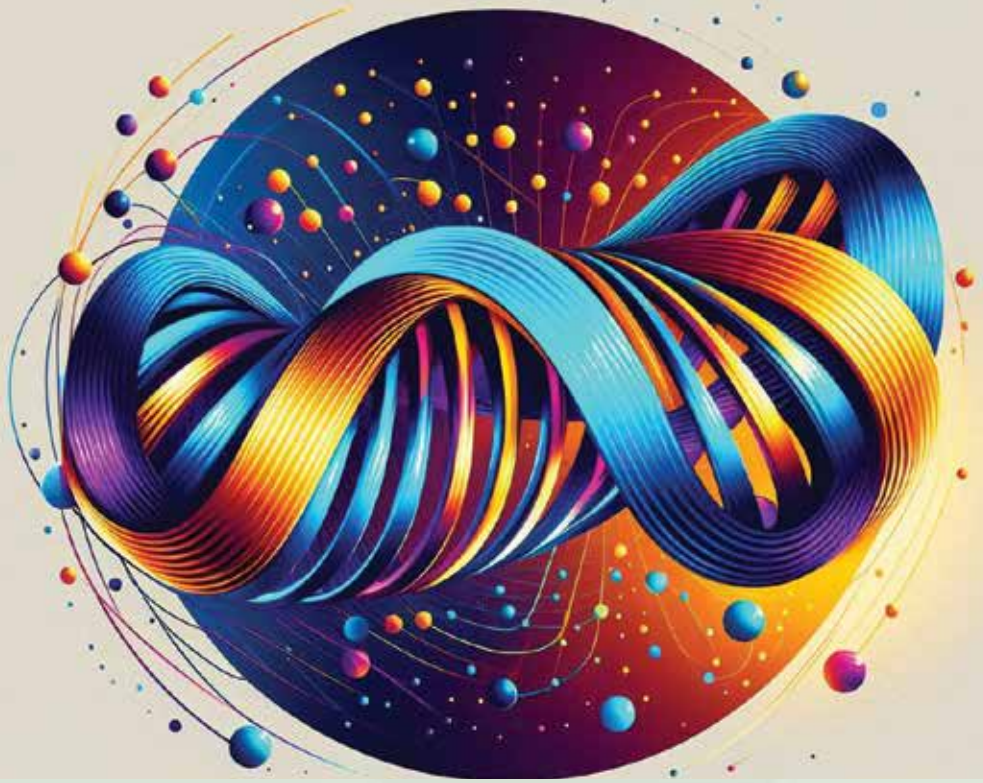
As I enter my third year as Chief Scientific Officer for Genome Prairie, I am excited about the genomics sector's vast potential and future possibilities in Manitoba and Saskatchewan. As Genome Prairie and the Canadian genomics enterprise enter its 25th year of collaboration to improve lives and communities and spur economic growth through genomics, the Prairies are playing an increasingly important role in genomics research and innovation. Now, more than ever, I am happy to report that Genome Prairie is advancing the regional genomics sector.

The 2023-24 year was marked by unprecedented success. Genome Prairie was delighted to be awarded administration for five of eleven national projects within the Climate Smart Agriculture and Food Systems initiative (aka CSAF). The CSAF initiative includes projects focused on mitigating harmful greenhouse emissions without reducing productivity for food producers. The announced projects cover a wide spectrum ranging from wheat, pea and lentil breeding to soil health and native forage diversity.

Although Genome Prairie's "traditional" strength is in supporting agricultural genomics, we are also incredibly proud of our health and natural resources projects. Of the 16 active regional projects in Saskatchewan and Manitoba, three are health-related, and four are investigating the application of genomics in conservation and biological remediation. Additionally, Genome Prairie will be an important partner in Genome Canada's upcoming Precision Health Initiative. We will work hard to connect regional researchers with collaborators for this high-impact, pan-Canadian initiative.

Finally, Genome Prairie is proud to have founded an Indigenous Peoples Genomic Advisory Committee to explore current and future genomics opportunities to benefit Indigenous researchers and communities in the prairie region. The committee will play a critical advisory role for Genome Prairie's project development team on indigenous-led or indigenous-partnered project applications.

I am proud of the strides Genome Prairie and our community have made this past year in addressing the evolving challenges in Canadian agriculture, health, and environmental sustainability. I am excited to further support genomics research and innovation across Manitoba and Saskatchewan as we continue cultivating future adaptation. Together, we are poised to see the genomics projects we champion make a lasting, positive impact throughout the Prairies, driving progress and resilience in our region.



GENOME PRAIRIE 2023-24 IN REVIEW:

SUPPORTING **IMPACTFUL** RESEARCH

1.0 BENEFITING MANITOBA, SASKATCHEWAN, AND BEYOND:

In 2023-24, Genome Prairie took major steps to support research projects and initiatives poised to deliver groundbreaking solutions to critical global issues. Our major successes extended to large-scale, interdisciplinary research closely aligned with practical applications. Genome Prairie strategically supported research focused on addressing societal challenges, granting access to advanced technologies, while emphasizing the role of genomics in the Prairie region of western Canada. Our focus and record of success during the year included pioneering efforts in food and crop production, innovative approaches to human health, and environmental breakthroughs, including supporting innovations toward reducing greenhouse gas emissions.

Climate-Smart Agriculture Interdisciplinary Challenge Teams:

Genome Prairie was successfully awarded five of eleven national projects within Genome Canada's pan-Canadian Climate-Smart Agriculture and Food Systems initiative. These projects total more than $24M in genomics investments that will support leading-edge genomics research in Saskatchewan and Manitoba. Genome Prairie is the administrative lead for three research projects: ACTIVATE: crop breeding for climate change mitigation; GG4GHG: native forage diversity; and BENEFIT: plant-growth promoting bioinoculants. Additionally, Genome Prairie was awarded co-lead with Genome Alberta for PeaCE. The Climate-Smart Agriculture and Food Systems initiative marked an outstanding result for Genome Prairie and will result in a dynamic partnership among genomics researchers, industry, producers and government from Manitoba and Saskatchewan while advancing food production and mitigating greenhouse gas emissions.

Knowledge Mobilization Hub:

Following the official launch by the Ministry of Innovation, Science and Economic Development, Genome Prairie was named co-lead for the establishment of an agriculture and agri-food genomics knowledge mobilization hub. The Global Institute for Food Security (GIFS), the University of Guelph, and Simon Fraser University will co-lead the knowledge mobilization hub. The hub will allow the Interdisciplinary Challenge Teams to share research outputs amongst themselves and translate this knowledge into impacts that will be used throughout the agricultural sector. Utilizing the Climate-Smart Agriculture research outputs will benefit producers, consumers and the agriculture sector nationwide.

Mainstreaming Genomics in Manitoba (MGM):

This $1.5M project (over 15 months) will build on the work of the Canadian Prairie Metabolic Network project. In MGM, Shared Health will include in its diagnostic offerings a system for non-genetics specialists to requisition whole genomic sequencing to diagnose rare diseases, allowing faster and less expensive diagnoses.. The referral and diagnosis committees will become established, allowing faster and less expensive diagnosis of rare diseases. Additionally, other omics technologies (such as iSCP, proteomics and transcriptomics) will be validated to increase overall diagnostic yields by providing positive diagnoses for variants of uncertain significance.

2.0 STRENGTHENING OUR RELATIONSHIP WITH KEY STAKEHOLDERS

Genome Prairie continued its work by collaborating with and supporting research, industry, government, and consumers. Genome Prairie continued championing equitable, diverse, and inclusive research, prioritizing excellence and tangible impact. Our efforts enhanced the influence of research and innovation by fostering collaboration and coordination across academia and industry on regional and national levels. Genome Prairie strengthened its relationships with key regional stakeholders in critical areas such as precision health, water pathogens, antimicrobial resistance, agriculture, and the reduction of greenhouse gas emissions, among others.

Dr. Lester Young, CSO, Genome Prairie, speaks during a national panel discussion at SynBio, held in Toronto, Ontario.

SynBio:

One of the most important events on the Canadian genomics calendar, Genome Prairie attended the 5th Canadian SynBio Conference in Toronto in June. From climate change and food insecurity to acute and chronic diseases, collaborative innovation was highlighted as the key to ensuring a sustainable future for future generations. The conference provided an engaging and informative experience, featuring insightful keynote presentations, dynamic panel discussions, and industry showcases that offered a glimpse into the latest trends and innovations in the field. Genome Prairie's CSO, Dr. Lester Young, joined a pan-Canadian panel which discussed regional advances in synthetic biology and genomics.

Precision Health Symposium:

In May, Genome Prairie attended this symposium in Montreal, with participants representing previously funded health-related project leads, Center representatives, Genome Canada staff and representatives from the Canadian Institutes of Health Research. The gathering included workshops and discussions on Canada's position in precision health and the emerging importance of data management, data sharing, and governance related to genomics. Genome Prairie was honoured to chair a larger discussion on population genomics and seeks to play a prominent role in the upcoming Genome Canada Precision Health funding opportunity.

Regional Stakeholder Gatherings

Genome Prairie's executive leadership was present at key stakeholder-organized events throughout the year. In September, leadership attended the annual general meeting of Protein Industries Canada in Edmonton, Alberta, with a strong presence of start-ups and small enterprises from the UK and Canada. Genome Prairie also participated in various events related to agri-food production, human and animal health and environmental research, including the Canadian Institute of Cancer Research annual meeting, the Canadian Animal Health Laboratory annual meeting, the Global Water Futures 2023 Open Science Meeting, and the Annual Society Impact of Science Conference in Halifax, Nova Scotia.

Dr. Andrew Van Kessel,Director of Research for VIDO, giving a presentation to attendees at the VIDO Animal Health Summit.

VIDO Animal Health Summit:

In October, Genome Prairie attended the Summit hosted by VIDO - Vaccine and Infectious Disease Organization, in Saskatoon. The Summit attracted participants from the lamb, swine, cattle, and dairy industries across Canada and government and industry stakeholders. This engagement underlined VIDO and Genome Prairie's long-term dedication to safeguarding animal health and agriculture, in particular, the ongoing threat of Foot-and-Mouth disease, a highly contagious viral infection that affects cloven-hoofed animals, including cattle, swine, and sheep.

Attendees at the Agri-Food Innovation Council included (l-r) Dr. Daryl Domitruk (Manitoba Pulse and Soybean Growers), Dr. Nancy Tout (Global Institute for Food Security - GIFS), Dr. Ryan Phillippe (Genome Canada), Robert Kitchen, MP (Souris-Moose Moutain), Mike Cey (Genome Prairie), Olufunke Okochi (GIFS), Dr. Karen Churchill (Ag-West Bio), and Cam Dalh (Manitoba Pork Council).

Agri-Food Innovation Council:

In the spring of 2023, Genome Prairie attended the Agri-Food Innovation Council Spring Engagement, which included stakeholder meetings with federal government officials, including select Members of Parliament and administration from the Ministry of Agriculture, on Parliament Hill in April. CEO & President Mike Cey participated in a session that discussed the application of genomic innovation in Canada and the potential benefit of increasing future yields to producers.

3.0 PROMOTING THE APPLICATION OF THE GENOMICS ECONOMY TO KEY AUDIENCES

Genome Prairie has made significant strides in raising awareness and showcasing the potential of genomics research across various sectors and communities. Through strategic partnerships, event organization, and outreach initiatives, the organization has focused on enhancing the visibility of genomics among government officials, indigenous communities, and industry stakeholders. Communicating with key individuals with a common interest in developing genomics research and commercial opportunities in the prairie region is critical to future growth and prosperity in genomics research.

Attendees at the Genomics in Manitoba Government event at the Manitoba Legislavtive Assembly. From l-r, Dr. Rene Zahedi (University of Manitoba), Dr. Lester Young (Genome Prairie), Karen Dunlop (Research Manitoba), Mike Cey (Genome Prairie), Dr. Paul Beaudin and Dr. Laura Curtis (Shared Health Manitoba).

Stewarding Regional Government Relationships:

Raising the profile and creating a greater understanding of the potential application and benefit of genomics with Genome Prairie's provincial government partners remained a high priority during the year. Investing time and resources in showcasing genomics research and researchers to elected officials and senior government administration via large-scale hospitality events with the Government of Manitoba and Saskatchewan has enhanced regional policy knowledge about genomics. During the year, Genome Prairie had numerous direct conversations with multiple ministries in Saskatchewan and Manitoba to ensure genomics remains a regional research priority for years to come.

Partnering with Indigenous Communities:

Throughout the year, Genome Prairie continued its path towards greater inclusion, diversity and accessibility, including with indigenous peoples in the Prairie region. Establishing an Indigenous Genomics Advisory Committee in alliance with a Genome Prairie Indigenous Steering Committee to advise Genome Prairie on projects under development with a significant impact on indigenous people or communities. Since its establishment, the Advisory Committee has examined ways Genome Prairie should approach the co-development of genomics proposals. Additionally, IPGAC members provided advice on a possible project investigating using -omics techniques as an adjunct to ground penetrating radar for the localization of unmarked graves. The next IPGAC meeting will focus on a review of the eDNA Surveillance proposals. The regional and the Indigenous-lead proposals have significant involvement from Indigenous communities in their activities.

Supporting Genomics Collaborative Events:

Genome Prairie continues its support of key regional and international gatherings to promote STEM programs, encouraging youth to choose science as a career path, while also investing in events to provide researchers and entrepreneurs with platforms to showcase their work. In July, Genome Prairie proudly sponsored Winnipeg's Manitoba Sustainable Protein Research Symposium. The event promoted advancements in genetic techniques to create sustainable plant protein and featured presentations on the role genetic engineering can play in manipulating rumen bacteria that generate greenhouse gases. Genome Prairie was also a proud partner and supporter of the GEO BON Global Conference: Monitoring Biodiversity, held in October at McGill University in Montreal. The event focused on the grand challenge of developing best practices and new technologies for biodiversity observations and monitoring to support transformative policy and conservation action. In partnership with Genome Alberta, in March 2024, Genome Prairie hosted a Genomics at Work for Prairie Crop Producers webinar event. Hosted by Dr. Stuart Smyth and an expert panel (including Patty Rosher, Ian Affleck, Drs. Cami Ryan, Francois Eudes, Lorne Hepworth, and Nancy Tout), the webinar examined the current state of genome-based technologies in the Prairie's agri-food sector.

The 2024 Bison Regional Science Fair award winners with Dr. Ifeoma Okwor, Genome Prairie Programs Manager.

Supporting Youth Education and STEM Programs:

Genome Prairie is proud of its continued support of youth education initiatives in the region, including its continued financial support to the Bison Regional Science Fair in Winnipeg, an annual competition for Grade 4-12 students in Manitoba. In Saskatchewan, Genome Prairie continued its ongoing support for promoting science in the classroom, including its continued support of regional science fairs in the province. As the genomics sector continues to expand, it will be critical that young people view genomics as a viable career path.

Genomics: Impact

As the Canadian genomics research sector continues its rapid expansion, Genome Prairie was focused on highlighting genomics' impact in the prairie region and beyond. This year, the Genomics:Impact series launched, profiling the individuals behind research advances and how the genomics sector impacted not only their academic and professional lives but also the lives of others in Saskatchewan, Manitoba, and beyond.

4.0 LOOKING FORWARD TO THE COMING YEAR

While 2023-24 was a busy year for Genome Prairie, there is much on the near horizon, including funding rounds that will help lay the foundation for a significant portion of genomics research in Canada in the coming decade:

Canadian Biotechnology Implementation and Commercialization (CBIC) Initiative:

In the future, Genome Canada will provide up to $80 million to support the Canadian Biotechnology Implementation and Commercialization (CBIC) initiative. The CBIC initiative will replace the Genomic Applications Partnership Program (GAPP) and will have a greater emphasis on pre-commercialization and commercialization. It also requires an organization (for-profit or not-for-profit) to work toward commercializing a genomics-enabled or genomics-derived product or service. The initial round of CBIC must start by 31 March 2025, with an additional four years of annual CBIC funding planned.

eDNA Surveillance Competition:

Genome Prairie will announce the commencement of two eDNA Surveillance projects in our region. One project will investigate using eDNA to detect and/or characterize antimicrobial resistance genes and emerging pathogens in feedlots and wastewater systems. The other project will partner with Indigenous groups and communities to examine Biodiversity, waterway health and community water systems. The eDNA Surveillance Program may also include the use of eDNA surveillance techniques to examine and better understand Biodiversity. Successful project applicants will address regional priorities. Additionally, an Indigenous-led or Indigenous-partnered project is expected to be awarded funding.

Canadian Precision Health Initiative:

Genome Canada will also launch the Precision Health Initiative in the Fall. This large ($80 M Genome Canada funding, $200 M total funding) program will initially look to generate new whole genome sequence data using already existing health resources. Disease research programs, biobanks, research collaborations and genomics sequencing programs will generate as many as 100,000 whole genome sequences to specified data standards. This data will be archived in a national database and available to health researchers across Canada. The initiative's second phase will identify or implement new diagnostic tests, prevention plans or treatments based on the data generated in the data generation phase.

Knowledge Mobilization Hub:

The Data Coordination and Cooperation Hub and the Knowledge Mobilization, Implementation and Cooperation Hub projects were announced in July 2024. When launched, the data-sharing hub will play a pivotal role in advancing innovative genomic research to reduce greenhouse gas emissions and minimize the carbon footprint of Canada's food production systems. By enhancing these systems' resilience, environmental sustainability, and economic viability, the hub contributes to building a more sustainable future. The hub's scope encompasses applying genomic technologies to support the goal of achieving net-zero emissions by 2050. It focuses on reducing the carbon footprint of agriculture and food production while driving solutions that enhance productivity without increasing greenhouse gas emissions or harming the natural environment. Additionally, the data-sharing hub is integral to the Interdisciplinary Challenge Team (ICT) projects, supported through programs dedicated to knowledge mobilization, data coordination, and implementation. This approach enables solutions from one area to benefit other food production systems and supply chains, creating a ripple effect that positively impacts the broader food system.

2023-24 PROJECTS REPORT

GENOME PRAIRIE PROJECTS

2023-24 marked a stellar year for Genome Prairie, as among others, it added four large-scale genomics projects to its management portfolio, GG4GHG (Grassland Genomics Project), Bio-Inoculations and Crop Resiliency Project, PeaCE (Pea-Climate-Efficient Project) and the ACTIVATING Genomics Project. The total value of these large-scale projects alone exceeded $24.6 million, a significant boost to the Manitoba and Saskatchewan genomics research and bio-economy sectors.

PROJECT TITLE	SECTOR	LEADERS	ORGANIZATION(S)	FUNDING
GENICE II: REIMAGING MONITORED NATURAL ATTENUATION AS AN OIL SPIL RESPONSE STRATEGY IN THE ARCTIC	BIODIVERSITY & ENVIRONMENT	STERN, GARY COLLINS, ERIC	UNIVERSITY OF MANITOBA	$6,020,000
EVOLVES: ENHANCING THE VALUE OF LENTIL VARIATION FOR ECOSYSTEM SURVIVAL	AGRICULTURE	BETT, KIRSTIN, VANDENBERG, ALBERT	UNIVERSITY OF SASKATCHEWAN	$7,43,000
GENOMIC ASSETS: ANTIMICROBIAL STEWARDSHIP SYSTEMS FROM EVIDENCE-BASED TREATMENT STRATEGIES FOR LIVESTOCK	AGRICULTURE	WALDNER, CHERYL OTTO, SIMON	UNIVERSITY OF SASKATCHEWAN, UNIVERSITY OF ALBERTA	$5,680,000
4DWHEAT: DIVERSITY, DISCOVERY, DESIGN AND DELIVERY	AGRICULTURE	POZNIAK, CURTIS CLOUTIER, SYLVIE	UNIVERSITY OF SASKATCHEWAN, AGRICULTURE AND AGRI-FOOD CANADA	$11,170,000
GG4GHG: GRASSLAND GENOMICS PROJECT	AGRICULTURE	BENNETT, JONATHAN ASSELIN, SEAN	UNIVERSITY OF SASKATCHEWAN, AGRICULTURE AND AGRI-FOOD CANADA	$5,900,000
BENEFIT: BIO-INOCULANTS AND CROP RESILIENCY PROJECT	AGRICULTURE	ORESNIK, IVAN DICENZO, GEROGE	UNIVERSITY OF MANITOBA, QUEEN'S UNIVERSITY	$6,150,000
ACTIVATING GENOMICS TO ACCELERATE CLIMATE-SMART CROP DELIVERY	AGRICULTURE	POZNIAK, CURTIS BETT, KIRSTIN	UNIVERSITY OF SASKATCHEWAN	$6,150,000
HELIOCOBACTER PYLORI GENOMICS PROJECT	HEALTH	ALEXANDER, DAVID REIMER, ALEISHA	CADHAM PROVINCIAL LABORATORY, PUBLIC HEALTH AGENCY OF CANADA	$1,650,000
OVARIAN CANCER GENOMICS PROJECT	HEALTH	DECOTEAU, JOHN KINLCOH, MARY	UNIVERSITY OF SASKATCHEWAN, SASKATCHEWAN HEALTH AGENCY	$2,030,000
BIG: BISON INTEGRATED GENOMICS	BIODIVERSITY & ENVIRONMENT	ADAMS, GREGG SHURY, TODD	UNIVERSITY OF SASKATCHEWAN, PARKS CANADA AGENCY	$1,680,000
CANADIAN PRAIRIE METABOLIC NETWORK (CPMN)	HEALTH	ROCKMAN-GREENBERG, CHERYL TOPP, ADAM	UNIVERSITY OF MANITOBA, SHARED HEALTH MANITOBA	$6,070,000
PEACE (PEA CLIMATE-EFFICIENT)	AGRICULTURE	SAMUEL, MARCUS A KAGLE, SATEESH	UNIVERSITY OF CALGARY, NATIONAL RESEARCH COUNCIL	$6,900,000

The wild Wood Bison are still considered a threatened species on the Canadian landscape.

BIG PROJECT

PROJECT LEADS: Dr. Gregg Adams (University of Saskatchewan), Dr. Todd Shury (Parks Canada)

Canada's wild wood bison population faces significant challenges, including shrinking numbers due to hunting and disease, as well as a lack of genetic diversity. This leaves herds vulnerable to further disease outbreaks and threatens their long-term survival.

Launched in July 2022, the Bison Integrated Genomics (BIG) Project aims to address these challenges through two key objectives: developing a vaccine for pathogens like brucella and tuberculosis and increasing the genetic diversity of the wood bison population.

Dr. Todd Shury, a lead researcher with Parks Canada, has overseen significant progress, particularly in expanding genetic diversity.

Researchers have collaborated with museums across North America to collect ancient bison bone samples, conducting genome sequencing on specimens as old as 100,000 years. The data gathered will help strengthen current wood bison herds by reintroducing more diverse genetic materials.

The team is also developing an SNP chip, a tool allowing researchers to identify genetic differences between plains and wood bison and detect cattle genetic introgression from crossbreeding. This will enhance efforts to preserve the genetic integrity of bison populations.

An important part of the project involves working closely with Indigenous groups, ensuring their involvement in managing the genetic samples and establishing governance frameworks for sample collection.

In addition to the genetic work, the project has made strides in vaccine development, with eight potential candidates for brucella and tuberculosis. The team plans to test these on bison calves, narrowing down to one effective vaccine.

In a written update, Dr. Shury indicated the project will soon be reaching major milestones. "For the coming year, the focus of the BIG Project will be on completing analyses of the experimental bison infection trial and scientific publication of the results of the combined vaccine trial," reported Shury.

We will also complete the analysis of ancient bison DNA samples to build a more reliable and cost-effective bison SNP chip with which we can quickly and confidently differentiate plains from wood bison."

Additionally, the BIG Project will continue to work with local Indigenous leaders and communities who are located near the project's geographical location in and around Wood Buffalo National Park. "Consultation with indigenous communities will remain a priority to facilitate access to valuable wood bison herds in and around the park, and potentially Alaska, to contribute valuable samples to the Bison Genome Biobank," said Shury.

"The BIG Project has been a success so far, and despite some hurdles, our multidisciplinary team continues the development of valuable genomic tools for bison conservation."

A synthetic fertilizer spreader making an application to the field.

BENEFIT

PROJECT LEADS: Dr. Ivan Oresnik (University of Manitoba), Dr. George diCenzo (Queens University)

Microbes are tiny, invisible to the human eye, and everywhere – from the Earth's crust to the deepest oceans. Despite their small size, microbes play a massive role in sustaining life on Earth, and now, they might be the next big thing in farming.

Researchers from Queen's University and the University of Manitoba are working on a project called BENEFIT, which explores how microbes could replace industrial fertilizers. Genome Canada is funding this project to develop microbial bio-inoculants that can help crops grow while reducing the need for synthetic fertilizers, which are costly and contribute to greenhouse gas emissions.

The goal is to find microbes that improve nutrient use efficiency and crop resilience. By collecting a vast array of microbes from Canadian soils and using genomics, researchers aim to identify the best strains to use in farming. These bio-inoculants could help maintain crop yields while cutting down on nitrogen fertilizers, a major source of greenhouse gas emissions.

Although essential for modern agriculture, nitrogen-based fertilizers have a significant environmental impact. Producing them requires a lot of energy and releases carbon dioxide, while using them in the field leads to nitrous oxide emissions, a potent greenhouse gas.

"To date, over 600 microbes have been isolated from wheat, barley, and canola fields, and about 1000 more are in the process of being purified, while over 500 rhizobia able to associate with edible dry bean and pea plants have been isolated," said Dr. George DiCenzo, BENEFIT co-lead and professor at the University of Manitoba. "Overall, it was been a productive first year in the project. We did have some delays with some activities when it began. Still, we feel we have made up for lost time and are excited about the many upcoming research activities that will build off the work completed so far."

Despite the benefits, there's a challenge: bio-inoculants are often less predictable than traditional fertilizers. However, the BENEFIT team is optimistic that with genomics and further research, they can develop more reliable inoculants that will help farmers reduce their carbon footprint without sacrificing productivity.

"Looking forward, we will continue developing our economic and environmental models to simulate the benefits (and costs) of microbial products, which will serve both to help guide our team in selecting which microbes to prioritize, as well as help growers determine when the use of a given microbial product is likely to be beneficial," said DiCenzo.

Members of the ACTIVATE project team. From l-r, Dr. Nicholas Tyack, Lacey-Anne Sanderson, Dr. Kirstin Bett, Dr. Curtis Pozniak, Dr. Sean Walkowiak, Dr. Kate Congreves, and Laura Jardine. Photo courtesy mattbradenphoto.

ACTIVATE

PROJECT LEADS: Dr. Curtis Pozniak and Dr. Kirstin Bett (University of Saskatchewan)

Farmers are under pressure to deliver higher crop yields while reducing greenhouse gas (GHG) emissions. With the rise of climate change, challenges like drought, and diseases such as Fusarium, this is no small task. Crop rotations and genomics might offer a solution.

Canadian producers, especially those in the prairies, are dealing with the need to grow more food while cutting back on synthetic fertilizers that contribute to GHGs. In fact, agriculture accounts for nearly 10% of Canada's total GHG emissions, close to what's produced by cars and trucks.

Researchers at the University of Saskatchewan's Crop Development Centre are considering crop rotation. In 2023, Genome Canada and Genome Prairie launched ACTIVATE, a genomics-based project aimed at increasing yields while reducing emissions. The project, which was part of the Climate-Smart Agriculture and Food Systems Initiative, is led by Dr. Kirstin Bett and Dr. Curtis Pozniak and focuses on developing new varieties of lentils and wheat that can thrive in rotations and reduce GHGs.

One of the major challenges farmers face is the application of more nitrogen fertilizer than crops can utilize, which leads to environmental problems. The ACTIVATE project aims to address this by introducing crops that use nitrogen more efficiently, meaning farmers don't need as much fertilizer, helping the environment and farmers' bottom lines.

Crop rotation, where different crops are planted sequentially on the same land, helps break disease cycles and enhances soil fertility. Bett explains that diseases like root rot can be mitigated through rotations, reducing the need for costly and environmentally harmful field sprays.

ACTIVATE also focuses on breeding new lentil varieties that can obtain their own nitrogen from the atmosphere and provide some to the next crop in the rotation. ACTIVATE will identify wheat varieties best suited to utilizing the nitrogen produced by lentils during the previous year. ACTIVATE aims to prove that using genomics to study crop rotations will benefit the environment and save farmers money.

4DWHEAT

PROJECT LEADS: Dr. Curtis Pozniak (University of Saskatchewan), Dr. Sylvie Cloutier (Agriculture and Agri-Food Canada)

The 4D Wheat project, supported by Genome Prairie, is a groundbreaking initiative aimed at addressing global food shortages projected for the coming decades. Wheat, the world's most consumed crop, is central to global food security. However, with the population expected to exceed 10 billion by 2050, experts warn that current production levels will fall short, necessitating a 50% increase in output to meet demand.

Genomics offers a promising solution. By decoding wheat's complex genome, researchers are developing higher-yielding, disease-resistant strains that are more adaptable to climate change. Wheat's genome, with 14 billion base pairs, has long been challenging for scientists due to its immense size and complexity. The 4D Wheat project builds on recent advances in sequencing technology and bioinformatics to unlock wheat's genetic potential.

Dr. Sylvie Cloutier, a co-lead of the project and a genomics scientist at Agriculture and Agri-Food Canada, explains, "Wheat has evolved over the last 10,000 years and contains subgenomes from wild relatives that still exist today. These wild relatives are reservoirs of genes for disease resistance, productivity traits, and stress tolerance that we can tap into."

Launched in 2019, the 4D Wheat project focused on understanding genetic diversity and applying this knowledge to plant breeding.

"4D Wheat has been about building a genomic platform to maximize the breeding value of genetic resources. Our core research was focussed on a broad spectrum of genetic resources from wild relatives to elite varieties."

Cloutier said the research team has made much progress.

"All activities within 4D Wheat have been successful and have produced a variety of outputs. For example, we completed sequencing six diploid Aegilops species genomes, including four that had not been sequenced before," says Cloutier. "Thanks to these efforts, the genome assemblies of all 11 diploid Aegilops is now complete."

With 4D Wheat winding down in 2025, Cloutier said the remainder of the work will focus on documenting the project's research and discoveries.

"With 4D Wheat ending in March 2025, the team will focus on summarizing the research results for publication and ensuring that the large amount of data generated is properly disseminated and preserved in accordance with our data management plan."

EVOLVES

PROJECT LEADS: Dr. Kirstin Bett and Dr. Albert Vandenberg (University of Saskatchewan)

Lentils might seem like a humble food, but they are becoming a major player in Canadian agriculture thanks to cutting-edge research at the University of Saskatchewan's Crop Development Centre. With millions of tonnes of lentils grown in Canada every year, mainly in Saskatchewan, researchers are now focusing on ways to keep the country ahead of increasing overseas competition.

Instead of just focusing on growing more lentils, the future lies in producing specialized varieties tailored to premium markets. Just like picking out a car, consumers will soon be able to choose lentils based on traits like size, colour, nutrition, or even suitability for specific dishes. This shift from quantity to quality is part of the EVOLVES project, a major research effort funded by Genome Prairie and other partners.

By using genomics, researchers are improving the genetic diversity of lentils to create new varieties that meet the demands of picky consumers in markets like India, where premium quality is highly valued. They are also working on making lentils more environmentally friendly.

As food prices rise and staple crops like wheat face shortages, lentils could become an even more important part of our diets. They are cheap, versatile, and packed with protein, making them a smart choice for anyone looking for a healthy, sustainable food option. Lentils are no longer just a basic pantry item—they're poised to become a premium, "cool" food choice.

Now in its final year of research, the EVOLVES project team is extremely pleased with the advances made since its launch in 2019.

"Our goals were to harness this diversity, empowering lentil breeding programs with the development of tools for more accurate genotyping, precise phenotyping and efficient selection," said Laura Jardine, EVOLVES project manager. "We dove deep into the internal and external qualities of lentils. We were interested in nutritional value in both cultivated and wild varieties and have profiled minerals, vitamins, amino acids and protein across diverse genetic backgrounds and grown in different environments."

Jardine said the project made significant advances in understanding the structural variations between cultivated and wild lentils, which will lead to future breeding that could greatly benefit producers.

"In studying variation, we were able to pin-point chromosome locations for desirable qualities in wild lentils like disease resistance and drought tolerance, along with locations of less desirable traits, like pod-shattering," said Jardine. "All of this work allowed us to provide markers to lentil breeding programs for a variety of traits, along with a better understanding of how to optimally use wild lentils in crossing."

A microscopic view of the *Helicobacter pylori* baterium.

HELICOBACTER PYLORI

PROJECT LEADS: Dr. David Alexander (Cadham Provincial Laboratory), Dr. Aleisha Reimer (Public Health Agency of Canada)

Helicobacter pylori (*H. pylori*) is a bacterium that infects around half of the world's population. While many infected people don't show symptoms, it can lead to serious health problems like ulcers and even stomach cancer. In Canada, about 14 million people are thought to have H. pylori, and diagnosing and treating it is often challenging.

Researchers in Manitoba are using genomics to better understand *H. pylori* and improve its diagnosis and treatment. A $1.6 million project funded by Genome Canada is underway at the National Microbiology Laboratory and the Cadham Provincial Laboratory in Winnipeg. The goal is to bring *H. pylori* testing into the modern age, as current methods, like endoscopy and biopsies, are invasive and outdated.

One main focus is using stool samples for detection, which could be a less invasive and more direct way of identifying the bacterium. Beyond detection, treatment of H. pylori typically involves a mix of antibiotics, but success is not guaranteed. About 30% of patients don't respond to treatments, largely due to antibiotic resistance, which is a growing concern.

The *H. pylori* Genomics Project aims to create "susceptibility profiles" to help doctors identify which strains of *H. pylori* are prevalent in different regions of Canada. This could lead to more targeted and effective treatments, especially in communities with higher infection rates, such as Indigenous and immigrant populations.

Project academic lead Dr. Alisha Reimer said that the project has been focusing on refining a model for accurately determining if an *H. pylori* patient is resistant to antibiotics.

"The first technical approach we use, shotgun metagenomics, was not able to provide sufficient data to determine antibiotic resistance accurately," said Reimer. "So we are now actively exploring ways to target or amplify the parts of the *H. pylori* genome that can tell us if the infection is antibiotic resistant."

"That work is well underway, and we have several successes in hand, including developing a test to detect if *H. pylori* is present in clinical samples."

By 2026, the researchers hope to have developed better diagnostic tools and treatment strategies for H. pylori, potentially reducing the bacterium's impact on Canadians and lowering antibiotic resistance. The project could have a huge impact, making diagnosing and treating this stealthy but serious infection easier.

"Despite pivoting our technical approaches, the project is yielding valuable information, with a stellar and enthusiastic team and eager end-users driving us forward," said Reimer. "In the next year, we will finalize and validate our laboratory and bioinformatic protocols to detect *H. pylori* and antibiotic resistance in clinical samples and share this work with the scientific community."

GG4GHG project co-lead, Dr. Sean Asselin. Dr. Asslin is also a Senior Research Scientist at Agriculture and Agri-Food Canada.

GG4GHG

PROJECT LEADS: Dr. Jonathan Bennett, (University of Saskatchewan), Dr. Sean Asselin, (Agriculture and Agri-Food Canada)

Grasslands are some of the most diverse ecosystems on Earth, yet they're rapidly disappearing. Dr. Jonathan Bennett, a professor at the University of Saskatchewan, sees grasslands as more than just plant life—they represent life itself. Canada's grasslands are only 5% of what they used to be 100 years ago.

Grasslands are vital for more than just the livestock industry. They play a crucial role in storing carbon and helping combat climate change. Unlike forests, which release carbon during wildfires, grasslands store most of their carbon underground, making them more stable and effective at reducing greenhouse gases.

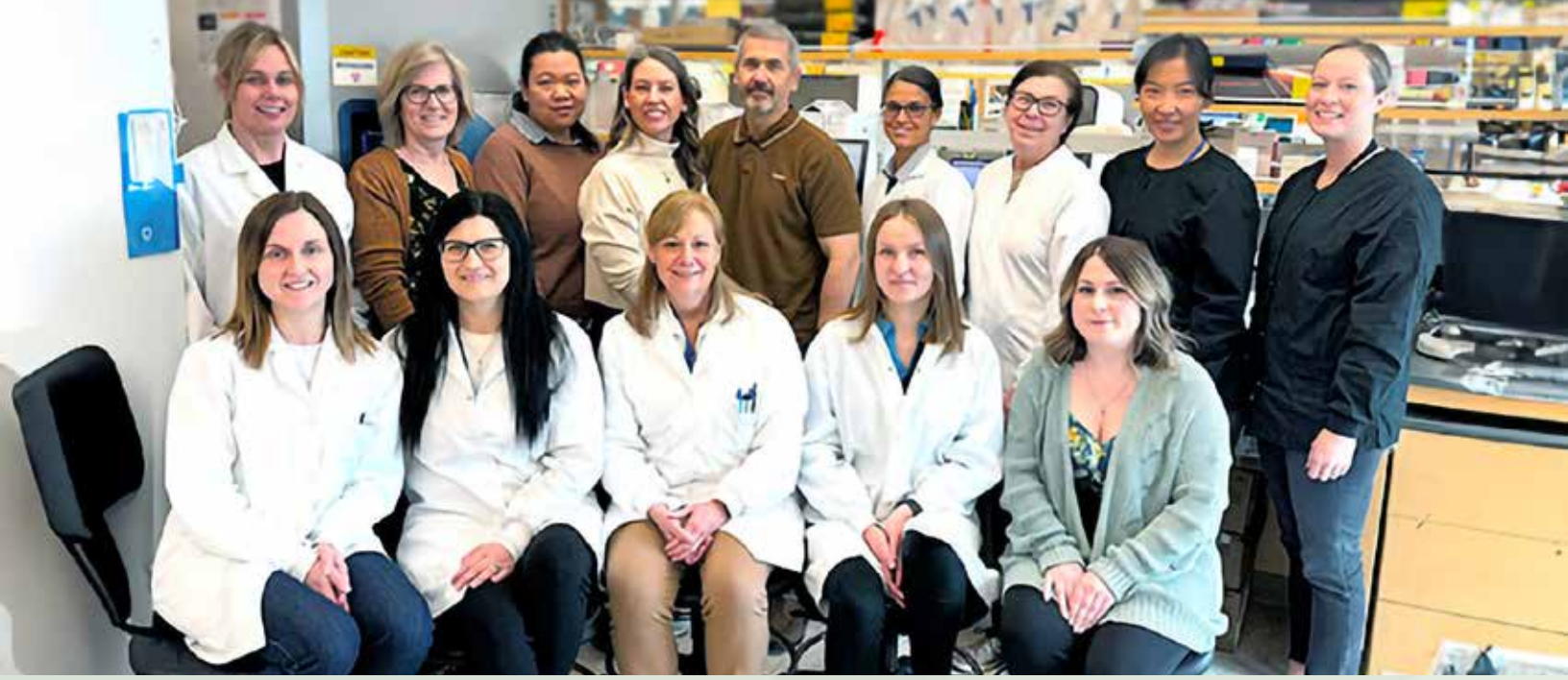
Bennett and Dr. Sean Asselin lead the Grasslands Genomics Project (GG4GHG), funded by Genome Canada. The project aims to explore the biodiversity of grasslands, focusing on how plants, microbes, and insects interact. The goal? To enhance grassland biodiversity, improve carbon storage, and support better pest management.

One of the project's key areas is studying native and pasture grasslands. Native grasslands have cultural significance and incredible biodiversity, while pasture grasslands are crucial for livestock. Using genomics, the team identifies plant species that are more drought-tolerant or better at capturing carbon. They're also studying soil microbes, which are essential for carbon storage, and how different insect populations interact with plants.

"In our first year of the project we have been hard at work in sampling grasslands across the Canadian prairies, collecting more than 2000 plant, soil, and insect samples across more than 30 different grasslands in Saskatchewan and Manitoba this summer," said Bennett. "These samples will be used to identify plant genotypes, their microbiomes, and their associated insect communities using DNA sequencing."

Bennett hopes the project will not only boost biodiversity but also provide long-term solutions for climate change. Grasslands could be key in storing carbon, improving pollination, and managing pests. With the world facing both climate change and a looming biodiversity crisis, grasslands might be a big part of the solution.

"Over the next year, we will continue sampling Canadian grasslands, including moving into Alberta, and will finish processing all the collected samples," said Bennett. "We will establish an experiment to determine whether specific populations of our focal native plants are better at providing these ecosystem services and whether these ecosystem services can be enhanced by increasing the species and genetic diversity of seeded mixtures."



The Ovarian Cancer Genomics Project research team at the University of Saskatchewan.

THE OVARIAN CANCER GENOMICS PROJECT

PROJECT LEADS: Dr. Jon DeCoteau (University of Saskatchewan), Dr. Mary Kinlcoh (Saskatchewan Health Agency)

Ovarian cancer is tough to treat, and researchers in Saskatchewan are looking to genomics to improve diagnosis and outcomes. Every year, thousands of Canadian women are diagnosed with ovarian cancer, and unfortunately, many don't survive. This cancer is difficult to detect early, making treatment less effective.

Dr. Mary Kinloch, a gynecological pathologist, and Dr. John DeCoteau, a molecular pathologist, are leading the Ovarian Cancer Genomics Project. This project aims to use genomics to better identify different types of ovarian cancer, allowing for more targeted and effective treatments.

One of the big challenges is identifying patients with HR-deficient tumors, which are more likely to respond well to a class of drugs called PARP inhibitors. These drugs work by pushing cancer cells toward self-destruction. About 50% of ovarian cancer patients are HR-deficient, but diagnosing them accurately has been tricky.

Right now, most diagnostics focus on the BRCA gene, but there are actually dozens of other genes that could indicate HR deficiency. This means some women could benefit from PARP inhibitors but aren't identified correctly. The Ovarian Cancer Genomics Project aims to fix that by using real-time lab techniques to better diagnose these patients. By gathering detailed genomic data on ovarian cancer patients, the project hopes to refine treatments, helping more women avoid the side-effects of chemotherapy. The team also wants to expand this approach to other cancers, like breast and prostate cancer, making precision medicine more accessible.

Kinlcoch said the project has already begun clinical trials in Saskatchewan and beyond.

"The project is using complete genomic profiling to determine precision treatment options. It is open and enrolling patients in Saskatchewan and looking to enroll patients from outside of Saskatchewan across Canada in the next year, including Edmonton, Toronto, and Halifax."

Kinloch said she's optimistic the project will achieve major milestones in the coming year, including a genetic profiling database that will result in better-quality patient care.

"For the next year we are working on the knowledge transfer of genetic profiling results," said Kinloch. "We will be working with multiple stakeholders on implementing software to capture and transfer genetic profiling results into a relational database. This will be used to improve care delivery to patients through quality assurance and provide a research database for University of Saskatchewan researchers to determine new insights of comprehensive ovarian cancer genomic profiling."

ASSETS

PROJECT LEADS: Dr. Cheryl Waldner (University of Saskatchewan), Dr. Simon Otto (University of Alberta)

Infectious diseases, like Bovine Respiratory Disease (BRD), are significant concerns in the cattle industry, impacting both animal health and economic productivity. Researchers are advancing genomics-based solutions to detect and manage these infections more effectively.

BRD is the leading cause of illness and death among cattle transported to feedlots, and while antibiotics can treat it, overuse has led to rising antimicrobial resistance (AMR), complicating disease control.

To address this, Dr. Cheryl Waldner and her team lead Genome Prairie's ASSETS project (Antimicrobial Stewardship Systems from Evidence-based Treatment Strategies). Launched in 2019, the project focuses on using genomics to identify calves with high levels of BRD-causing microbes in their nasal passages. By applying metagenomics, they aim to detect a wide range of pathogens and resistance genes from a single test, making diagnostics more comprehensive and potentially reducing the need for antibiotics. Unlike traditional tests that look for specific bacteria or viruses, metagenomics offers a broad view, pinpointing the exact pathogens and resistance profiles in a sample.

"It is often not feasible to rely on testing of individual animals using conventional and narrowly targeted testing, a challenge compounded by the time it takes to obtain results," stated ASSETS project manager Lianne McLeod in a written project update. "To help tackle these issues, we have developed genomics-based testing protocols which allow for casting a wide net to detect the presence of potential pathogens."

McLeod further stated that the project team frequently collaborated with stakeholders to develop effective feedlot testing procedures.

"Throughout the ASSETS project we have worked closely with industry partners including feedlot veterinarians to understand the opportunities for and barriers to implementing testing for AMR in the feedlot setting and to ensure the strategies developed will be practical and economically feasible to implement," stated McLeod.

With the ASSETS project winding down, field results will soon be available to help veterinarians make data-driven decisions on BRD management, potentially reducing antibiotic dependency and improving cattle health in the process.

"We have produced several publications related to various foundational aspects of the project, and as our project wraps up in the coming months, we will continue to focus on data analysis and communicating the results of our project through a variety of venues," McLeod indicated.

The Ocean-Sea Ice Mesocosm (OSIM) Facility in Churchill, Manitoba. The OSIM facility will allow for controlled experiments for marine and freshwater environments. Photo courtesy the University of Manitoba.

GENICE II

PROJECT LEADS: Dr. Gary Stern and Dr. Eric Collins (University of Manitoba)

The Canadian Arctic is undergoing significant changes due to global warming, with sea ice melting at unprecedented rates. Previously impassable waterways, such as the Northwest Passage, are now open to shipping, increasing traffic and the associated risk of oil and fuel spills. Researchers from the University of Manitoba are addressing these challenges through the GENICE II project, which combines cutting-edge genome sequencing technologies with collaboration from Indigenous communities to protect the fragile Arctic environment.

The Arctic's transformation is striking. Historically characterized by massive icebergs and treacherous waters, the Northwest Passage was declared ice-free in 2007, and shipping traffic has since surged. Between 2013 and 2019 alone, traffic increased by 44%, with some tankers carrying up to 18,000 tonnes of oil. This rising activity, coupled with warming temperatures and thinning ice, has also made oil exploration more feasible. An estimated 8.4 billion barrels of oil lie beneath Arctic seabeds and tundra, though a moratorium currently prevents drilling.

The GENICE II team, led by Dr. Gary Stern and Dr. Eric Collins, utilizes portable DNA sequencing devices, such as the MinION Oxford Nanopores, to monitor microbes that naturally degrade hydrocarbons. These microbes "bloom" when exposed to oil, helping to break down contaminants in marine environments. By tracking microbial activity in real time, the researchers can assess the efficacy of natural biodegradation and provide an affordable, on-site response to spills.

Collins said the GENICE II team has experienced a busy year collecting and analyzing data.

"We've had a great year. Over 2,000 gigabytes of DNA sequencing from 768 ice and water samples, which is currently undergoing analysis to detect oil-degrading genes and species."

GENICE II represents a forward-thinking approach to addressing the dual challenges of climate change and environmental protection in the Arctic. By combining advanced technology, local engagement, and natural processes, the project offers a sustainable strategy for mitigating the risks posed by increased shipping and potential oil exploration in one of the planet's most vulnerable regions.

"For 2025, we plan to conduct more experiments to help us understand the impact of seasonal changes on the natural attenuation of oil in ice-covered waters," stated Collins. "We are also planning to hold a community co-development workshop in Chesterfield Inlet, Iqaluit, to conduct a nanopore sequencing training workshop."

2023-24
AUDITED FINANCIAL STATEMENT

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Consolidated Financial Statements of

GENOME PRAIRIE

And Independent Auditor's Report thereon

Year ended March 31, 2024

INDEPENDENT AUDITOR'S REPORT

To the Board of Directors of Genome Prairie

Opinion

We have audited the consolidated financial statements of Genome Prairie (the Entity), which comprise:

- the consolidated statement of financial position as at March 31, 2024
- the consolidated statement of operations and changes net assets for the year then ended
- the consolidated statement of cash flows for the year then ended
- and notes to the consolidated financial statements, including a summary of significant accounting policies

(Hereinafter referred to as the "financial statements").

In our opinion, the accompanying financial statements present fairly, in all material respects, the consolidated financial position of the Entity as at March 31, 2024, and its consolidated results of operations and its consolidated cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Basis for Opinion

We conducted our audit in accordance with Canadian generally accepted auditing standards. Our responsibilities under those standards are further described in the "***Auditor's Responsibilities for the Audit of the Financial Statements***" section of our auditor's report.

We are independent of the Entity in accordance with the ethical requirements that are relevant to our audit of the financial statements in Canada and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the Entity's ability to continue as a going concern, disclosing as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Entity or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the Entity's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit.

We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion.

  The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

- Communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group Entity to express an opinion on the financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

KPMG LLP

Saskatoon, Canada

June 27, 2024

GENOME PRAIRIE

Consolidated Statement of Financial Position

March 31, 2024, with comparative information for 2023

	2024	2023
Assets		
Current assets:		
Cash and cash equivalents (note 3)	$ 5,119,254	$ 5,018,137
Accounts receivable	60,596	42,809
GST receivable	8,139	10,755
Project advances	2,764,693	2,630,564
Prepaid expenses	11,058	7,724
	7,963,740	7,709,989
Investments (note 3)	1,000,000	-
	$ 8,963,740	$ 7,709,989
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities	$ 134,804	$ 85,759
Project advances payable	259,930	34,205
Deferred contributions (note 4)	8,303,519	7,324,538
	8,698,253	7,444,502
Net assets	265,487	265,487
	$ 8,963,740	$ 7,709,989

Commitments (note 5)

See accompanying notes to consolidated financial statements.

On behalf of the Board:

Director

Director

GENOME PRAIRIE

Consolidated Statement of Operations and Changes in Net Assets

Year ended March 31, 2024, with comparative information for 2023

	2024	2023
Revenue:		
Project revenues (note 4)	$ 4,606,309	$ 4,749,632
Administrative support revenues (note 4)	964,432	869,317
Interest income	242,771	128,543
	5,813,512	5,747,492
Expenses:		
Project expenditures	4,606,309	4,749,632
General and administrative	1,180,224	940,633
Project development	26,979	57,227
	5,813,512	5,747,492
Excess of revenue over expenses	-	-
Net assets, beginning of year	265,487	265,487
Net assets, end of year	$ 265,487	$ 265,487

See accompanying notes to consolidated financial statements.

GENOME PRAIRIE

Consolidated Statement of Cash Flows

Year ended March 31, 2024, with comparative information for 2023

	2024	2023
Cash flows from (used in):		
Operations:		
Excess of revenues over expenses	$ -	$ -
Change in non-cash operating working capital:		
Accounts receivable	(17,787)	28,288
GST receivable	2,616	34,022
Project advances	(134,129)	(173,224)
Prepaid expenses	(3,334)	3,090
Accounts payable and accrued liabilities	49,045	3,886
Project advances payable	225,725	(119,579)
Deferred contributions	978,981	1,229,227
	1,101,117	1,005,710
Investing:		
Purchases of investments	(1,000,000)	-
Increase in cash and cash equivalents	101,117	
Cash and cash equivalents, beginning of year	5,018,137	4,012,427
Cash and cash equivalents, end of year	$ 5,119,254	$ 5,018,137
Cash and cash equivalents consist of:		
Cash	$ 3,386,359	$ 3,351,684
Investment certificate	1,732,895	1,666,453
	$ 5,119,254	$ 5,018,137

See accompanying notes to consolidated financial statements.

1. Nature of business:

Genome Prairie (the "Corporation") was incorporated in 2000 under the *Canada Corporations Act* and transitioned in 2013 to the *Canada Not-for-profit Corporations Act* as a not-for-profit organization. The Corporation funds organizations and institutions that conduct genomic research and development for the economic benefit of the Prairie Region (Saskatchewan and Manitoba) and Canada. The majority of Genome Prairie's operational funding is received from Genome Canada.

2. Significant accounting policies:

(a) Basis of presentation:

The consolidated financial statements include the accounts of the Corporation and its subsidiary, Interra Biosciences Inc.

These financial statements have been prepared in accordance with Canadian accounting standards for not-for-profit organizations ("ASNPO").

(b) Use of estimates:

The preparation of financial statements in accordance with ASNPO requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenue and expenses during the year. Significant items subject to such estimates and assumptions include deferred contributions. Actual results could differ from these estimates.

(c) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured.

During the year ended March 31, 2024 and March 31, 2023 the Corporation received contributions related to the purchase of equipment. There is uncertainty related to the future ownership of this equipment. Therefore, the Corporation has expensed this as project costs and recognized the corresponding contribution as project revenue.

(d) Cash and cash equivalents:

Cash and cash equivalents include cash on hand and short-term deposits which are highly liquid with original maturities of less than three months or are readily convertible to known amounts of cash and are subject to insignificant risk of changes in value.

2. Significant accounting policies (continued):

(e) Financial instruments:

Financial instruments are comprised of financial assets (including cash and cash equivalents, accounts receivable, GST receivable, project advances, prepaid expenses and investments) and financial liabilities (including accounts payable and accrued liabilities and project advances payable). Financial instruments are initially recognized at fair value and subsequent measurement is at amortized cost with investment income recorded on an effective interest basis.

(f) Income taxes:

The Corporation qualifies as a tax-exempt organization under Section 149 of the Income Tax Act.

(g) Government assistance:

Government assistance related to current revenue and expenses is included in the determination of excess revenue over expenses for the period.

3. Investments

Included within cash and cash equivalents are redeemable term deposits which earn interest at a rate of 4.00% (2023 – 3.50%) with maturity dates of March 10, 2027 and March 17, 2027. The term deposit may be redeemed by the Corporation at any date prior to the maturity date without penalty. Long-term fixed term deposit which earns interest at 4.70% was made during the year with a maturity date of April 11, 2025.

4. Deferred contributions:

The Corporation receives funding from Genome Canada, Provincial Ministries, and other sources to be held, administered and distributed in accordance with the related funding agreements between Genome Prairie and the other parties. Deferred contributions relate to expenses of future periods and represent the unspent externally restricted funding and related investment income, which are for the purposes of providing funding to eligible recipients and the payment of operating and capital expenditures in future periods. The Corporation's Board of Director's has approved a motion to restrict $234,513 of the deferred contributions related to administration for use only in a contingency, this combined with net assets would provide $500,000 for reserve if the Corporation was required to wind up. The changes in the deferred contribution balances for the period are as follows:

	2024	2023
Opening deferred contributions for expenses of future periods	$ 7,324,538	$ 6,095,311
Contributions during the year:		
Genome Canada	6,549,722	5,970,450
Province of Saskatchewan – Projects	-	413,506
Genome Alberta	-	265,203
Miscellaneous	-	15,675
Manitoba Agriculture, Food and Rural Initiatives	-	183,343
University of Saskatchewan – Project development	-	-
Total contributions received	$ 6,549,722	$ 6,848,177
Total contributions available	$ 13,874,260	$ 12,943,488
Less amounts recognized as project revenues	(4,606,309)	(4,749,633)
Less amounts recognized as administrative support revenues	(964,432)	(869,317)
Closing deferred contributions for expenses of future periods	$ 8,303,519	$ 7,324,538

Deferred contributions are comprised of the following balances:

	2024	2023
Projects	$ 7,529,936	$ 6,644,295
Administration	773,583	680,243
Closing deferred contributions for expenses of future periods	$ 8,303,519	$ 7,324,538

5. Commitments:

Funding commitments:

The Corporation signed a new funding agreement with Genome Canada on January 30, 2023, which applies to all funding awarded and provided to the Corporation from Federal Government Budget 2021 for the period 2022-2027.

Base funding

The Corporation received a Notice of Award from Genome Canada on March 29, 2022, approving administrative support funding up to a maximum of $880,000 for fiscal years 2022-23 and 2023-24. As a condition of funding under this Notice of Award, the Corporation is expected to secure co-funding from other sources in an amount at least equal to the contribution of Genome Canada or provide Genome Canada with a documented plan to meet this requirement within a reasonable time period. As specified in the funding agreement, Genome Canada may provide funding to the Corporation notwithstanding the fact that formal commitments from other parties have not yet been secured. In such cases, funds provided in advance "in good faith" shall not be reimbursable in the event such commitments from other parties are not secured, but Genome Canada may then terminate the present agreement or suspend or reduce funding. The Corporation is in the process of renewing the agreement, the draft agreement includes a reduction of the administrative support from Genome Canada from $880,000 to $616,000, impact is not fully known as a final agreement has not been signed at the time of issuing these financial statements.

Project funding

Genome Canada has approved funding remaining of $10,023,520 (2023 - $5,018,804) to be provided to the Corporation for ongoing and future research projects. In accordance with the funding agreements, the Corporation will secure additional financial contributions or in-kind commitments at amounts specified in the Notice of Awards issued by Genome Canada. As of March 31, 2024, the Corporation had $22,554,874 (2023 – $15,934,318) in co-funding related to these projects still to be applied.

Lease commitments:

The Corporation has entered into a sub-lease agreement for its Saskatoon office space expiring on December 31, 2025. The approximate annual rental is $50,000. The Corporation has also entered into a rolling sub-lease agreement with the University of Manitoba for its Winnipeg office space with an approximate annual rental of $15,000.

6. Financial risk management:

The fair value of the Corporation's cash and cash equivalents, accounts receivable, and accounts payable and accrued liabilities approximate their carrying amounts due to the short-term to maturity of these financial instruments. The Corporation has exposure to the following risks from its use of financial instruments:

Interest rate risk

The Corporation is exposed to interest rate risk arising from fluctuations in interest rates on amounts invested in interest bearing accounts and investment certificates. Cash, when received, is deposited into an interest-bearing account which earns interest at a rate of 4.01% (2023 – 0.40%). During the year there has been a increase in prime rate as the Bank of Canada has increased rates from 4.50% to 5.00% in the year, which will impact the Corporations interest revenue, given the short term duration for investments, the interest rate change will have minimal impact to the Corporations interest income.

Credit risk

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. The Corporations' main credit risks relate to its accounts receivable. The Corporation in the normal course of its operations has accounts receivable, given the majority of receivables are from government organizations, the corporation is not exposed to significant credit risks. There is no change in risk exposure from 2023.

Liquidity risk

Liquidity risk is the risk that the Corporation will not be able to meet its financial obligations as they become due. Liquidity risk also includes the risk of not being able to liquidate assets in a timely manner at a reasonable price. The corporation's approach to managing liquidity is to ensure, as far as possible, that it will always have sufficient cash flows to fund its operations and to meet its liabilities when due, under both normal and stressed conditions. The Corporation has restricted deferred contributions of $234,513 of deferred contributions related to administrative for use in case the Corporation was required to wind up operations. This combined with net assets of $265,487 would provide the Corporation with $500,000 reserve to complete administrative functions to perform an orderly wind up. There is no change in risk exposure from 2023.

Other risks

The Corporation has no significant exposure to currency risk or other price risk. There is no change in risk exposure from 2023.

MAJOR FUNDING AGENCIES

Genome Canada

MAJOR PROJECT FUNDERS

Agriculture and Agri-Food Canada

Public Health Agency of Canada / Agence de la santé publique du Canada

University of Saskatchewan

University of Manitoba

Shared health / Soins communs Manitoba

Manitoba Agriculture

Government of Saskatchewan Ministry of Agriculture

RDAR Results Driven Agriculture Research

Saskatchewan Pulse Growers

SaskWheat Development Commission

Manitoba Crop Alliance

WGRF Advancing Agriculture through Research

GIFS

Canada

CAPP Canadian Association of Petroleum Producers

Saskatchewan Health Authority


Genome
Prairie