

Celebrating our 10th Anniversary

A Decade of Innovation and
Partnerships in Genomics Research



Building Strong Bonds



Annual Report 2009 – 2010



GenomePrairie

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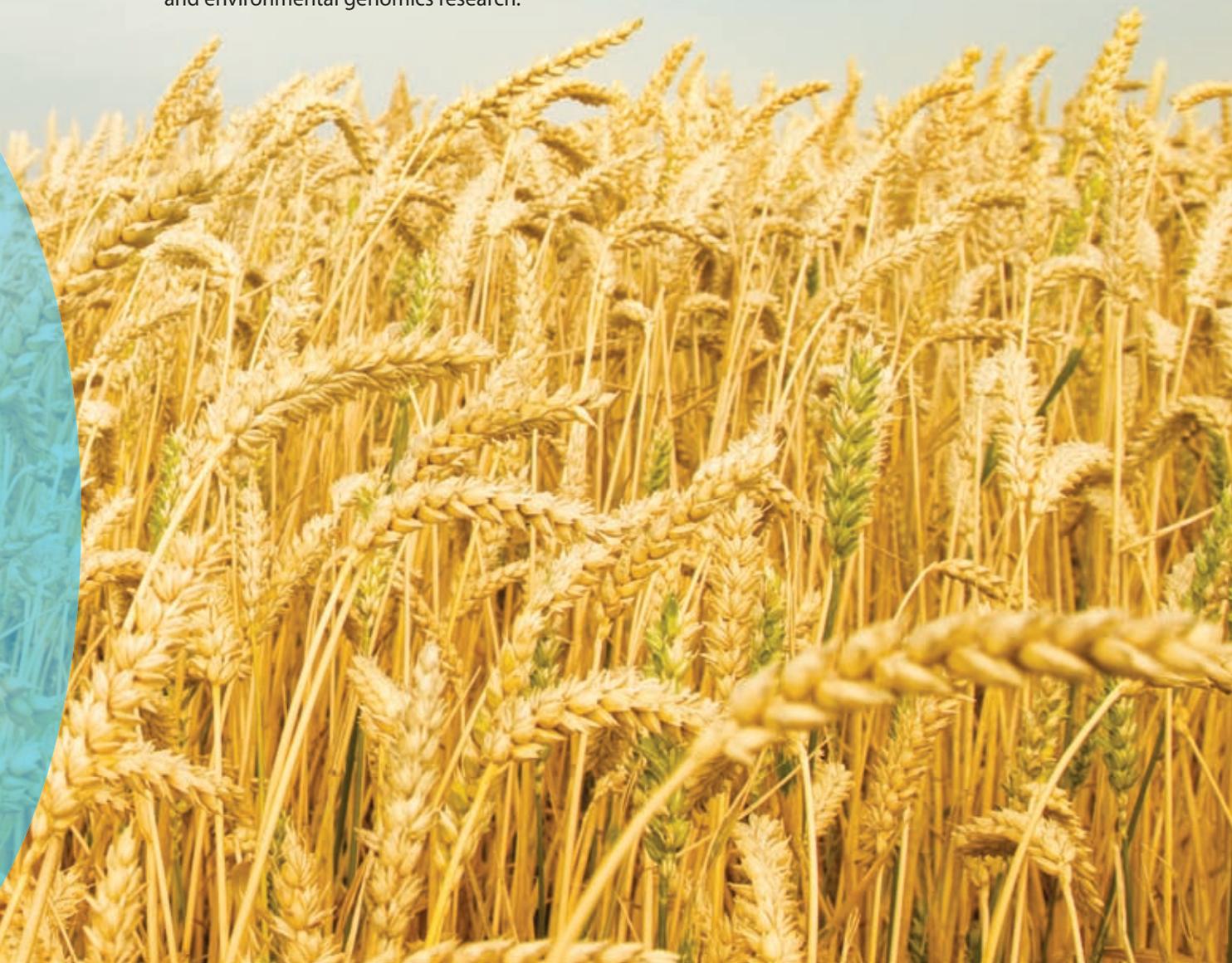


A Decade of Discovery

Since the inception of Canada's national genomics research centres in 2000, Genome Prairie has provided visionary leadership, research excellence and expert guidance, attracting and managing over \$188 million for multi-stakeholder projects. Genome Prairie's ability to build strong partnerships and facilitate collaborations nationally and internationally has engaged some of the world's leading genomics scientists. With its partners, Genome Prairie has become an international leader in agricultural, health and environmental genomics research.

Our Vision

Genome Prairie will transform the future of the bioscience sector by fostering world-class research and commercialization in Manitoba and Saskatchewan.





Capitalizing on Synergies

Genome Prairie has undertaken a variety of activities to reinforce research collaborations in Manitoba and Saskatchewan and to develop a long-term strategic vision for genomics-related biosciences on the Prairies. Through the development of the four Western Canadian Genomics Networks we have strengthened partnerships with governments and industry to help translate genomics research from innovation to commercialization. We continue to identify areas of regional priorities and project linkages, especially in the areas of health and agriculture.

Genome Prairie's success is a result of the commitment and expertise of our scientists, the leadership of our board of directors, and our outstanding managerial and support team. We gratefully acknowledge the provincial and federal governments and their agencies for helping to establish Genome Prairie as a leader in genomics research in Canada and the world.

Dr. Arnold Naimark
Chair

Building on a Strong Foundation

Over the past ten years, Genome Prairie—along with Genome Canada and our sister genome centres—has established a strong foundation in generating new knowledge in the broad fields of genomics and related biosciences. Since 2000, Genome Prairie has managed eleven large multidisciplinary, multi-stakeholder projects in agriculture, health, societal impact and environmental research. Key to Genome Prairie's strength and success as we move forward is the emphasis on promoting research collaborations, fostering agency and industry partnerships, and engaging stakeholders in our regional communities.

Going forward we will continue to build on our strength as coordinators and facilitators of genomics and related biosciences with the goal of translating discoveries into socio-economic benefits for the people of Manitoba and Saskatchewan.

Dr. Wilf Keller
President and CEO

In partnership with Western Economic Diversification Canada (WD), Genome Prairie has established four regional innovation networks in areas of strategic interest. Genome Prairie's networks are catalysts for a vibrant, genomics-driven life sciences cluster with far-reaching social and economic benefits to Saskatchewan, Manitoba and all of Canada.

Supported by:



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Diversification de l'économie
de l'Ouest Canada

Canada



Innovation to Commercialization

Western Canadian Genomics Network Highlights

Western Canadian Vaccine Network (WCVNet)

Western Canada has several major vaccine enterprises, including involvement in three of the four Grand Challenges projects funded by the Bill & Melinda Gates Foundation. Over the past two decades, a number of research networks have been established to promote vaccine development, vaccine usage and the implementation of immunization programs. WCVNet links existing vaccine networks to facilitate discovery, communication and commercialization of vaccine research. The National Microbiology Laboratory in Winnipeg and VIDO-InterVac (Vaccine and Infectious Disease Organization International Vaccine Centre) in Saskatoon house extensive laboratories and animal facilities—from level 2 to 4 containment—to enable world-class research and ensure biosafety. The WCVNet facilitates communication and coordinates activities so that greater synergies can be achieved among networks doing basic research and those working in vaccine formulation and delivery.



Canadian flaxseed in order to ensure compliance with EU market access rules. As the industry moves forward, the CFGI will continue to strengthen the competitiveness of Canadian flax through innovation and commercialization.

Canadian Brassica Genomics Network (CBGN)

Researchers in Western Canada are world leaders in *Brassica* (canola) genomics, a crop industry that generates \$13 billion to the Canadian economy annually and employs 214,000 people. The CBGN is working to preserve and strengthen Canada's position in canola research and commercialization. Network members are involved in various projects with goals that include: sequencing the entire canola genome in order to understand the mechanisms in crop traits such as yield and oil content, and improving by-products to produce high-value livestock feeds. In addition, members are working to develop new markets for canola oil and by-products.



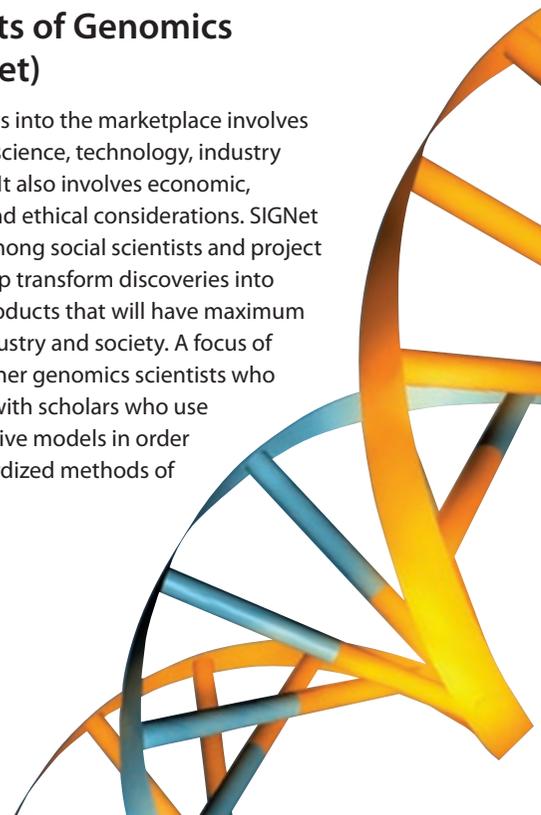
Canadian Flax Genomics Initiative (CFG)

Canada is the world's largest producer and exporter of flax, with annual exports valued at \$150–\$180 million. In Saskatchewan, flax is part of the crop rotation in one out of four farms. The CFGI, a Western Canadian genomics network, brings together research centres, government agencies and all stakeholders involved with flax research, production, market development and export to identify common areas of opportunity and challenge. In 2009, the CFGI supported the flax industry's efforts to remediate the discovery of genetically modified seed found in Canadian flax exports. *A Sampling and Testing Protocol for Canadian Flaxseed Exported to the European Union* was developed to provide a system of sampling, testing and documenting CDC Triffid seed in shipments of



Societal Impacts of Genomics Network (SIGNet)

Bringing new discoveries into the marketplace involves an array of expertise in science, technology, industry and the social sciences. It also involves economic, environmental, social and ethical considerations. SIGNet facilitates interaction among social scientists and project scientists in order to help transform discoveries into viable programs and products that will have maximum value for producers, industry and society. A focus of SIGNet is to bring together genomics scientists who use deductive analysis with scholars who use inductive and comparative models in order to develop new, standardized methods of project evaluation.



Agriculture Research Success



Utilizing Flax to the Max

One of the first domesticated crops, flax is also one of the most versatile. Since ancient times it has been harvested for food, fibre and medicine. Today, flaxseeds and oil are recognized as valuable health supplements. Flaxseed oil is rich in Omega-3 fatty acids, which have been shown to reduce “bad” cholesterol and the risk of heart disease. Flax is also rich in plant estrogens associated with reduced risks of breast, prostate and colon cancer. Flax fibre is used in a myriad of industrial products, such as durable linoleum flooring, solvents and paints. The strong durable fibre has been used for millennia in making linen; however, its additional potential uses are still under development.

As the world’s largest flax producer, Canada is also a world leader in flax research and development. Total Utilization of Flax Genomics (TUFGEN) is one of three new large-scale Genome Prairie projects to receive major funding from Genome Canada’s 2008–2009 Competition in Applied Genomics Research in Bioproducts and Crops. The TUFGEN aim is to enhance the benefits and versatility of this multi-purpose crop by developing genomic methods to study and improve flax growth, performance and usefulness. Enhancing the utilization of flax will greatly increase the potential economic impact of this important crop.

Key Outcome

In the project’s first year, TUFGEN researchers have made great strides in sequencing the complete flax genome—the single largest contribution to the sequencing of a genome by any Canadian group.



Developing Frost-Hardy Crops

One of the longest-running Genome Prairie research initiatives has been to improve the frost tolerance of cereal crops. Enhanced cold tolerance could save millions of dollars in crop losses for prairie farmers, lessening reliance on agriculture insurance programs. Planting cold-tolerant winter wheat varieties has significant societal benefits, as these crops can be planted earlier, resulting in better weed control, reduced herbicide costs and increased production through crop rotation. Winter wheat fields also provide a safe nesting place for birds and waterfowl.

Key Outcomes – Functional Genomics of Abiotic Stress

- Published 34 peer-reviewed papers and nine books.
- Invited to give 87 presentations.
- Obtained two provisional patents.

Key Outcomes – Crop Adaptation Genomics

- Identified 72 genetic markers corresponding to eleven different quantitative trait loci (QTL) of the genomes of different wheat and barley species.
- Completed a genetic map of rye and identified major cold-tolerance markers that coincide with two genes that activate other genes to protect the plant from cold.
- Collaborated with a German research team to test a number of hybrid rye varieties that showed 20 to 50 percent higher production than current non-hybrid varieties.
- Crossed strong cold-tolerant QTL from Norstar winter wheat into current-production spring wheat varieties, which exhibited improved cold tolerance in preliminary results.
- Collaborated with Ducks Unlimited and Bayer CropScience’s winter wheat survival model to access additional weather data from the Canadian Wheat Board WeatherBug® Network.

Health Research Success



Fostering International Collaboration

The North American Conditional Mouse Mutagenesis (NorCOMM) project, managed by Genome Prairie, brings together research groups from across Canada, the US and Europe to develop mouse models for genomics health research and drug discovery.

By inactivating specific genes in mice, researchers can study these model organisms to understand the role of genetic changes in human diseases. NorCOMM is part of the International Knockout Mouse Consortium (IKMC), a worldwide effort to generate knockout mutations in every gene in the mouse genome.

NorCOMM has become a world leader in developing knockout mouse embryonic stem (ES) cell lines for biomedical research. The genetically altered cell lines allow researchers to study the role of genetic changes in the development of specific human diseases. This in turn accelerates drug discovery.



Harnessing the Body's Innate Immunity

Project researchers sponsored by Genome Prairie and Genome British Columbia are working to harness the body's first line of defence against disease-causing microbes to develop novel therapeutics for drug-resistant pathogens. They have been studying the role of genes in the innate response—early events that occur immediately after infection by a viral or bacterial pathogen.

In the **Functional Pathogenomics of Mucosal Immunity (FPMI)** program, the first project in this research led by Genome Prairie, researchers used DNA microarrays and computational analysis to study which host genes are turned on or off when cells are infected by bacteria or viruses. They also studied the effect of compounds called host-defense peptides as well as vaccines on host immunity and the ability to protect against infection. Unlike antibiotics, host-defense peptides act on the host (human or animal) cell rather than the microbe, thereby avoiding the problem of antibiotic resistance. The use of both human and animal cells, as well as live animal models including mice and cattle, was a major asset to the study.

Key Outcomes

- Brought together the international research community to share discoveries, pool resources and facilitate genomics health research worldwide.
- Undertook baseline phenotyping of several knockout mouse strains and will make these data publicly available to underpin hypothesis-driven research in functional genomics.
- Established a library of mouse embryonic stem cells that enables researchers from across Canada and around the world to develop new mouse models of human disease to further both pre-clinical and therapeutic research goals.
- Distributed more than 175 mutant ES cell lines to both academic and biopharmaceutical researchers worldwide.

Key Outcomes

- Gathered new knowledge about genes involved in the immune response to infections in both human and bovine species.
- Developed new computational methods of analysis that are freely available to the research community.
- Published 38 peer-reviewed papers.
- Obtained four patents for antimicrobial peptides and compounds that modulate and boost immune response, which formed the basis of two Grand Challenges in Global Health grants. These compounds show outstanding potential as anti-infective treatment for malaria and diarrhea and as adjuvants for single-shot vaccines to protect against whooping cough. They are currently in pre-clinical development and are being evaluated by three companies for licensing.

Genome Prairie Partners 2000 to 2010

Success in genomics research requires building strong bonds with regional, national and international partners. Through collaboration and strategic partnerships, Genome Prairie is working to maximize benefits of genomics research for the Prairie provinces, Canada and the world.

Genome Prairie acknowledges and thanks its partners:

Advancing Canadian Agriculture and Agri-Food Saskatchewan	Delft University of Technology, Kluver Center for Genomics of Industrial Fermentation
Ag-West Bio Inc.	Department of Biotechnology (DBT), India
Agriculture and Agri-Food Canada	Ducks Unlimited
Agricultural Bioproducts Innovation Program	Dycor Technologies Ltd.
Agricultural Biotechnology International Conference Foundation	Enterprise Saskatchewan
Alberta Agricultural Research Institute	European Conditional Mouse Mutagenesis Program
Alberta Cancer Board	European Union
Alberta Heritage Foundation for Medical Research	Flax Canada 2015
Alberta Ingenuity Centre for Machine Learning	Flax Council of Canada
Alberta Livestock Industry Development Fund	Genome Alberta
Alberta Network for Proteomics Innovation	Genome Atlantic
Alberta Science and Research Authority	Genome British Columbia
Allen Institute of Brain Science	Genome Canada
Bill & Melinda Gates Foundation	Genome Quebec
BioTalent Canada	GNS Science
Bio Tools Incorporated	Government of Alberta
British Columbia Cancer Agency	Government of Canada
Canadian Bioinformatics Resource	Government of Manitoba
Canadian Cystic Fibrosis Foundation	Government of Quebec
Canadian Foundation for Innovation	Government of Saskatchewan
Canadian Institutes of Health Research	Indian Agricultural Research Institute
CancerCare Manitoba	Inimex Pharmaceuticals Incorporated
Canola Council of Canada	Institut fur Entwicklungsgenetik, GSF
Capital Health	Interactive Research School for Health Affairs, India
Chenomx Inc.	International Institute for Sustainable Development
Cold Spring Harbour Laboratory	Irish Department of Agriculture and Food
College of Agriculture, Nagpur India	Life Sciences Association of Manitoba
Core Cryolab Inc.	Manitoba Flax Growers Association
Crop Development Centre, Saskatoon	Manitoba Institute of Cell Biology
Dalhousie University	Manitoba Rural Infrastructure Fund
Danaher Corporation	

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 National Institutes of Health
 National Renewable Energy Laboratory - US
 National Research Council of Canada
 National University of Singapore
 Natural Sciences Engineering and Research
 Council of Canada
 Ontario Cattlemen's Association
 Ontario Genomics Institute
 Oregon State University
 Poultry Industry Council of Canada
 Research Institute of Crop Production,
 Czech Republic
 Richardson Centre for Functional Foods
 and Nutraceuticals - Winnipeg
 RIKEN Genomics Sciences Centre
 Roslin Institute
 Ryerson University
 Samuel Lunenfeld Research Institute
 Sanofi Pasteur Limited
 Saskatchewan Flax Development Commission
 Saskatchewan Health Research Foundation
 Saskatchewan Trade and Export Partnership
 Science Foundation Ireland
 SCION Research
 Simon Fraser University
 SRC Holdings Ltd.
 St. Boniface General Hospital
 Sun Microsystems of Canada Inc.
 Swedish University of Agricultural Sciences
 The Hospital for Sick Children (SickKids),
 Toronto
 The Royal Institute for the Advancement of
 Learning/McGill University
 The Wellcome Trust Sanger Institute

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 for Research in Intellectual Property and
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 Yvelines
 University of Waterloo
 University of Western Ontario
 Vaccine and Infectious Disease Organization
 Virginia Commonwealth University
 Western Ag Innovations
 Western Economic Diversification Canada
 Western Grains Research Foundation



Public Outreach



Genomics research touches all aspects of daily life, from health and the food that sustains us, to the energy that fuels our vehicles, to the products and services that drive our economy. Through public outreach programs, Genome Prairie fosters understanding of how genomics researchers are working to improve health and livelihoods and to create a more sustainable economy.

Development of new technologies requires ongoing public debate to educate citizens about the legal, ethical and public policy issues. Through annual and ongoing initiatives, Genome Prairie provides opportunities for public education and engagement in the issues, challenges and benefits of genomics research. In addition, Genome Prairie's educational initiatives strive to promote and encourage young scientists.

Genome Prairie Events

Maureen McTeer Public Lecture

Genome Prairie hosted a free public lecture, "The Impact of Genomics on Our Health, Wealth and Agriculture," presented by Maureen McTeer, a leading expert in the societal and ethical impacts of genomics research.

Sanofi-Aventis BioTalent Challenge

Genome Prairie is the regional coordinating agency for the Sanofi-Aventis BioTalent Challenge (SABC), Saskatoon Region, which encourages young Canadians to pursue studies and careers in the field of biotechnology. For a second year in a row, SABC's national 2010 winner was from Saskatoon. Rui Song, partnered with Dr. Sabine Banniza from the College of Agriculture and Bioresources at the University of Saskatchewan, won the top award in Ottawa for her project "Racing to find a marker: Development of Molecular Markers for *Colletotrichum Truncatum*." The 2009 national winner was Scott Adams from Saskatoon.

Arnold Greenberg Lecture in Cancer Research

Genome Prairie sponsored the Arnold Greenberg Lecture in cancer research at the University of Manitoba, commemorating one of Canada's most distinguished medical researchers in immunology and cell biology. The free public lecture titled "Generating Functional Tissues from Human Pluripotent Stem Cells" was presented by Dr. Gordon Keller, Canada Research Chair in Stem Cell Biology at the University of Toronto, and a renowned researcher for the University Health Network in Toronto, one of the largest cancer research centres in North America.

Scientific Conferences

Through conference sponsorships and presentation involvement across Manitoba and Saskatchewan, Genome Prairie has raised awareness of genomics

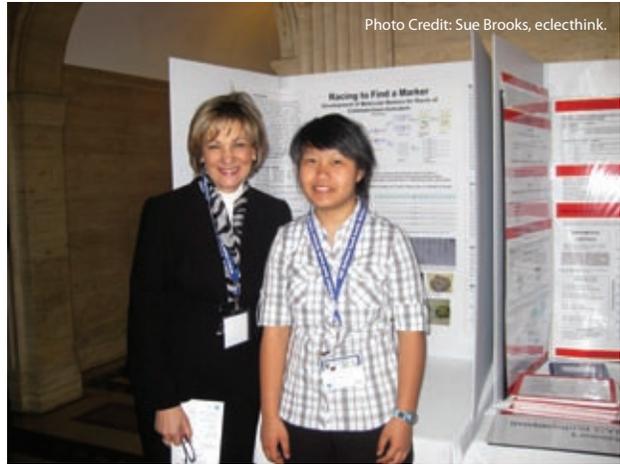


Photo Credit: Sue Brooks, eclecticthink.

Honourable Lynne Yelich, Member of Parliament, Blackstrap and Minister of State (Western Economic Diversification) and Rui Song, SABC Saskatoon and SABC National Winner 2010.



Honourable Tony Clement, Industry minister, listens to a question from the audience at the Greater Saskatoon Chamber of Commerce Luncheon, January 2010, as MC Carol Reynolds looks on.

research and outcomes. Conferences include the National Agricultural Biotechnology Conference, the Canadian Plant Genomics Workshop and the International Plant and Animal Genomics Conference.

Public Education

Genome Prairie maintains ongoing public outreach and education through the sponsorship of National Biotechnology Week events in Manitoba and Saskatchewan, the Sanofi-Aventis BioTalent Challenge (Winnipeg), the Canadian Public Health Association Annual Conference (Winnipeg), and the National Bioscience Educators Conference (Winnipeg).

In addition, Genome Prairie participates in outreach events hosted by partner companies and community organizations including Ag-West Bio Inc., Greater Saskatoon Chamber of Commerce, Winnipeg Chamber of Commerce, Saskatchewan Chamber of Commerce, and the Life Sciences Association of Manitoba.



2009

A Decade of Innovation and Discovery in Genome Prairie Research

Total Utilization Flax Genomics (TUFGEN)

Project Leaders: Gordon Rowland, University of Saskatchewan

Sylvie Cloutier, Agriculture and Agri-Food Canada

Project Manager: Chris Barker, Genome Prairie, Saskatoon

Project Value: \$11.8 M

Genome Canada Contribution: \$5.6 M

Other Funding Partners: \$6.2 M

Competition: Applied Genomics Research in Bioproducts or Crops 2009

TUFGEN aims at enhancing the usefulness and versatility of flax by developing strong genomics research as a base for enabling flax breeding and improvement. The project goal is to help develop flax as a multi-purpose crop providing both seeds and straw products of unmatched quality and high value.

TUFGEN researchers will determine the DNA sequence of the entire flax genome and develop genetic and physical maps outlining the position and relationship of genes that are important for improved flax usefulness. The information and genomic tools created through TUFGEN will accelerate flax research and create opportunities for advancements on flax yield and applications that were unheard of only a short while ago.

Funding Partners: Genome Canada, Genome Alberta, Government of Saskatchewan, Government of Manitoba, Manitoba Flax Growers Association, Flax Council of Canada, and the Saskatchewan Flax Development Commission.

Microbial Genomics for Biofuels and Co-Products from Biorefining Processes (MGCB²)

Project Leaders: David Levin, University of Manitoba

Richard Sparling, University of Manitoba

Project Manager: Jody Dexter, Genome Prairie, Winnipeg

Project Value: \$10.5 M

Genome Canada Contribution : \$4.8 M

Other Funding Partners: \$5.7 M

Competition: Applied Genomics Research in Bioproducts or Crops 2009

Biofuels are a promising alternative energy source in which fuels such as ethanol are produced from a wide variety of agricultural feedstocks. However, long-term prospects of grain-based ethanol production are in question because of the high cost of feedstocks. In addition, the use of food grains has negative implications for food prices. A better use of biofuels technology is needed to produce higher environmental and social benefits.

MGCB² research involves studying the bacteria that accomplish the conversion of ligno-cellulosics to ethanol, hydrogen and plastics. This requires detailed understanding of both the genes (and their function) and the metabolism of bacteria that use cellulose to make fuels and other products. The goal of MGCB² is to enable bio-refineries to generate products (ethanol, hydrogen and co-products) from relatively low-cost feedstocks of ligno-cellulosics, thereby increasing their economic viability. This research will help establish Canada as a leader in the production of biofuels and bioplastics.

Funding Partners: Genome Canada, Government of Manitoba, and the Canadian Foundation for Innovation.

2008

2006

Value Addition Through Genomics and GE³LS (VALGEN)

Project Leaders: Peter Phillips, Johnson-Shoyama Graduate School of Public Policy, University of Saskatchewan

David Castle, University of Ottawa

Project Manager: Kari Doerksen, Genome Prairie, Saskatoon

Project Value: \$5.4 M

Genome Canada Contribution: \$2.6 M

Other Funding Partners: \$2.8 M

Competition: Applied Genomics Research in Bioproducts or Crops 2009

The goal of VALGEN is to positively influence the governance around public policy that regulates how innovative products move from the laboratory to the marketplace. This diverse national research team uses and enhances the latest social research tools to study how Canada can increase the benefit from translating genomics discoveries in agriculture.

VALGEN focuses on three important factors for removing roadblocks to innovation in Canada's bio-based economy. First, it examines the role of intellectual property such as patents, copyright and trade secrets in moving laboratory discoveries toward practical application. Second, the project recommends policy changes for regulating important new agricultural technologies and products. Third, researchers adapt and test a wide range of engagement tools to determine the interests and attitudes of the Canadian public concerning new technologies.

Over 100 students, as well as 60 industrial and government partners, are contributing to the research and development of the VALGEN project. VALGEN researchers have already engaged scholars from across Canada, the US and Europe.

Funding Partners: Genome Canada, the Government of Saskatchewan, Western Economic Diversification Canada, University of Saskatchewan, Genome Alberta, Genome British Columbia, Genome Quebec, and the Canola Council of Canada.

Enabling Technologies for Embryonic Stem Cell Functional Genomics

Project Leader: Geoff Hicks, University of Manitoba

Project Manager: Reno Pontarollo, Genome Prairie, Saskatoon

Project Value: \$720,000

Genome Canada Contribution: \$330,000

Other Funding Partners: \$390,000

Competition: Technology Development 2008

Embryonic stem (ES) cells have played an indispensable role in helping researchers understand the function of human disease genes and in creating mouse models of human disease. ES research has the potential to transform knowledge of human disease into the development of new classes of therapeutic agents—from novel drugs to cell-based therapies. This research project identifies key barriers in the current state of ES cell technology and proposes novel technologies to overcome these barriers. The technologies are expected to significantly impact biomedical research programs and biotech companies in Canada and thereby increase the rate at which new medical discoveries are moved into health care delivery.

Funding Partners: Genome Canada, Government of Manitoba, Government of Alberta, and the Allen Institute of Brain Science.

North American Conditional Mouse Mutagenesis (NorCOMM)

Project Leaders: Geoff Hicks, University of Manitoba

Janet Rossant, University of Toronto

Project Manager: Lauryl Nutter, The Hospital for Sick Children, Toronto

Project Value: \$20.4 M

Genome Canada Contribution: \$8.4 M

Other Funding Partners: \$12 M

Competition III 2006

Knockout mice are model organisms in which specific genes have been inactivated. These model organisms make it possible to understand the role of genetic changes in the development and treatment of human diseases. NorCOMM is establishing cell lines in which mouse genes of interest are knocked out and made available to the scientific and biotech communities. Researchers can then address the exact role of genetic changes in the development of specific human diseases, which is expected to accelerate the rate at which new medical discoveries are moved from bench to bedside.

NorCOMM researchers are developing cell-based and computer-based applications linked to target genes associated with disease and establishing a distribution centre so that Canadian biomedical research projects, whether public or private, can readily benefit from this knowledge. NorCOMM is working closely with global partner projects to create a publicly accessible source of ES cell lines.

Funding Partners: Genome Canada, Government of Manitoba, Government of Alberta, and Core CryoLab.

2003

Crop Adaptation Genomics (CAG): Use of Genomic Tools for Crop Improvement in Temperate Climates)**Project Leader:** Brian Fowler, Crop Development Centre, University of Saskatchewan**Project Manager:** Chris Barker, Genome Prairie, Saskatoon**Project Value:** \$8.1 M**Genome Canada Contribution:** \$4.1 M**Other Funding Partners:** \$4 M**Competition III 2006**

Canada's harsh winters and cool summers can lead to devastating crop losses. Key to maintaining and improving Canada's competitive position as a grain and cereal producer is using genomic approaches to identify factors involved in the climatic adaptation of particular crops.

CAG research is focused on three economically important crops—wheat, barley and rye. The immediate goal of the project is to learn about traits from the low-temperature adaptation of hardy species like rye and apply them to important crops like wheat and barley. Drawing on extensive genetic data and multiple research tools, the team is working to understand the low-temperature responses of these crops. CAG will provide technology transfer opportunities for crops with cold resistance and more efficient moisture utilization.

Funding Partners: Genome Canada, Genome Alberta, Government of Saskatchewan, Ducks Unlimited, and the Western Grains Research Foundation.

Enhancing Canola Through Genomics**Project Leader:** Wilf Keller, National Research Council, Plant Biotechnology Institute**Project Manager:** Faouzi Bekkaoui, Genome Prairie, Saskatoon**Project Value:** \$9.5 M**Genome Canada Contribution:** \$3.7 M**Other Funding Partners:** \$5.8 M**Competition II 2003**

The goal of this project was to use genomics methods to study and improve seed development and composition in canola and related oilseed crops. This knowledge was also applied to other important crops such as wheat, barley, beans and peas. This work has led to a deeper understanding of many aspects of plant growth that will make canola a more productive and adaptable crop.

Researchers developed basic genomic tools to facilitate worldwide genetic research on canola plants. The team established DNA microarrays and other tools to study which canola genes are important in various growth phases. These have been made available to researchers on canola and other plants all over the world. This work is leading to the development of canola with increased oil content, improved oil and protein quality, frost and drought tolerance, disease and pest resistance, and enhanced yield. Similar improvements in other crop plants will follow.

Funding Partners: Genome Canada, Agriculture and Agri-Food Canada, the National Research Council of Canada, Government of Alberta and the Canadian Foundation for Innovation.

Development of Enabling Technologies for Proteomic Research**Project Leader:** William Davidson, MDS Analytical Technologies**Project Manager:** Chris Dambrowitz, Genome Prairie, Toronto**Project Value:** \$17.9 M**Genome Canada Contribution:** \$8.6 M**Other Funding Partners:** \$9.3 M**Competition II 2003**

The goal of this project was to develop new proteomic research instruments and machines that can measure the amount and type of proteins in samples, in order to speed up basic research and clinical studies. The research team developed new methods to prepare biological samples very rapidly and with extremely small amounts of tissues. In particular, they created powerful high-performance mass spectrometry instruments with extreme sensitivity and precision for the analysis of protein and DNA molecules. These devices are able to process very small samples. The group developed methods to make plastic devices that can replace more expensive glass ones. They also developed a way to locate and measure protein markers in living tissue, which is important in the early diagnosis of disease.

Funding Partners: Genome Canada, and Danaher Corporation (formerly MDS Analytical Technologies).

2002

Functional Pathogenomics of Mucosal Immunity

Project Leaders: Lorne Babiuk, University of Saskatchewan

Robert Hancock, University of British Columbia

Project Manager: Paul Hodgson, Genome Prairie, Saskatoon

Project Value: \$26.9 M

Genome Canada Contribution: \$8.4 M

Other Funding Partners: \$18.5 M

Competition II 2003

Using DNA microarrays, project researchers determined which genes are important in the innate immune response and studied which host genes are turned on or off when cells are infected by bacteria or viruses. They also studied the effects of compounds called host-defense peptides, as well as vaccines, on host immunity and the ability to protect against infection. Current antibiotic therapies have led to the increased occurrence of antibiotic-resistant pathogens. Since host-defense peptides act on the host cell rather than the microbe, the problem of antibiotic resistance is avoided. The group compared these genes in mice, humans and cattle. Several patents were filed for new host-defense peptides that demonstrate the ability to boost the host immune response without developing the harmful effects of inflammation. New computational methods of analysis were developed and are freely available to the research community.

Funding Partners: Genome Canada, Government of Saskatchewan, Genome British Columbia, Inimex Pharmaceuticals Incorporated, and Pyxis Genomics Inc.

Commercialization and Society: Strategic and Policy Implications

Project Leader: Edna Einsiedel, University of Calgary

Project Manager: Jennifer Medlock, Genome Prairie, Calgary

Project Value: \$3.3 M

Genome Canada Contribution: \$1.7 M

Other Funding Partners: \$1.6 M

Competition I 2002

This project studied public attitudes concerning the applications of genetic and genomic research, and made policy recommendations based on these studies. The results will help governments make policies to ensure that the applications of genomic research occur safely and in the full knowledge of public opinion. The research group produced a variety of studies on public reaction to the use of genetically modified foods, on the impact of news media on public attitudes and information, on legal aspects of human genetic databases, and on the implications of patenting life forms.

Funding Partner: Genome Canada.

Functional Genomics of Abiotic Stress

Project Leaders: Bill Crosby, (NRC Plant) Biotechnology Institute

Randall Weselake, University of Alberta

Project Manager: Elizabeth Nanak, Genome Prairie, Saskatoon

Project Value: \$19.5 M

Genome Canada Contribution: \$9.7 M

Other Funding Partners: \$9.8 M

Competition II 2002

Project researchers used a range of genomics and proteomics technologies to decipher the genetic and biochemical mechanisms underlying plant responses to abiotic stresses, such as extreme temperatures and adverse soil nutrient conditions. The project focused on wheat and canola—two crops of central importance to Canadian agriculture. The project has positioned Canada as a world leader in the area of multidisciplinary genomics research related to abiotic stress in plants and has provided foundational tools for the development of frost-resistant plants. The project forged international linkages with leading research centres in the United States, Australia and Europe. This has strengthened Canada's crop development programs at a technical and organizational level.

Funding Partners: Genome Canada, Government of Saskatchewan, Government of Quebec, Alberta Science and Research Authority, National Research Council – Plant Biotechnology Institute.

Societal Impacts of Genomics

An integral aspect of all Genome Canada-funded projects is translating discovery into real-world applications while ensuring maximum societal benefits. Over the past decade, research in societal impacts of genomics has provided a framework for—and continues to guide—investigations in the legal, social, economic, environmental and ethical issues around genomics research. As a result of this research, Canada is the only non-European nation besides Israel to be invited to join the European Research Area for Societal Aspects of Genomics.

In agricultural genomics, researchers work with growers' associations to examine market acceptability, environmental effects and socio-economic issues surrounding the development of genetically enhanced plants or seed crops with novel traits. The economic and environmental factors surrounding land use, land value and farming practises are also studied. For example, the development of winter wheat has advantages in crop rotation, requires less use of herbicides and offers the ability to expand production into more northerly areas as our climate changes. The environmental and ethical questions surrounding new crop developments are typical of those addressed in societal impacts of genomics research.

In health research, ethical issues around personalized medicine, reproductive technology and animal testing are examined. In the NorCOMM project, researchers continue to examine the costs and benefits of global access to a public database of single gene knockouts of mouse embryonic cells.



Genome Prairie researchers in the recent VALGEN project and SIGNet address the issues of genomics and society by:

- Developing tools to help Canadians participate in decisions about new agricultural products and technologies.
- Studying ways to regulate new technology and products that translate research into societal benefits quickly and safely.
- Facilitating interaction among genomics and society scholars and project scientists to help transform research discoveries into vital programs and products that have maximum value for producers, industry and society.

Our People

Board of Directors

Ms. June Bold
Chief Executive Officer
Saskatchewan Health
Research Foundation

Dr. Gerald Brown
Director of
Commercialization
PanProvincial Vaccine
Enterprise (PREVENT)

Dr. Karen Chad
Vice-President Research
University of
Saskatchewan

Dr. David Gauthier
Chief Executive Officer
Entrepreneurial
Foundation of
Saskatchewan

Dr. Martin Godbout
Past President and CEO
Genome Canada

Dr. Digvir Jayas
Vice-President
(Research)
University of Manitoba

Dr. Murray McLaughlin
President and CEO
Sustainable Chemistry
Alliance
University of Western
Ontario Research Park

Mr. Lyle Merrell
Business Consultant

Dr. Arnold Naimark
(Chairman of the
Board)
Director, Centre for
the Advancement of
Medicine
Faculty of Medicine
University of
Manitoba

Dr. Ashley O'Sullivan
Past-President
Ag-West Bio Inc.

Mr. Dale Patterson
(*ex officio*)
Interim CEO and
Vice-President,
External Relations
Genome Canada

Dr. Grant Pierce
Executive Director of
Research
St. Boniface General
Hospital
Assistant Dean of
Research
Faculty of Medicine
University of Manitoba

Dr. Ian Smith
Director General
National Research
Council of Canada
Institute for
Biodiagnostics

Genome Prairie Staff

Chris Barker
Senior Project Manager
CAG, TUFGEN

Colette Chantler
Office Manager and
Executive Assistant

Gladys Coombes
Accountant

Jody Dexter
Project Manager, MGCB²

Kari Doerksen
Project Manager
VALGEN

Bo Jiang
Communications and
Outreach Assistant

Wilf Keller
President and CEO

Lana Mollard
Administrative
Assistant

Faye Pagdonsolan
Executive Assistant
to the Chief Scientific
Officer, and Project
and Network Support

Pat Pitka
Chief Financial Officer

Reno Pontarollo
Chief Scientific Officer

Daniel Ramage
Business
Development Officer

Carol Reynolds
Director
Communications
and Government
Relations



"Genome Prairie has represented the prairie bioscience cluster in Manitoba and Saskatchewan well. The centre has a history of collaborations within the region, the country and internationally with managed projects and related initiatives. We are pleased to have the centre as a strong contributor to the Genome Canada family."

- Dale Patterson, Interim CEO and Vice President, External Relations, Genome Canada

Celebrating our 10th Anniversary

A Decade of Innovation and Partnerships in Genomics Research



Saskatoon Office

101 – 111 Research Drive
Saskatoon, Saskatchewan
Canada S7N 3R2
Phone: (306) 668-3570
Fax: (306) 668-3580

Winnipeg Office

John Buhler Research Centre
Room 815A, 715 McDermot Avenue
Winnipeg, Manitoba
Canada R3E 3P4
Phone: (204) 480-1356
Fax: (204) 975-7772

For more information:
www.genomeprairie.ca
info@genomeprairie.ca



GenomePrairie

Financial Statements of

GENOME PRAIRIE

Year ended March 31, 2010



KPMG LLP
Chartered Accountants
600-128 4th Avenue South
Saskatoon Saskatchewan S7K 1M8
Canada

Telephone (306) 934-6200
Fax (306) 934-6233
Internet www.kpmg.ca

AUDITORS' REPORT TO THE DIRECTORS

We have audited the statement of financial position of Genome Prairie as at March 31, 2010 and the statements of earnings and changes in net assets and cash flows for the year then ended. These financial statements are the responsibility of the Corporation's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation.

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Corporation as at March 31, 2010 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

KPMG LLP

Chartered Accountants

Saskatoon, Canada
June 4, 2010

GENOME PRAIRIE

Statement of Financial Position

March 31, 2010, with comparative figures for 2009

	2010	2009
Assets		
Current assets:		
Cash	\$ 2,116,405	\$ 2,395,511
Receivables	179,945	89,122
GST receivable	50,684	17,801
Project advances	1,032,084	348,373
Prepaid expenses	11,073	16,757
	<u>3,390,191</u>	<u>2,867,564</u>
Equipment and leasehold improvements	-	3,506
	<u>\$ 3,390,191</u>	<u>\$ 2,871,070</u>
Liabilities and Net Assets		
Current liabilities:		
Accounts payable and accrued liabilities	\$ 257,816	\$ 193,161
Deferred contributions:		
Expenses of future periods (note 4)	2,866,889	2,408,916
Equipment and leasehold improvements	-	3,506
	<u>3,124,705</u>	<u>2,605,584</u>
Net assets	265,486	265,486
	<u>\$ 3,390,191</u>	<u>\$ 2,871,070</u>

See accompanying notes to financial statements.

On behalf of the Board:



Director



Director

GENOME PRAIRIE

Statement of Earnings and Changes in Net Assets

Year ended March 31, 2010, with comparative figures for 2009

	2010	2009
Revenue:		
Project revenues (note 4)	\$ 5,572,461	\$ 3,433,877
Administrative support revenues (note 4)	1,505,033	1,538,907
Amortization of deferred capital contributions related to equipment and leasehold improvements	3,506	3,506
Interest	26,983	95,540
	<u>7,107,983</u>	<u>5,071,830</u>
Expenses:		
Research project expenditures	5,572,461	3,433,877
General and administrative (note 6)	1,443,911	1,440,621
Project development costs	88,105	193,826
Amortization	3,506	3,506
	<u>7,107,983</u>	<u>5,071,830</u>
Excess of revenue over expenses	-	-
Net assets, beginning of year	265,486	265,486
Net assets, end of year	\$ 265,486	\$ 265,486

See accompanying notes to financial statements.

GENOME PRAIRIE

Statement of Cash Flows

Year ended March 31, 2010, with comparative figures for 2009

	2010	2009
Cash flows from (used in):		
Operations:		
Excess of revenues over expenses	\$ -	\$ -
Items not involving cash:		
Amortization of deferred capital contributions	(3,506)	(3,506)
Amortization	3,506	3,506
Change in non-cash operating working capital:		
Receivables	(90,823)	(59,146)
GST receivable	(32,883)	(3,224)
Project advances	(683,711)	(415,443)
Prepaid expense	5,684	48,228
Accounts payable and accrued liabilities	64,654	(31,208)
Net change in deferred contributions	457,973	(585,425)
	(279,106)	(1,046,218)
Financing:		
Capital contribution	-	7,012
Investing:		
Purchase of equipment and leasehold improvements	-	(7,012)
Decrease in cash	(279,106)	(1,046,218)
Cash, beginning of year	2,395,511	3,441,729
Cash, end of year	\$ 2,116,405	\$ 2,395,511

See accompanying notes to financial statements.

GENOME PRAIRIE

Notes to Financial Statements

Year ended March 31, 2010

1. Nature of business:

Genome Prairie (the "Corporation") was incorporated in 2000 under the *Canada 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.

2. Significant accounting policies:

(a) Basis of presentation:

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

(b) Use of estimates:

The preparation of financial statements in conformity with Canadian generally accepted accounting principles 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 reporting period. Actual results could differ from these estimates.

(c) Revenue recognition:

The Corporation follows the deferral method of accounting for contributions which includes funding from Genome Canada, Provincial Ministries, the Commercial sector and other funding sources.

Deferred contributions related to expenses of future periods represent 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.

Deferred contributions related to capital assets represent the unamortized amount of contributions received for the purpose of capital assets. The amortization of such contributions is recorded as revenue in the statement of operations. Restricted contributions related to the purchase of capital assets are deferred and recognized to revenue using the same methods and rates of the capital assets.

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.

GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2010

(d) Equipment and leasehold improvements:

Equipment and leasehold improvements are recorded at cost. Amortization is provided for on the straight line basis to amortize the cost of the assets over their remaining estimated useful life which is determined based on committed funding.

(e) Financial Instruments:

Financial assets and financial liabilities are initially recognized at fair value and subsequent measurement is dependent on their classification as described below:

- Cash and short-term investments are classified as financial assets held for trading and are measured at fair value. Fair value fluctuations in these assets including interest earned, interest accrued, gains and losses realized on disposal and unrealized gains and losses are included in investment income.
- Accounts receivable are classified as loans and receivables and are recorded at amortized cost using the effective interest method.
- Accounts payable and accrued liabilities and other liabilities are classified as other liabilities and measured at amortized cost using the effective interest method.

Transaction costs related to held for trading financial assets are expensed as incurred. Transaction costs related to other liabilities and loans and receivables are netted against the carrying value of the asset or liability and are then recognized over the expected life of the instrument using the effective interest method.

(f) Derivative instruments - embedded derivatives:

The Corporation selected January 1, 2003 as the transition date for embedded derivatives, as such only contracts or financial instruments entered into or modified after the transition date were examined for embedded derivatives. As at March 31, 2010, the Corporation does not have any material outstanding contracts or financial instruments with embedded derivatives that require bifurcation.

(g) Income taxes:

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

GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2010

3. Financial instruments and risk management:

The Corporation, through its financial assets and liabilities, has exposure to the following risks from its use of financial instruments: credit risk and market risk (interest rate risk and other price risk).

Credit Risk

The Corporation's principal financial assets are cash and accounts receivable, which are subject to credit risk. The carrying amounts of financial assets on the statement of financial position represent the Corporation's maximum credit exposure at the balance sheet date.

The Corporation's credit risk related to accounts receivable is virtually non-existent since the amounts have since been paid. The credit risk on cash is limited because the counterparties are chartered banks with high credit ratings assigned by national credit-rating agencies.

Interest Rate Risk

Cash has a limited exposure to interest rate risk due to its short-term maturity.

Fair Values

The fair values of cash, accounts receivable, accounts payable and accrued liabilities approximate their carrying values due to their short-term maturity.

GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2010

4. Expenses of future periods:

The Corporation receives funding from Genome Canada, Provincial Ministries, Western Economic Diversification Canada 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 related to expenses of future periods represent these unspent externally restricted funding and related investment income, which are for the purposes of proving funding to eligible recipients and the payment of operating and capital expenditures in future periods. The changes in the deferred contribution balances for the period are as follows:

	2010	2009
Opening deferred contributions for expenses of future periods	\$ 2,408,916	\$ 2,994,341
Contributions during the year:		
Genome Canada	4,638,846	3,889,495
Province of Saskatchewan	1,559,300	10,000
Enterprise Saskatchewan	800,000	-
Western Economic Diversification	176,919	350,000
Project Expense Recoveries	127,751	10,703
Province of Manitoba	50,000	33,089
University of Manitoba	16,500	46,428
Seed Development Symposium	33,208	2,056
Workshops and Other	26,385	-
Manitoba Flax Growers Association Inc	25,000	-
Saskatchewan Flax Development Commission	25,000	-
Bio Talent	18,000	12,000
NRC IRAP	13,500	-
Sanofi Aventis	13,000	13,000
Government of Canada - Service Canada	12,058	15,000
Educational Activities Contributions	-	12,600
	7,535,467	4,394,371
Total contributions available	9,944,383	7,388,712
Less amounts recognized as project revenues	(5,572,461)	(3,433,877)
Less amounts recognized as administrative support revenues	(1,505,033)	(1,538,907)
Transfer to deferred contribution - equipment and leasehold improvements	-	(7,012)
Closing deferred contributions for expenses of future periods	\$ 2,866,889	\$ 2,408,916

GENOME PRAIRIE

Notes to Financial Statements (continued)

Year ended March 31, 2010

5. Project commitments:

In accordance with an agreement for funding signed with Genome Canada effective April 1, 2009, Genome Prairie has agreed to obtain equivalent funding support from other parties. As specified in the agreement, Genome Canada may provide transition funding to Genome Prairie notwithstanding the fact that formal commitments from other parties have not yet been secured. In such cases, funds provided in advance "in good faith" as part of the transition budget shall not be reimbursable in the event such commitments from other parties have not been secured. Genome Canada may then terminate the agreement or funding for a particular component. Additional funding arrangements are negotiated with Genome Canada to cover administration, program management, and position papers.

6. General and administrative expense:

	2010	2009
Per financial statements	\$ 1,443,911	\$ 1,440,621
Network expenses included in expense	(195,365)	(345,731)
Position paper expense	-	(19,607)
Expense recoveries included in revenue	(214,888)	(203,931)
Net administration costs, comparative basis	\$ 1,033,658	\$ 871,352

7. Comparative figures:

Certain comparative figures have been reclassified to conform with the financial statement presentation adopted in the current year.