

# BIOCAP CANADA



Annual Report 2004-2005



The BIOCAP Canada Foundation is a not-for-profit organization, harnessing the nation's research capacity to find biosphere solutions to the challenges of climate change and clean energy. Based at Queen's University and supported by the Federal Government and 16 industry, provincial and non-governmental organizations, BIOCAP is coordinating, funding and communicating a network of national research networks that involve more than 60 government and industry researchers as well as 165 university researchers and 220 students at 25 universities in eight provinces.



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## REFLECTIONS

### A MESSAGE FROM THE CEO



BIOCAP is now six years old and it is exciting to see the organization mature and deliver on the promise for which it was created.

In the first three years, industry and provincial support were essential in allowing the foundation to develop a broad vision for how Canada's vast biological resources could be used to address the challenges of climate change and clean energy. However, it was only after January 2002, when BIOCAP received federal government funding, that it could start to build a network of research networks to deliver on that vision.

In the three and a half years that have since passed, BIOCAP has been instrumental in the launch of the Fluxnet Canada Research Network, the Greenhouse Gas Management Canada Network (Human Dimensions), the forest carbon component of the Sustainable Forest Management NCE and a biofuels component in the Auto21 NCE.

We have also brought industry, government and universities together to plan national networks around other critical research areas, including sustainable agriculture, greenhouse gas sources and sinks in aquatic systems, biomass energy technologies and new crop development.

This effort is paying off as we have just heard that BIOCAP's Green Crop Network has been successful in a five year, \$6.6M NSERC Network grant, the culmination of a process that began with a BIOCAP call for network proposals in 2002. After three years of working closely with this talented group of researchers, we are delighted to see this project move forward.

A major highlight of the past year was our First National Conference held in Ottawa in early February. With more than 370 attendees and 80 presentations, the meeting clearly illustrated the magnitude of 'Canada's Green Advantage'. Some of the feedback received from attendees at this conference has been quoted in the margins of this annual report.

The past year has also seen the launch of six new BIOCAP-initiated and sponsored NSERC Strategic Project Grants, for total funding of over \$2M, all addressing biosphere solutions to climate change and clean energy. We are hoping for even greater success this coming year, with an objective of at least 10 proposals being supported out of the 28 that BIOCAP supported in the spring 2005 competition.

Since January 2002, BIOCAP has invested or committed \$6.2 million dollars in research on biosphere solutions and has successfully leveraged this investment to garner an additional \$27.5 million dollars of funding. Once the Green Crop Network is launched, BIOCAP and its partners will be supporting the work of 66 government and industry researchers, as well as more than 160 university researchers and 225 graduate students at 25 universities in eight provinces.

Even though most of the BIOCAP research projects are less than two years old, the results are starting to flow in terms of valuable insights and innovative technologies. In response, we are shifting more of our efforts and resources towards the integration and translation of the research findings so that they can best inform policy and investment decisions in government and industry.

Certainly, this is what must occur if this nation is to truly capture its 'Green Advantage' in addressing the challenges of climate change and clean energy

Sincerely,

A handwritten signature in black ink, appearing to read 'D. Layzell'. The signature is fluid and cursive, written over a light-colored background.

David B. Layzell, Ph.D. F.R.S.C.,  
CEO & Research Director  
BIOCAP Canada

## WORKING TO CAPTURE CANADA'S GREEN ADVANTAGE

A MESSAGE FROM THE CHAIR



'Capturing Canada's Green Advantage' - this has been BIOCAP's mission for the past 6 years. With 10% of the world's forests and over 60 million hectares of agricultural land but only 0.5% of the world's population, Canada has a major "Green Advantage" compared to other nations.

The "Capturing" comes in when we nurture this vast resource to generate climate change solutions by reducing and sequestering greenhouse gases while complementing fossil fuel use with renewable biomass energy.

However, to achieve this goal requires changes and improvements in how we manage and use our biological carbon and nitrogen cycles. On page six of this report, an illustration of Canada's carbon and nitrogen cycles shows how improved understanding and new technologies arising from BIOCAP research can inform policy and investment decisions and provide real solutions to the challenges of climate change and clean energy.

BIOCAP's networking, research and communications activities are benefiting Canada in three ways. First, the insights and technologies we are generating will help this nation meet its Kyoto commitments. They will also guide national, regional and sectoral strategies for the optimal use of our biological resources to address climate change commitments beyond Kyoto. Finally, BIOCAP is providing the foundation and building blocks for a vibrant and sustainable bio-based economy.

In this document, we report on our activities milestones and successes under these three categories. I think you will be impressed by the progress that BIOCAP has made, especially considering that we have only had the federal resources to implement since 2002. As the research results are now beginning to flow, we are excited by the implications they have for Canadian industry and society.

I am pleased with the progress and successes that BIOCAP has achieved to date. However, it is clear that much more research and implementation work remains if we are to truly 'Capture Canada's Green Advantage'.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert Page". The signature is fluid and cursive.

Dr. Bob Page  
Board Chair, BIOCAP Canada

**"Without BIOCAP, the research that I do, looking for biomass technologies to form the basis of new companies, would take much longer and be less comprehensive. BIOCAP is very important in driving future investment in the renewable energy sector (specifically in biomass related businesses). The BIOCAP model of coupling research with motivated commercial partners is key to identifying new lower cost technologies that can assist in removing some of the uncertainty facing investors and will improve the sustainability of new businesses."**

**Ken Arnold**  
StonePoint Strategies  
Kingston, Ontario

# THE BIOCAP APPROACH

## Why the Biosphere?

Canada has an unparalleled advantage in the fight against climate change. With 10 percent of the world's forests, over 60 million hectares of agricultural land and just 0.5 percent of the global population, we are in a unique position to develop biological solutions to climate change, clean energy and the economy.

The Canadian biosphere - comprising the land, water, and air that supports life - has the potential to reduce greenhouse gas emissions by up to 80 million tonnes a year; more than 25% of our total commitment under the Kyoto Protocol. These reductions can occur through:

**Reducing** greenhouse gas emissions from biological sources such as agriculture, landfill sites and wetlands;

**Sequestering** carbon dioxide by enhancing carbon sinks in forests and farmlands;

**Complementing** fossil fuel use with biomass to provide a renewable source of energy, chemicals and materials; and

**Adapting** biological systems to maintain biodiversity and carbon stocks in a changing atmosphere and climate.



## The Role of BIOCAP

Since BIOCAP was established in 1998, the Foundation has been bringing together university researchers from a variety of disciplines to form a coordinated, nation-wide research effort. Just as importantly, BIOCAP has also brought industry, government and non-governmental organizations into the process. The participation of multi-sectoral stakeholders ensures that the research insights will inform policy and investment decisions in government and industry, with multiple benefits to the environment, the economy and society.

In addition to coordinating research, BIOCAP provides funding to support critical research initiatives that leverage support from industry and from federal and provincial granting agencies.

A final, equally critical, role for BIOCAP is the synthesis and integration of relevant research results and the communication of these insights to decision-makers in industry, government, and the broader public.

**"The BIOCAP programs are really impressive, and have put Canada well ahead of the USA in many areas. [BIOCAP] activities will provide critical data for decision makers who must design and implement Canada's response to international agreements and will also provide a foundation of baseline data for future management and conservation actions long after Kyoto."**

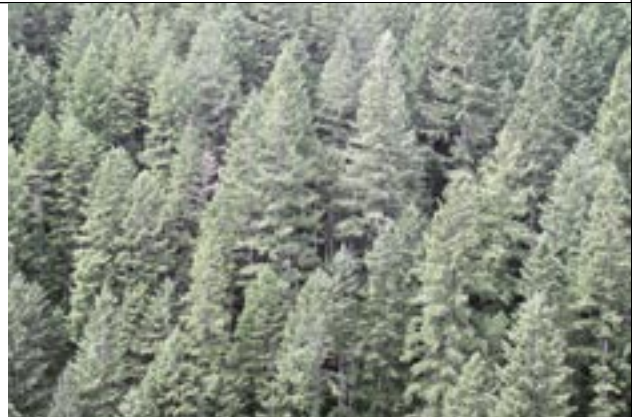
*Steven C. Wofsy  
Abbott Lawrence Rotch  
Professor of Atmospheric  
and Environmental  
Chemistry  
Harvard University*

## The BIOCAP Model

BIOCAP has developed a powerful and internationally-recognized model to harness the nation's research capacity. The model is centred upon a "network of research networks", a nationwide framework of integrated, multi-sector and multi-disciplinary strategic partnerships.

In developing its networks, BIOCAP works with members of government, industry, NGOs and academia to identify research priorities in four key areas of biosphere research: Forestry and Natural Ecosystems, Agriculture, Bioenergy and Human Dimensions. Once research priorities are determined, highly-qualified research personnel from across the country are encouraged to apply to federal or provincial granting agencies with the financial and organizational backing of BIOCAP and its partners. After successful peer review, the research begins and ultimately contributes to the goals of the network. BIOCAP assists in the synthesis, integration and communication of the results to inform policy and investment decisions.

Using this model, BIOCAP is helping Canada lead the way in developing a sustainable, competitive bioeconomy while improving the environment and the competitiveness of Canadian industry.




# CAPTURING CANADA'S GREEN ADVANTAGE: The Carbon and Nitrogen Cycle in Canada

Each year, 5,000 to 10,000 Mt of greenhouse gases (GHGs) cycle naturally between the Canadian biosphere and the atmosphere. By targeting just a few key areas in this cycle with new technologies or improved management, we can achieve GHG reductions of up to 80 Mt – more than 25% of Canada's commitment under Kyoto.


**1 Forest Management**

Improved silviculture, pest management and fire prevention can preserve and enhance carbon stocks in Canada's 140 M ha of managed forest. (see p. 11, 15)




**2 Carbon Cycling in Forests**

In forests across the country, the data from 'flux towers' that measure CO<sub>2</sub> exchange are used to predict how climate changes, natural disturbances and human activities affect forest carbon stocks. Such information is critical in managing forests to cope with future climate impacts. (see p. 11, 15)



**3 Aquatic Systems**

Aquatic systems play a major role in storing or releasing greenhouse gases. We need to better understand how our management of aquatic environments affects these GHG sources and sinks in a changing climate. Future international agreements may include human impacts on aquatic systems. (see p. 14)




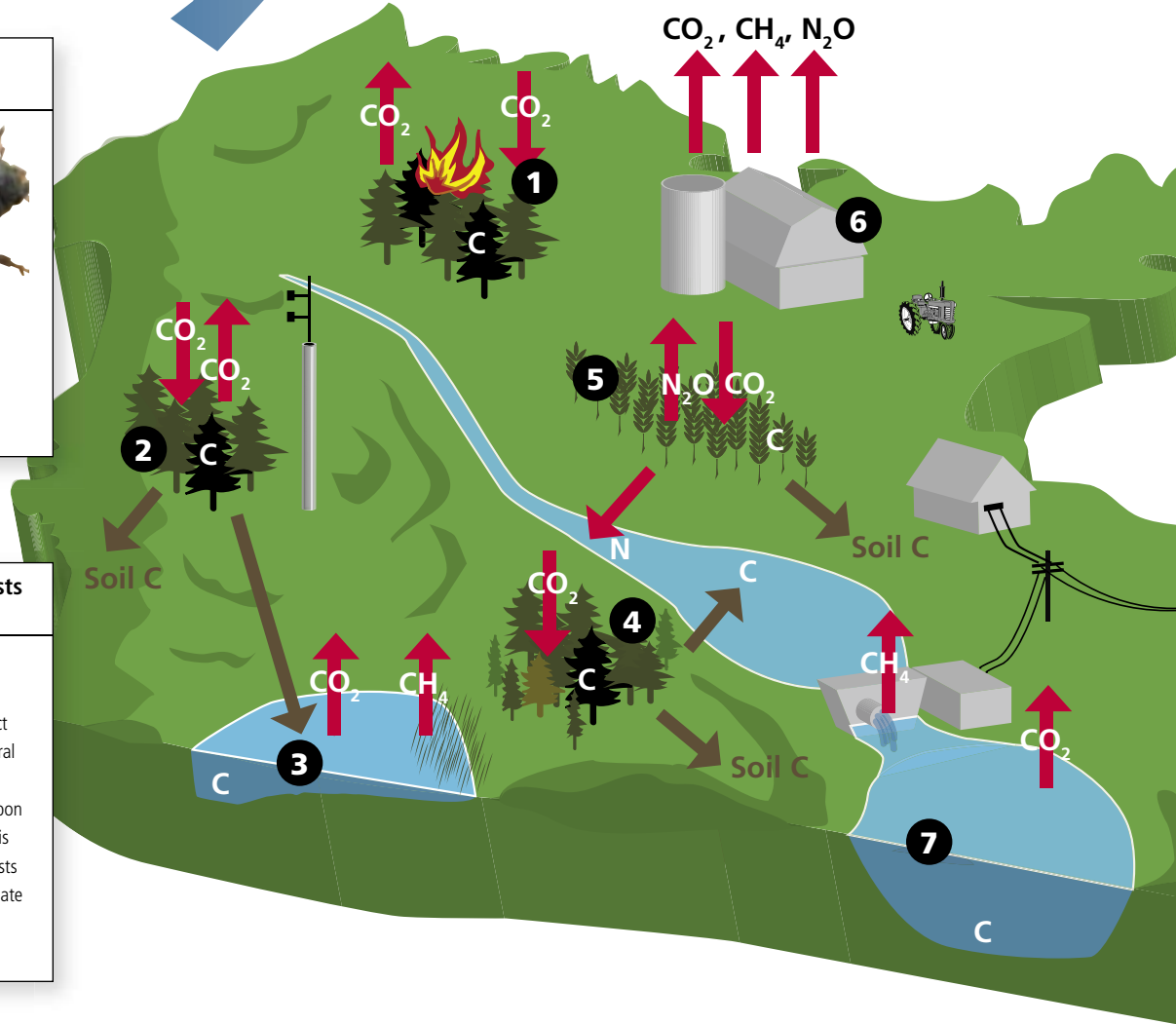
**4 Afforestation**

Millions of hectares of unused or marginal land could be used to grow trees or biomass crops that sequester carbon or provide biomass for energy production. (see p. 14, 20)



**5 Integrated Farm Management**

Reduced tillage, increased use of perennial crops and other farming practices can lower N<sub>2</sub>O emissions, reduce nutrient run-off and increase soil carbon stocks in the 30 M ha of Canadian cropland seeded annually. (see p. 10, 19)

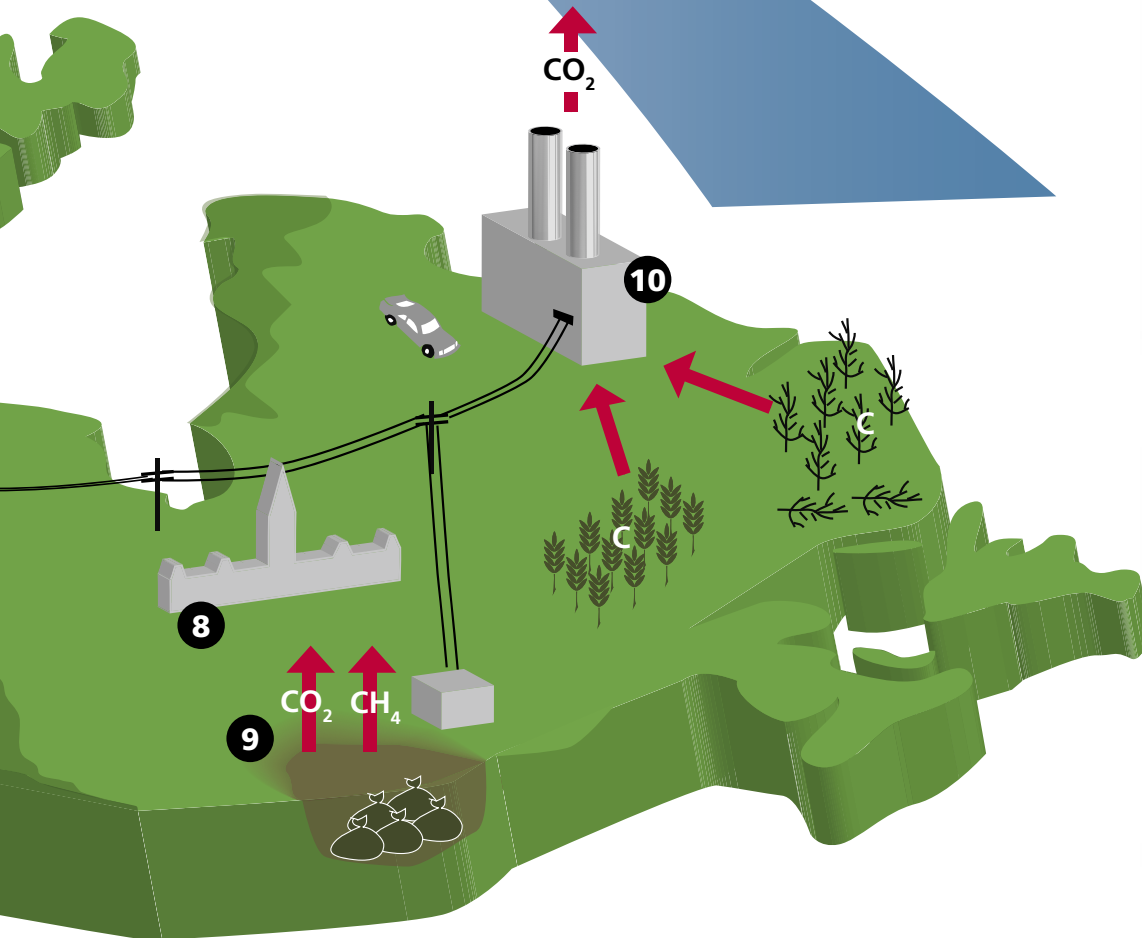





# Greenhouse Gases

## CO<sub>2</sub> CH<sub>4</sub> N<sub>2</sub>O

- CO<sub>2</sub> carbon dioxide, the most common greenhouse gas (GHG)
- CH<sub>4</sub> methane, a GHG with 21x the warming potential of CO<sub>2</sub>
- N<sub>2</sub>O nitrous oxide, a GHG with 300x the warming potential of CO<sub>2</sub>
- C carbon sequestered in plant material, or dissolved in aquatic systems
- Soil C carbon sequestered in the soil as organic matter
- N ↘ nitrogen run-off from agricultural systems, some of which is lost as N<sub>2</sub>O
- ↑ release of GHGs to the atmosphere
- ↓ uptake of GHGs from the atmosphere
- ↔ lateral movement of carbon across the landscape



**10 Bioenergy and bioproducts**

Dedicated energy crops and residual biomass from forestry, agriculture and municipalities can provide millions of tonnes of carbon-neutral feedstocks for the production of heat, power, transportation fuels, commodity chemicals and materials. (see p. 11, 16-18, 22)

**9 Landfill GHG Management**

Capturing landfill CH<sub>4</sub>, a potent but energy-rich GHG - can provide a source of heat and power while reducing GHG emissions. (see p. 22)

**6 Animal Production and Manure Management**

More efficient livestock production and manure management can reduce GHG emissions while enhancing carbon sinks in pastures. Biodigesters can provide on-site heat and power while reducing CH<sub>4</sub> emissions. (see p. 10, 11, 21)

**7 Reservoirs**

Man-made water bodies can serve as significant sources and sinks for GHGs, and reporting on these is likely to be required in future international agreements. Understanding the source/sink dynamics of these systems is critical to calculating Canada's overall emissions and developing mitigation strategies. (see p. 14)

**8 Policy and Investment Decisions**

Social science research assesses the costs and benefits of policy and economic initiatives that lead to new technologies, improve our management of the biosphere and help build a sustainable bioeconomy. (see p. 11, 23)

## RESEARCH ACTIVITY AND PROGRESS

It has been an exciting year, with a successful National Conference, intense research activity in 10 networks, and 13 new research projects to complement 24 ongoing initiatives. The networking, coordination and communications expertise developed within the organization has yielded research investments or commitments from BIOCAP and its partners totalling \$33.8M in cash for all projects since 2002, based on a direct BIOCAP research investment of only \$6.2M. BIOCAP's credibility was endorsed in the recently released federal government document *Project Green: Moving Forward on Climate Change, A Plan for Honouring our Kyoto Commitment* which recognized that BIOCAP plays "a very important role in advancing our understanding on the role of our natural resources in climate change".

### Influencing Biosphere Strategies

It is often said that 'imitation is the sincerest form of flattery' and BIOCAP concepts, principles and implementation strategies have influenced thinking and action in government and industry in several tangible ways.

The articulation of four biosphere solutions (reduce, sequester, complement and adapt), the concept of Canada's "Green (or Natural) Advantage", the strategy of linking bioenergy research into "feedstock-to-product threads", and the identification

of novel strategies for establishing national research networks as described below, are but some of the ways BIOCAP has had a wide-reaching impact during its brief existence.

### Adding Value to Research Findings

BIOCAP catalyzes knowledge transfer between the science and policy communities, where direct connections are sometimes compromised by limitations of language, scope and time. Value is added to a primary research finding by "processing" it through the emerging predictive models. For example, research results generated by Drs. Dan Pennock and Claudia Wagner-Riddle (Landscape Scale Cropping Systems) on the evolution of N<sub>2</sub>O from agricultural soils under different management regimes are shared with BIOCAP-funded researcher Dr. Suren Kulshreshtha in the associated Greenhouse Gas Mitigation Canada network for use in a model on GHG mitigation impacts. Such research integration provides powerful insights that are immediately useful in informing policy and investment decisions.

### Developing Network Models

Each of BIOCAP's 10 research networks has been 'hand-made', tailored to fit the specific needs and opportunities within particular subject areas. Four different network-building models have been employed – two founded on traditional structures, and two novel initiatives developed at BIOCAP.

1. Where relevant research networks already existed (e.g. Sustainable Forest Management NCE or Auto 21 NCE), we have negotiated joint funding agreements to add BIOCAP-relevant projects. This 'affiliated network model' has many advantages, including the efficiency associated with using an existing organizational structure.

2. Where no pre-existing network existed, (e.g. Fluxnet Canada Research Network and Green Crop Network), BIOCAP built partnerships and worked closely with researchers for two or three years until they were able to compete successfully for a large network grant (\$1.2M to \$2.5M/yr) from granting agencies such as NSERC or CFCAS, with some ongoing financial support from BIOCAP. This **'traditional network model'** requires a substantial up-front commitment from BIOCAP with a relatively low probability of success, but when successful, yields a larger, well-funded network with smaller overall financial commitments from BIOCAP.

3. In the **'de-novo network model'** used for GHG Management Canada Network, BIOCAP negotiated an agreement with SSHRC to develop and manage a call for proposals for multi-researcher, multi-disciplinary nodes in a national network. The node grants were approved in a peer review process and then combined into the national network. A separate competition was held for the network directorship.

4. In the **'building-block network model'**, an advisory committee of industry, government and university experts guide the scope and priorities of the network, while BIOCAP provides support for workshops, database management, preparation of discussion papers and secretariat activities. The research is then funded through BIOCAP support of research projects submitted to national competitions (e.g. NSERC Strategic Grants). This model is being used for networks such as Landscape-Scale Cropping Systems (LSCS), Animal Production and Manure Management (APMM), Aquatic Systems and Climate Change

(ASCC) and Bioeconomy Science and Technologies.

### BIOCAP: The Subject of Research

In 2004, Drs. Thomassin and Clouthier presented a conference paper at the System Dynamics Society's Annual meeting in Oxford, England, that compared the 'de-novo network model' with other research network models and concluded that it offered many advantages to researchers and stakeholders.

**"BIOCAP is a unique organization. It combines the efforts from different disciplines for a goal of GHG mitigation in Canada. It plays an important role in bringing academia, industries and government together. Canada is unique ...and it has a huge potential to utilize its green advantage sustainably and optimally. Currently, we do not utilize our agricultural and forestry resources optimally. We need a concerted effort to utilize this and BIOCAP is the organization which does it."**

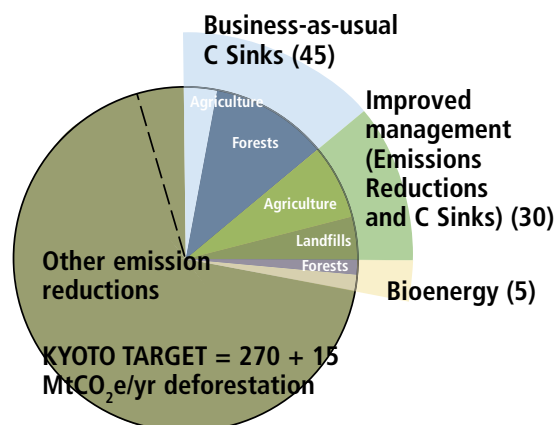
*Amit Kumar  
Assistant Professor,  
Department of  
Mechanical Engineering  
University of Alberta*

## HELPING CANADA TO MEET ITS KYOTO COMMITMENTS

The recent federal climate change plan, *Project Green*, calls on the Canadian biosphere to provide about 80 of the approximately 285 Mt of greenhouse gas (GHG) reductions required during the first Kyoto

commitment period (2008-12). About 45 MtCO<sub>2</sub>e/yr of the total may be allocated to “business as usual” credits associated with carbon (C) sequestration, providing that Canada can verify the claimed carbon stock changes. Another 30 Mt may be associated with implementation of improved management strategies in agriculture, forestry and landfills, and the remaining proportion could be achieved through the use of bioenergy. Thus, BIOCAP activities that will help Canada to meet its commitments are focussed on quantification and modelling of C stock changes, understanding and incenting beneficial management practices, and developing the science and technology needed for a vibrant biofuels industry.

### Biosphere Solutions: ~80 MtCO<sub>2</sub>e/yr



“BIOCAP is a key source of financial support for the university portion of our research network along with CFCAS and NSERC, and they played an important role in our initial organizing activities and in facilitating our interaction with the stakeholder community about the carbon cycle of Canada’s forest and peatland ecosystems. BIOCAP-supported scientists have made significant progress in furthering our understanding of how we might manage our carbon cycle for the benefit of both Canada and the rest of the planet.”

*Hank Margolis*  
Program Leader,  
Fluxnet-Canada Research  
Network and Professor  
Université Laval

### Carbon Stock Changes in Peatlands

Dr. Peter Lafleur and his colleagues in the Fluxnet-Canada Research Network at the Mer Bleue bog in Eastern Ontario have measured C exchange data under a wide range of climate variables, with particular focus on temperature and water table levels. This research is improving our ability to predict how climate change will affect C cycling in peatlands, which collectively sequester nearly half the world’s soil C. Despite large year-to-year variability, their work has shown that carbon stocks consistently increase in peatlands. If these results are transferable to forested peatlands, the potential to offset emissions during the Kyoto period is enormous.

### Credit from Crops

Beneficial management practices that enhance soil C or reduce N<sub>2</sub>O emissions may provide environmental benefits and credits for producers. The amount of improvement is partially dependent upon the variability of the landscape. BIOCAP researcher Dr. Dan Pennock (LSCS) has shown that precision conservation on uneven agricultural lands holds tremendous promise for improved

co-management of C and nitrogen (N), thus increasing overall soil organic content and minimizing N loss. Dr. Pennock's work to improve the accuracy of emissions measurements at the landscape level will influence the management of riparian and wetland areas bordering agricultural production zones.

### **Domestic Emissions Trading Systems**

Dr. Paul Thomassin, node leader of the Greenhouse Gas Management Canada Network, (GHGMC) is studying the development of a domestic emissions trading system. His work has shown that temporary carbon offset trading credits may be critical to the successful establishment of a domestic system for agricultural producers, a group that is unlikely to alter their current agricultural practices without substantial financial incentives. Dr. Thomassin and other GHGMC researchers are preparing a new book that will report socio-economic research specific to the use of the Canadian biosphere to mitigate climate change, and offer perspectives on how incentives may be used to help Canada meet its Kyoto targets.

### **The Technical Working Groups: Predicting Emissions and Potential Offsets**

The federal government has an urgent need to accurately predict emissions and potential offsets from various agricultural practices. To this end, it has established a National Offsets Quantification Team (NOQT) to determine reliable co-efficients for estimating emission reductions from beneficial management practices under a variety of on-farm scenarios. A series of technical working groups (TWGs) have been established to generate the necessary co-efficients for practices related to pork production (PTWG), beef production (BTWG), manure processing (MPTWG) and soils (SMTWG). Each working group includes provincial agronomists,

representatives of the research and producer communities, Climate Change Central and BIOCAP. BIOCAP has provided workshop funding to each working group to enable university researchers to contribute directly to protocol development.

### **Damaged Wood to Power in BC**

Bioenergy production is a powerful C management tool that holds tremendous opportunities for the Kyoto period. The *Project Green* plan acknowledges a role for biofuels, but the industrial use of bioenergy to complement current coal consumption has particularly untapped potential. A BIOCAP-initiated feasibility study examined the potential of mountain pine beetle damaged timber as a feedstock for energy production in the province of BC. Using this feedstock-to-product approach, BIOCAP has engaged researchers and members of the forest industry, along with the BC Ministry of Forests and BC Hydro, to consider a proposal for the use of 200 to 500 million cubic metres of damaged wood for energy production, with associated benefits of job preservation and reduced risk of forest fires. Construction of a wood-fired electrical generation pilot plant will engender a suite of associated economic benefits for the people of BC.

### **The Feasibility of Large Scale Biomass Energy in the Great Lakes Region**

The potential for bioenergy use by the major coal-reliant industries and chemical companies located on the Great Lakes, using primarily biomass from forestry residues and

**"The BIOCAP formula of partnering government, academia and industry is clearly working. The current BIOCAP program is only scratching the surface and it is imperative for Canada's economy and the planet's survival that we continue funding this initiative."**

*Philip Bailey  
Essa Technologies Ltd.  
Vancouver, British  
Columbia*

supplemented by biomass crops, agricultural residues and municipal wastes, has emerged from collaborative consultations with BIOCAP stakeholders. Distributed bioenergy plants in northern Ontario would likely be optimal, but there should be sufficient biomass to feed southern Ontario industries through shipping routes on the Great Lakes or through the existing rail network. BIOCAP is working on this project with

Ontario's power generation, steel and cement industries, as well as with the Ontario Ministry of Natural Resources and the forestry sector, to identify feedstock availability and to carry out an initial feasibility study. Replacing 20% of Ontario's coal consumption with biomass would result in a 10 Mt CO<sub>2</sub>e emission reduction, in addition to reductions in SO<sub>x</sub> and NO<sub>x</sub> emissions. Bioenergy implementation in Ontario would have the additional benefits of stimulating rural and northern economies.

## Some Featured International Speakers at BIOCAP's 1st National Conference:

**John Reilly**, Associate Director for Research for Joint Program, Laboratory for Energy and the Environment, MIT  
*Managing the Carbon Cycle: Interactions between the Economy and Biosphere*

**Steve Wofsy**, Abbott Lawrence Rotch Professor of Atmospheric and Environmental Science, Harvard University  
*Measuring Forest Carbon Fluxes to Inform the North American Carbon Plan*

**Charles Rice**, Professor of Soil Microbiology and Director, CASGMS and Kansas EPA-EPSCoR Program, Kansas State University  
*Opportunities for GHG Management Through Soil and Crop Carbon Sequestration- A U.S. Perspective*

**Bernhard Schlamadinger**, Senior Scientist, Joanneum Research, Austria, Head of IEA Task 38  
*The GHG Implications and Balances of Bioenergy – Maximizing Reductions*

**"...without an organization like BIOCAP to coordinate our efforts, I do not see how we as a nation can develop rational, coordinated policies supported by focused research and development, that will enable us to meet our Kyoto commitments."**

**David B. Levin**  
Associate Professor  
University of Victoria

## Canada's Leadership Potential

BIOCAP was pleased to host several international speakers at its National Conference (Capturing Canada's Green Advantage: Biosphere Solutions for Climate Change and the Economy) who shared insights from the US and Europe. All of the speakers listed below concluded that Canada's "Green Advantage" and capacity for leadership in research and implementation was real and significant.

The need to quantify carbon-stock changes, incent beneficial management practices and support the development of a biofuels and bioenergy option serves not only to meet Canada's Kyoto commitment, but potentially to advance Canada to a global leadership role.



## GUIDING OPTIMAL BIOSPHERE USE BEYOND KYOTO

In the fight against climate change, Canada has a "Green Advantage". Our vast natural resources (10% of the world's forests and 68 M ha of agricultural land) relative to our small population make us ideally positioned to develop long-term, biosphere-based solutions to climate change and clean energy. The biosphere can help address these goals by: reducing GHG emissions from natural sources, sequestering atmospheric CO<sub>2</sub> into vibrant ecosystems, complementing fossil fuel energy with carbon-neutral biomass and adapting ecosystems to a changing climate

"If this proposal is successful [this project] will put Canada on the forefront to use state-of-the-art science and technology in addressing a reduction in GHG emissions and [help Canada] meet the limits set in the Kyoto protocol"

*Anonymous reviewer of the Green Crop proposal in its application for a NSERC Network Grant.*

and atmosphere. Much of BIOCAP's research and activities are providing the insights necessary to support longer-term, sustainable use of the biosphere.

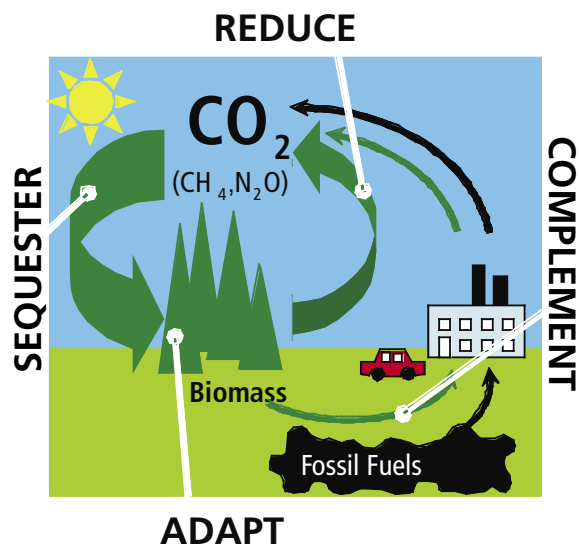
### What Impacts Do Humans Have On GHG Sources and Sinks in Aquatic Systems?

Nutrient loading, acid rain and water impoundment in reservoirs are just some of the ways that humans impact aquatic systems, and these impacts are likely to

have major effects on GHG sources and sinks. Although not included in the first Kyoto commitment period, aquatic systems are likely to be part of future climate change negotiations. With financial support from Hydro Quebec, Manitoba Hydro and Environment Canada, and under the guidance of a Steering Committee, BIOCAP has identified key academic, industry and government individuals who will adopt a watershed approach to address questions about carbon and nitrogen cycling in aquatic systems. The addition of a new Network Facilitator for Forestry and Natural Ecosystems has moved the development of an Aquatic Systems network into high gear at BIOCAP.

### Increasing Carbon Sequestration Through Afforestation and Biomass Crops

Afforestation, or the planting of fast-growing tree species, and the production of biomass crops offer the benefits of sequestering additional atmospheric C and providing a biomass feedstock for energy, chemicals and materials. A new research project undertaken by Dr. Sally Aitken will identify forest genotypes especially amenable for





afforestation activities. Several proposals for afforestation projects were submitted in response to the February 2005 BIOCAP/NSERC call for proposals, indicating an increased interest in research and development in this area that will provide valuable insights for the period beyond Kyoto.

### **Achieving the Fluxnet-Canada funding extension**

Fluxnet-Canada Research Network received a \$2.5M funding extension from CFCAS for years four and five of the base network activities, along with additional funding for two add-on projects: (1) Measurements of Greenhouse Gases and CO<sub>2</sub> Stable Isotopes on Two Tall Towers in Western and Eastern Canada for Up-Scaling from Local to Regional Scales; and (2) Implications of Large-Scale Afforestation for Climate Change in Canada. Both new projects have tremendous potential for providing insights particularly relevant to the period beyond Kyoto when regional fluxes may provide important indicators for altered management strategies implemented during the first Kyoto period, and when implementation of biosphere solutions may increase demand for available feedstocks.

### **Protecting our Forests**

Because of Canada's location in the northern hemisphere, our vast forests are going to be impacted more by climate change than those of most other nations. Climate and biosphere carbon models predict that many of the stands currently regenerating following harvest will not survive to maturity as a result of death due to climate, insects or forest fire. Research is needed to couple the insights from carbon cycle science (such as BIOCAP's Fluxnet Canada Network) to forest management strategies to ensure that Canada's forests will continue to provide

the wood supply, bioenergy feedstocks, carbon stocks, biodiversity and other societal benefits that they have provided in the past.

The Sustainable Forest Management NCE approved funding for an additional project following a joint SFMN/BIOCAP call for proposals. Designed to assess the sustainability of woody debris removal, Dr. Jay Malcolm's project will examine the tradeoffs of altered harvest techniques with above and below-ground carbon supply and ecosystem benefits. This study is expected to offer valuable insights that will guide forest C management, and will contribute to the establishment of management protocols for the sustainable use of woody debris.

### **Developing 'Greener' Crops for More Sustainable Agriculture**

Advances in plant breeding have revolutionized agricultural crops in recent decades, but attention in this field has yet to focus on GHG-mitigating traits or the full understanding of the air-soil-plant continuum. Exciting research opportunities exist to develop crops that have less N<sub>2</sub>O emissions, build soil carbon stocks, take better advantage of the elevated atmospheric CO<sub>2</sub>, or produce transportation fuels and commodity chemicals.

After three years of development, the Green Crop Network (GCN) received notice of funding approval in the spring of 2005 and will advance the fundamental plant science research needed to improve Canada's GHG budget while ensuring that the nation's needs for high quality food, fibre, materials and clean energy are met. Led by Dr. Don Smith of McGill University, GCN will include 55 scientists at 18 universities and be supported by NSERC, Environment Canada and BIOCAP along with a number of industrial partners; cash and in-kind contributions total \$11.2M for a five year funding period.

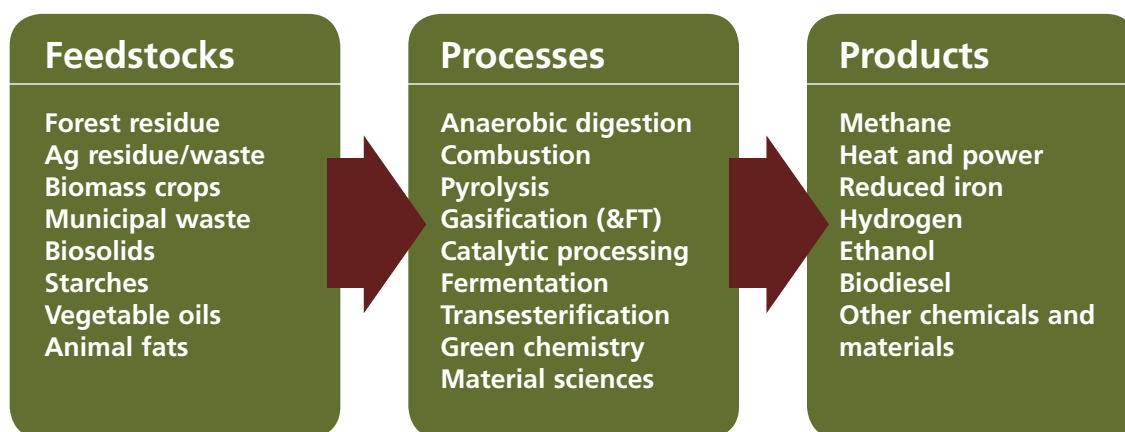
## BUILDING A SUSTAINABLE BIOECONOMY

Canada's vast biological resources provide us with a competitive advantage in developing a bioeconomy - an economic system where the basic building blocks for industry and the raw materials for energy are derived from renewable biomass. Major products include biofuels (liquid transportation fuels such as biodiesel), biopower (biomass used for electricity and for industrial heat generation) and bioproducts (chemicals or materials made from biomass resources).

A BIOCAP inventory of Canada's biomass revealed that the amount of carbon removed in forest and agricultural harvests each year is about 143 Mt, an amount comparable to our atmospheric emissions

from fossil fuel use. Large residual "waste" biomass streams associated with existing agricultural, forest and municipal waste management practices contain enough energy to meet 18-27% of the energy demand in Canada that is currently met by fossil fuels. To capture this "Green Advantage", it is important to have industries, policy makers and the research community focus on "Feedstock-to-Product" threads. These threads link those producing the biomass to those involved in pre-processing and transportation, to those converting the biomass into energy, chemical and material resources, and on to those individuals or companies using the final products.

### Feedstock - to - Product Threads



**The Canadian Biodiesel Research Initiative: Toronto, Ontario, June 28 & 29, 2004**

BIOCAP, in conjunction with Natural Resources Canada, produced the report *Canadian Biodiesel Initiative: Aligning Research Needs and Priorities with the Emerging Industry*. This report was the result of a year-long initiative intended to identify the gaps and priorities for biodiesel research, and how that research can assist the biodiesel industry in Canada. After an extensive period of stakeholder engagement, including a national workshop, the report was released in August 2004. Biodiesel, which has grown in acceptance worldwide, provides the foundation for integration of other biofuels into Canada's existing transportation infrastructure.

**Bioenergy and Northern Communities Workshop: Saskatoon, Saskatchewan, November 16 & 17, 2004**

BIOCAP partnered with the Saskatchewan Research Council to host the Bioenergy and Northern Communities Workshop in Saskatoon in November, 2004. The workshop provided an opportunity for those involved in bioenergy, power and energy systems, northern and aboriginal community development, and environmental management to come together in a single forum to explore the issues addressing implementation of bioenergy in Canada's remote northern communities. Bioenergy provides more jobs per unit of energy than any other energy source, which is of great importance to Canada's northern and rural communities, where biomass harvesting and conversion operations could provide substantial income sources.



## New Projects to Support Bioenergy Development

Four of the six 2004 funded NSERC Strategic Grants supported by BIOCAP will provide key understandings to advance Canada towards a bioeconomy. They include:

**Kozinski, Janusz**  
McGill University,  
*Application of Bioenergy for  
GHG Mitigation in the Iron and  
Steel Industry*

**Lessard, Jean U.** of  
Sherbrooke, *Biomass-derived  
High Octane Synfuels from C5  
Sugars*

**Levin, David U.** of Victoria,  
*Hydrogen Production from  
Cellulosic Biomass*

**Saddler, Jack** UBC,  
*Development of Lignin Co-  
Products from Lignocellulosics  
to Ensure the Viability of the  
Biorefinery Concept Within a  
Biomass-to-Ethanol Process*

used in factories and consumer goods. Over 6,000 paper copies of the Primer were distributed across Canada. In response to the high demand, Environment Canada supported the production of the Primer on ID Rom. BIOCAP is proud to distribute such high-quality communication materials which promote understanding of biosphere solutions and a movement towards a bio-based economy.

## Conference Delegates Challenged to Look to the Future

Dr. Ralph Hardy, BIOCAP Board of Directors Member and respected scientist, challenged conference delegates to make the linkage between atmospheric C management and human needs for energy, chemicals and materials in his powerful final plenary address at the BIOCAP National Conference. Dr. Hardy made a convincing argument for basing policy development and investment decisions on science-based insights, and called for visionary approaches that would propel Canada and the world towards a bio-based economy.

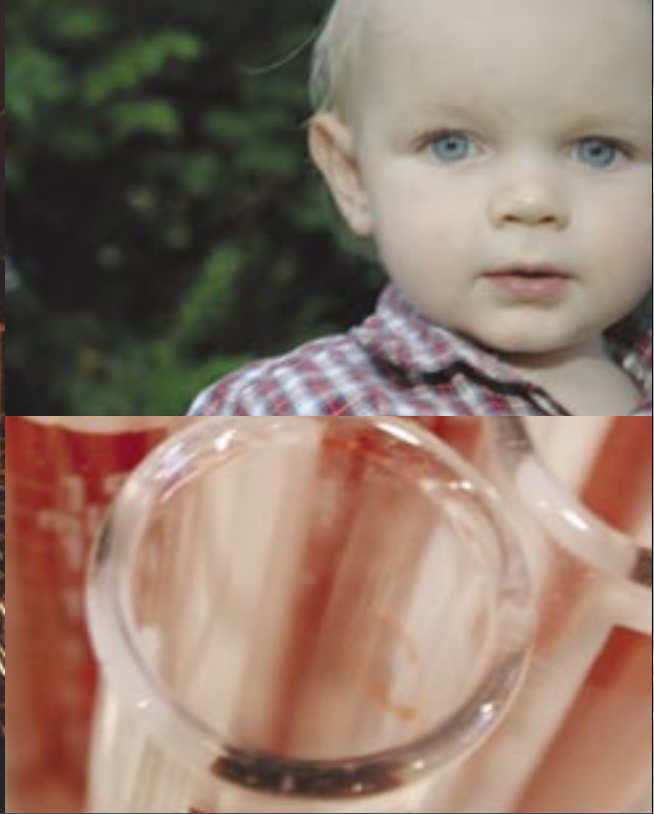
**Ralph Hardy**, Board Member and  
President  
National Agricultural Biotechnology  
Council  
*Decreasing Net GHG Emissions in the  
Energy Sector: The Major Biobased  
Benefit*

**"The focus and co-ordination provided through the BIOCAP Networks at the research stage to harness Canada's research and innovation capacity is paying-off already."**

**Ron Kehrig**  
VP Bio-Products  
and Bio-Processing  
Ag-West Bio Inc.  
Saskatoon, Saskatchewan

## Communicating Fundamental Information: Pollution Probe Primer on Bio-products

In November 2004, BIOCAP co-funded and partnered in the development of Pollution Probe's *Primer on Bioproducts* – an introduction to technologies and processes that use plants, micro-organisms and their products as an alternative or complement to the fossil fuels and petrochemicals



The following are current BIOCAP research projects organized by research area including a brief description, financial details and partners.

## FORESTRY & NATURAL ECOSYSTEMS

Principal Investigator	Recipient Institution	Description	Term	Financial Support		Key Funding Partners
				BIOCAP	Total	
Margolis, Hank	Laval	Fluxnet Canada Research	2002-2007	\$1,000,000	\$13,631,731	NSERC,
MacLean, David	University of New Brunswick	Influence of Forest Management, Silviculture, and Pest Management on Carbon Sequestration	2003-2006	138,100	276,200	SFMN
Schmiegelow, Fiona	University of Alberta	A Bioregional Assessment of Sustainable Forest Management for the Boreal Plains	2003-2006	75,000	262,800	SFMN
Armstrong, Glen	University of Alberta	Carbon Credit Trading: the Law, Firm Behaviour, Economics and Landscape Impacts	2004-2007	123,377	331,600	SFMN
Duinker, Peter	Dalhousie University	Old-Growth Forests in Eastern Canada: Exploring Tradeoffs among Timber, Biodiversity, Carbon, and Public Preferences	2004-2007	38,033	85,270	SFMN, Bowater
Lantz, Van	University of New Brunswick	Role of Pest Management in Sequestering Carbon in the 2008-12 Kyoto Commitment Period: Integration with CBM-CFS3 Bad Economic Analysis	2004-2007	63,590	164,500	SFMN
Malcolm, Jay	University of Toronto	Dynamics of Eoody Debris in Eastern Boreal Forests: Implications for Carbon and Wildlife Management	2004-2006	85,500	431,763	SFMN
Aitken, Sally	University of British Columbia	Adapting Forest Genetic Resource Management to Climate Change	2002-2006	230,026	460,052	NSERC
Moore, Tim	McGill University	Dissolved Organic Carbon and Carbon Cycling in Canadian Forests	2003-2006	130,635	261,270	NSERC
St. Onge, Benoit	Université du Québec à Montréal	Analysis of Forest Biomass and Carbon Stocks Using Lidar and Photogrammetry in Support of the National Forest Inventory	2003-2006	201,275	402,550	NSERC
Grayston, Sue	University of British Columbia	Forest Fertilization and Identification of Microbial Indicators to Enhance Carbon Sequestration and Reduce GHG Emissions.	2004-2007	50,000	410,639	NSERC
Moore, Tim	McGill University	Methane in Soil	2004-2007	30,000	330,000	CFCAS
				\$2,165,536	\$17,048,375	
20 BIOCAP CANADA ANNUAL REPORT 2004-2005						

## AGRICULTURE

Principal Investigator	Recipient Institution	Description	Term	Financial Support		Key Funding Partners
				BIOCAP	Total	
Livingston, Nigel	University of Victoria	The Development of Methanotrophic Biofilters and Bioreactors to Reduce Point Source Methane Emissions, Sequester Carbon and Increase Soil Fertility	2002-2005	\$233,000	\$466,000	NSERC
Tulip, John	University of Alberta	Laser Atmospheric Sensing	2002-2005	203,500	407,000	NSERC
Pennock, Daniel	University of Saskatchewan	Landscape-Scale Measurement and Upscaling of Process-Level Nitrous Oxide Measurements	2003-2006	307,742	750,483	NSERC, Ducks Unlimited, Environment Canada, CALE
Wagner Riddle, Claudia	University of Guelph	Temporal Dynamics of Greenhouse Gas Fluxes Linked to Soil Biophysical Processes and Management Practices	2004-2007	80,000	562,843	NSERC, OMAF, OSCIA
Pennock, Daniel	University of Saskatchewan	Integrated Catchment Monitoring of GHG Emissions in the Prairie Pothole Region - Saskatchewan Site	2003-2004	16,666	46,666	Ducks Unlimited
Lobb, David	University of Manitoba	Integrated Catchment Monitoring of GHG Emissions in the Prairie Pothole Region - Manitoba Site	2003-2004	16,667	46,667	Ducks Unlimited
Wagner-Riddle, Claudia	University of Guelph	Long-term Greenhouse Gas Flux Monitoring Site at Elora, Ontario	2003-2004	16,667	46,667	OSCIA
France, James and Wagner Riddle, Claudia	University of Guelph	Secretariat Funding: Animal Production & Manure Management Network	2004-2005	25,000	25,000	n/a
Pennock, Daniel	University of Saskatchewan	Secretariat Funding: Landscape-Scale Cropping Systems Network	2004-2005	25,000	25,000	n/a
				\$924,242	\$2,376,326	

## BIOENERGY

Principal Investigator	Recipient Institution	Description	Term	Financial Support		Key Funding Partners
				BIOCAP	Total	
Dubé, Marc	University of Ottawa	Biodiesel Production from Acid-Catalyzed Transesterification of Waste Oils	2003-2006	\$143,070	\$286,140	NSERC
Duff, Sheldon	University of British Columbia	Enhancing Prospects for Higher Value Uses for Bio-Oil	2003-2006	171,750	343,500	NSERC
Dalai, Ajay	University of	Production of Biodiesel from Vegetable Oils and Lubricity Additives for Ultra-Low Sulphur Diesel Fuel and of Hydrogen from Byproduct Glycerol	2003-2006	120,000	240,000	NSERC
Saddler, Jack	University of British Columbia	The Development of a Technically and Economically Viable Pretreatment and Enzymatic Process for the Conversion of Softwood Residues to Ethanol	2003-2006	227,750	455,500	NSERC
Sain, Mohini	University of Toronto	Sustainable Biopackaging Materials for Green Technology	2003-2006	133,000	309,478	NSERC, Atofina
Daugulis, Andrew	Queen's University	Biomass to Hydrogen via H <sub>2</sub> S	2004-2005	30,000	220,000	NRCan, NSERC
DeYoe, David	ULERN	BIOS: Forest Biomass Opportunity Supply Model for Ontario.	2004-2005	10,000	98,500	FERIC, Tembec, Grant Forest Products
Karan, Kunal	Queen's University	Technical and Economic Analysis of Alternative Processes for Agricultural Waste Fueled Solid Oxide Fuel Cell	2004-2005	15,000	48,000	OMAF
Kozinski, Janusz	McGill University	Application of Bioenergy for the GHG Mitigation in the Iron and Steel Industry	2004-2007	52,000	444,850	NSERC
Lessard, Jean	University of Sherbrooke	Biomass-derived High Octane Synfuels from C5 Sugars	2004-2007	24,000	187,500	NSERC
Levin, David	University of Victoria	Hydrogen Production from Cellulosic Biomass	2004-2007	36,000	298,300	NSERC
Saddler, Jack	University of British Columbia	Development of Lignin Co-Products from Lignocellulosics to Ensure the Viability of the Biorefinery Concept Within a Biomass-to-Ethanol Process	2004-2007	30,000	255,000	NSERC
Schlaf, Marcel	University of Guelph	Direct Synthesis of 1,3-propane diol from Glycerol Using Transition Metal Based Ionic Hydrogenation Catalysts	2004-2007	15,000	125,949	OMAF, University of Guelph, NRCan
Sokhansanj, Shahab	University of British Columbia	British Columbia's Beetle Infested Pine: Biomass Feedstock for Producing Power	2004-2005	22,000	36,000	Gov. of BC
Thomson, Murray	University of Toronto	Enabling Biodiesel Fuel Use for Sustainable Mobility	2004-2005	30,000	310,000	NRCan, Auto21
				\$1,059,570	\$3,658,717	



## HUMAN DIMENSIONS

Principal Investigator	Recipient Institution	Description	Term	Financial Support		Key Funding Partners
				BIOCAP	Total	
Fulton, Murray	University of Saskatchewan	Transformative Change in Biosphere Greenhouse Gas Management	2003-2006	\$331,045	\$614,030	SSHRC
Klein, Kurt	University of Lethbridge	Socioeconomic Research Network on Bioproducts and Bioprocesses	2003-2006	347,810	646,030	SSHRC
Kulshreshtha, Suren	University of Saskatchewan	Integrated Analysis of Mitigation Strategies for Greenhouse Gas Emissions from Agriculture	2003-2006	215,720	438,590	SSHRC, AAFC
Thomassin, Paul	McGill University	Institutional Development of a Domestic Emission Trading System that Includes Carbon Offsets from the Agriculture and Forestry Sectors	2003-2006	277,455	741,585	SSHRC
Van Kooten, G. Cornelis	University of Victoria	The Economics of Terrestrial Carbon Sinks: Land Use, Land Use Change and Forestry	2003-2006	202,730	388,525	SSHRC
Weersink, Alfons	University of Guelph	Cost-Effective Agricultural Management Strategies and Technologies for Mitigating Greenhouse Gas Emissions	2003-2006	275,240	511,240	SSHRC
Willman, Elizabeth	University of Calgary	Property Rights and Contracts for Carbon Sequestration	2003-2005	50,000	88,160	Gov. of Alberta
				\$1,700,000	\$3,428,160	

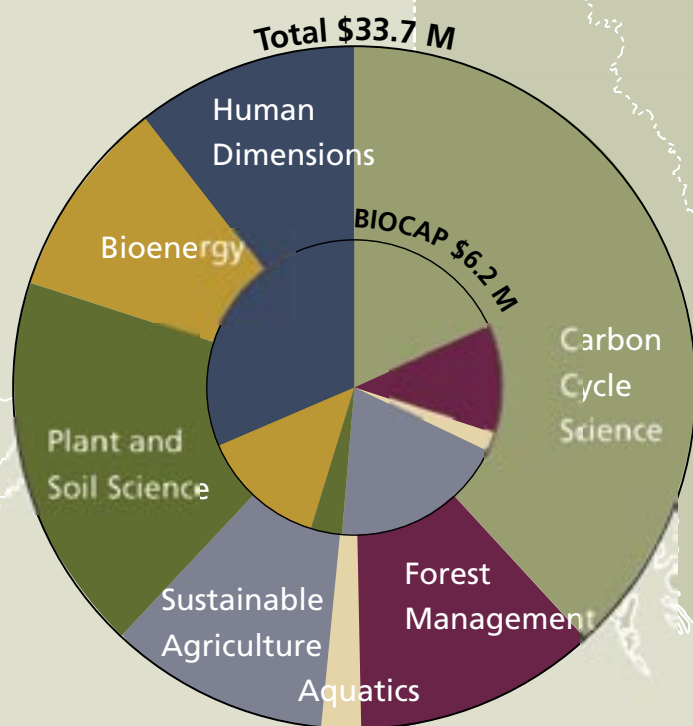
# BIOCAP'S NATIONAL IMPACT

## A look at the impact of our national research efforts

Regional research investments or commitments made by BIOCAP and its funding partners from January 2002 to June 2005 for the funding period 2002 to 2010:

British Columbia	\$5.5M
Prairies	\$11.1M
Ontario	\$7.5M
Quebec	\$7.4M
Atlantic	\$2.2M
Total	\$33.7M

## Research Investments 2002 - 2010



	BIOCAP	Total
Carbon Cycle Science	\$1,240,915	\$14,362,678
Forest Management	836,126	2,567,824
Aquatics	160,635	591,270
Sustainable Agriculture	940,241	2,424,326
Plant and Soil Science	150,000	6,671,550
Bioenergy	1,085,570	3,720,717
Human Dimensions	1,828,160	3,428,160
	<b>\$6,241,647</b>	<b>\$33,766,525</b>

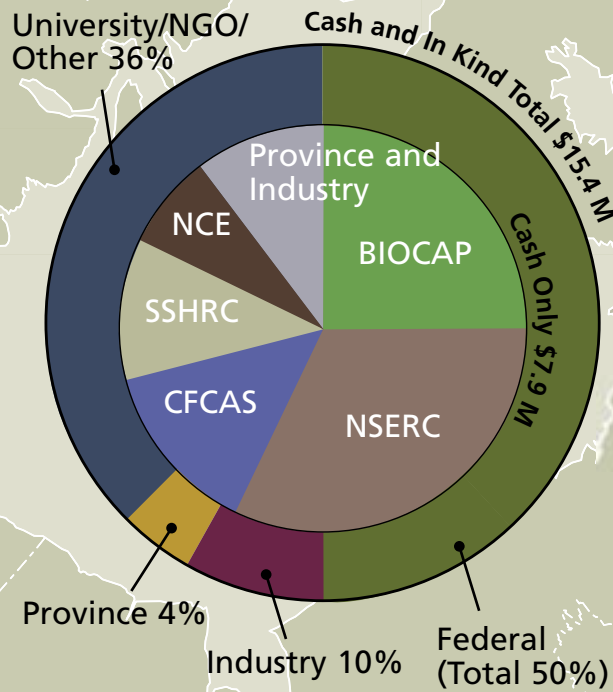
- Carbon Cycle Science
- Forest Management
- Aquatics
- Sustainable Agriculture
- Plant and Soil Science
- Bioenergy
- Human Dimensions

**Result:** total leverage of **\$4.28** for every \$1 invested by BIOCAP (FY 03/04 = \$2.02; FY 02/03 = \$1.28)

Number of University Researchers	166
Number of Government / Industry Researchers / Collaborators	66
Number of Graduate Students / Technicians	227
Number of Universities	25
Number of Provinces	8

For a complete list of researchers affiliated with BIOCAP networks and projects, see page 38

### Total Cash and In Kind Contributions FY 2004 - 2005



Source of support	Amount
Federal (Total)	\$7,583,731
Industry	1,555,139
Provincial	690,105
University/NGO/Other	5,559,640
<b>Total</b>	<b>\$15,388,615</b>

Cash Support 04-05	
BIOCAP	\$2,005,059
NSERC	2,543,121
CFCAS	1,220,297
SSHRC	767,000
NCE	477,475
Prov. & Industry	901,738
<b>Total</b>	<b>\$7,914,690</b>

## COMMUNICATING THE OUTCOMES

After several years of working to build a network of networks, this past fiscal year finally saw the first extensive research results begin to emerge from these initiatives. In preparation, BIOCAP has been planning and implementing various communications tools to increase our communications capacity.

Over the past year, we have worked to “communicate the outcomes” in the following ways:

### Events & Conferences

#### Capturing Canada's Green Advantage: Biosphere Solutions for Climate Change and the Economy

*BIOCAP Canada's 1st National Conference  
February 2 & 3, 2005*



In 2004, in light of the emerging research results, BIOCAP held a national conference focused on Biosphere Solutions. The goals of the conference were to:

1. Review what was known and what research questions remained to provide policy and industry-relevant solutions.
2. Present a case for how our country can ‘Capture its Green Advantage’ by utilizing our vast biosphere.
3. Provide a forum for the exchange of timely and informed perspectives on logical energy options and greenhouse gas offsets.

4. Showcase and communicate emerging knowledge in biosphere greenhouse gas management research.

Held February 2nd and 3rd, 2005 in Ottawa Ontario, BIOCAP's 1st National Conference, was a great success. Attendance estimates were surpassed with the event hosting over 370 people from academia, industry, government, NGO's, producer groups, environmental organizations and media.

The “carbon neutral” two-day conference featured a poster session of over 115 scientific posters, 5 tradeshow booths (Agriculture & Agri-Food Canada, NSERC, Canadian Fertilizer Institute, Queen's and Suncor) and presentations by 80 speakers including internationally renowned climate change experts and senior policy makers. Policy issues were explored through presentations from government representatives and social science experts.

Honoured guests included: Larry Bagnell, Parliamentary Secretary, Natural Resources Canada and Bryon Wilfert, Parliamentary Secretary Environment Canada. Jay Ingram from the Discovery Channel's *Daily Planet* entertained delegates with his dinnertime keynote address “Pop Culture and Climate Change,” after which he signed copies of his book *The Velocity of Honey*.

The popularity of the conference was highlighted by a special request by Larry Bagnell, who encouraged delegates to contact him with feedback on BIOCAP and the conference. The result was resounding support and encouragement. Mr. Bagnell received over 40 letters from delegates and speakers who attended the conference from

#### Conference Attendance

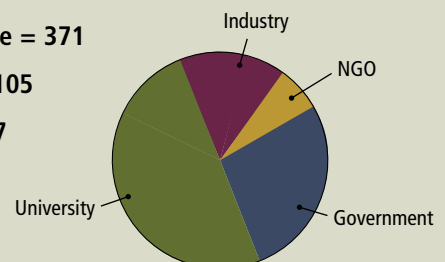
Total attendance = 371

Government – 105

University – 187

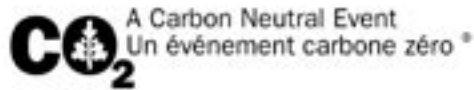
Industry – 53

NGO – 26.



**The BIOCAP Conference**  
*A carbon neutral event*

**BIOCAP, in association with Tree Canada Foundation, planted 150 trees in the Rideau Valley Watershed to offset the carbon dioxide equivalents that were released as a result of hosting the event.**



across Canada and internationally – quotes from some of these letters can be seen throughout this report.

**Bioproducts On The Hill**  
*Ottawa, Ontario, March 10, 2005,*

A BIOCAP display was showcased at a reception with Canada's leaders in the bioproducts sector.

**The Canadian Biodiesel Research Initiative**  
*Toronto, Ontario, June 28 & 29, 2004*

BIOCAP, in conjunction with Natural Resources Canada, produced the report *Canadian Biodiesel Initiative: Aligning Research Needs and Priorities with the Emerging Industry*.

**Bioenergy and Northern Communities Workshop**  
*Saskatoon, Saskatchewan, November 16 & 17, 2004*

BIOCAP partnered with the Saskatchewan Research Council to host the Bioenergy and Northern Communities Workshop in

Saskatoon in November, 2004.

**Canmore II Summit : Farm Level GHG Assessment Research Priorities**  
*Canmore, Alberta, June 2 & 3, 2004*

BIOCAP offered strategic planning in an effort by Alberta Agriculture and Climate Change Central to identify the major research challenges and priorities for Western producers and research teams. During the course of this two-day workshop, leaders from the research, producer and government communities met to pinpoint research gaps and priorities that would need to be addressed to enable Canada to knowledgeably address proposed Kyoto commitments. With many points of uncertainty identified, leaders rallied and initiated the technical working groups that have become indispensable to the National Offsets Quantification Team, by providing verifiable measurement strategies and protocols using ISO standard practices.

**Convention of the Parties (COP 10)**  
*Buenos Aires, Argentina, December 4 & 5, 2004*

The United Nations Convention of the Parties provided an opportunity for BIOCAP to share the message that scientific research plays a valuable role in gaining the necessary insights to guide mitigation efforts, and to inform policy and investment decisions. Opportunities for international networking have led to linkages that should prove beneficial to BIOCAP researchers and partners. For example, a team from Australia working on landscape-level nitrogen emission issues will travel to meet with BIOCAP's LSCS researchers and producer partners at a planned August 2005 workshop. Further, the Director of Research from INRA, France was inspired to travel to Canada to attend the National Conference, and has entered into a research agreement with plant scientists at McGill University.

## Reports & Papers

### *In The News*

*In The News* – a free, subscriber-based news service created and distributed by BIOCAP has continued to grow in popularity since it was launched in April of 2004. Over the past year, more than 200 new subscribers have asked that we send them the weekly digest-style synopsis of international biosphere research and climate change news. To receive *In the News* go to [www.biocap.ca](http://www.biocap.ca) and click on “Subscribe.”



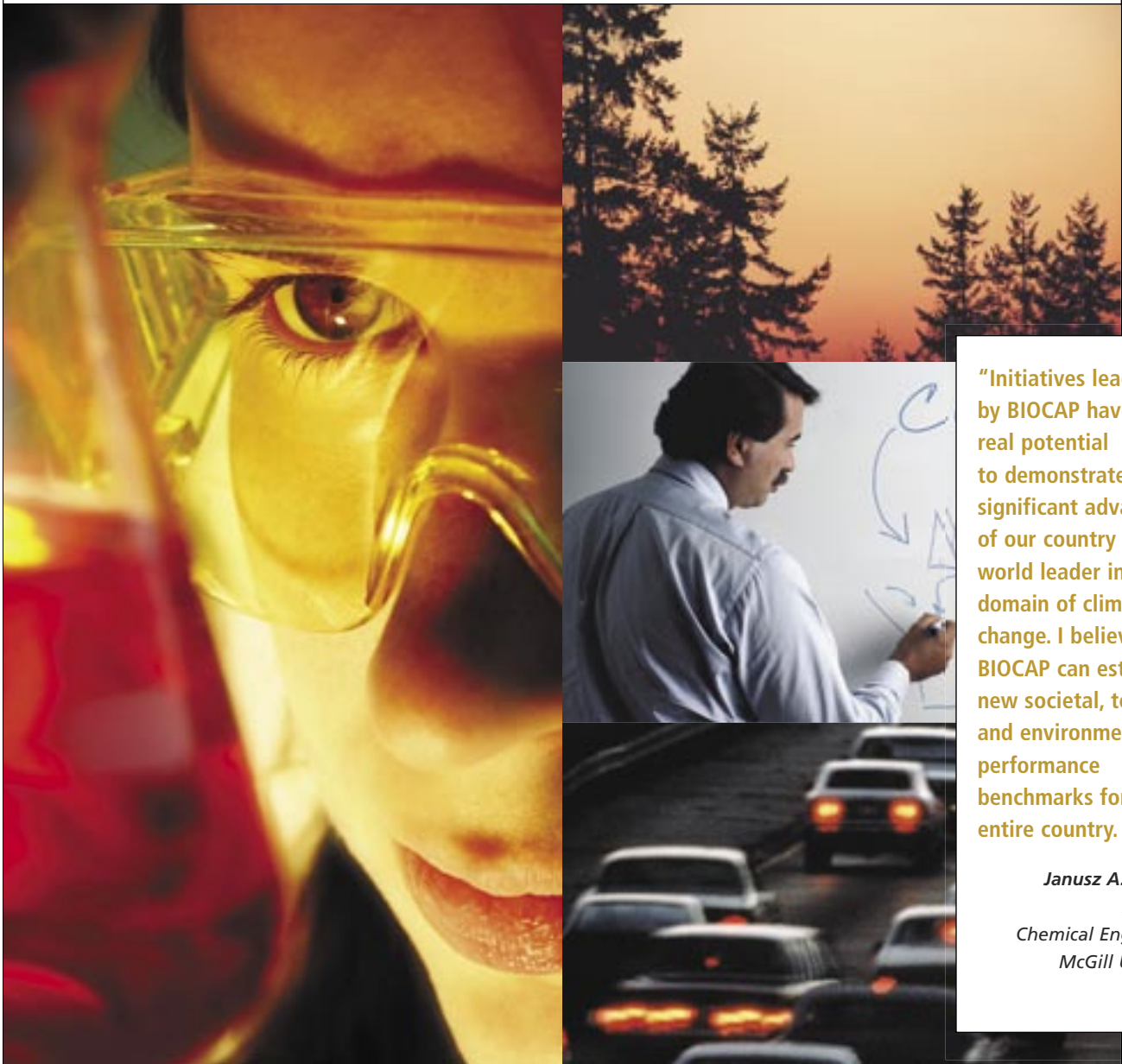
**“BIOCAP has become a major synthesizer for biosphere related science and engineering research and development in Canada. BIOCAP’s active search for Canadian solutions to climate change is outstanding.”**

*Shahab Sokhansanj*  
Adjunct Professor,  
Department of  
Chemical and Biological  
Engineering  
University of  
British Columbia

### Bioproducts Primer

In November 2004, BIOCAP partnered, for a second time, with Pollution Probe on the production of a Primer; this one on bioproducts. The Primer provides a thorough overview of the emerging bioproducts industry and explores the potential for use of the biosphere as feedstocks for the development of future sustainable energy, chemicals and materials. Six thousand hard copies were printed and distributed throughout Canada and after the immense success of the initial printing, Environment Canada sponsored a bilingual reprint of the Primer on ID ROM. Both hard copy and ID ROM versions are available upon request from BIOCAP.





"Initiatives lead by BIOCAP have real potential to demonstrate significant advantages of our country as a world leader in the domain of climate change. I believe that BIOCAP can establish new societal, technical, and environmental performance benchmarks for the entire country.

*Janusz A. Kozinski*  
Professor,  
Chemical Engineering  
McGill University

BIOCAP staff were more active than ever in 2004-05, participating in over 100 events, workshops and conferences nationally and internationally and working to ensure a steady flow of quality communications from the BIOCAP office. The demand for credible information on biosphere solutions to climate change has continued to steadily increase, and as a result, BIOCAP expects that the coming year will see even greater opportunities to network and communicate with industry, government, researchers and the public, the opportunities that can come of *Capturing Canada's Green Advantage*.

## Summarized Financial Statement Highlights

For the 12 months to March 31, 2005

**See Summarized Statement of Operations (page 32)– primarily column “E” for all funds totals)**

- 1. Financial Cash Resources (i.e., Revenues) totaled \$2,672,420** for all four FUNDS for the 2004-05 fiscal year which was very close to budget. (Note this does not include significant other cash and in-kind contributions to certain BIOCAP co-funded projects separately reported in the Annual Report.
- 2. Federal Government cash advances of \$2,000,001** were received under our main Contribution Agreement.
- 3. Four provincial governments contributed \$180,000** (budgeted \$150,000) now including Ontario with British Columbia, Alberta, and Saskatchewan.
- 4. Seven industry sponsors contributed cash netting \$229,250** (budgeted \$197,500) including Alberta Pacific Forest Products, Canadian Fertilizer Institute, Dofasco, Ontario Power Generation, Shell, TransAlta, and Suncor.
- 5. Targeted revenue amounted \$135,286** all recorded in BIOCAP Canada Foundation. Natural Resources Canada contributed respectively about \$67K for the Biodiesel and \$44K for Pyrolysis Initiatives. Also included is \$18K from the Province of B.C. for research at UBC related to bioenergy (matched by BIOCAP), and \$4,475 from Agriculture & Agri-food Canada for facilitating a bio-products workshop. Overall targeted revenue is below the budget of \$212,948 because of the deferral of the Pyrolysis, Aquatic, and Human Dimensions workshops to the subsequent fiscal year and thus the related sponsoring organization revenue.
- 6. Cost recoveries totaling \$46,118** includes \$44,500 of registration fees to the national conference and other small amounts were close to the budget of \$51,650.

### **Program Activity Expenditures (85% of all expenditures):**

- 7. Research cash grants / funding amounted to \$1,313,908** was disbursed to university networks and researchers. Various new and continuing initiatives are listed on pages 20 - 23. Research Investments and Commitments along with partner cash and in-kind contributions (leverage).
- 8. Communication activities totaled \$540,555** directed to work on the FY 2004-05 annual report, a series of BIOCAP Briefs delivering a succinct highlight of current research initiatives, and a weekly news service and the very successful execution of the BIOCAP National Conference in Feb. with an overall net cost of \$155,492 which was below the budget of \$178,144 set by the Executive Committee. Overall communication spending is below the



\$580,842 budget by \$40,287 due to staff vacancies during the period but much increased from the prior year.

**9. Research networking activities totaled \$374,869** is below the \$495,236 budget due to staff vacancies and deferring the organizing of the Pyrolysis, Aquatics and Human Dimensions workshops.

### **Supporting Activity Expenditures (15% of all expenditures):**

**10. Administration expenditures amounting to \$397,068** is lower than the prior year amount of \$459,507 by \$62,439 due to lower salary costs and lower overhead to Queen's University which amounted to \$99,291 in 2004-05 versus \$123,217 in 2003-04. Administration as a percentage of total expenditures for the Environment Canada Fund is 15%, as is the overall percentage for all funds combined.

### **See Summarized Statement of Financial Position (page 33):**

#### **Net Assets (Fund Balances):**

**11.** Please note the combination of all Net Assets in column "E" is at the bottom of the statement. The general funds available from the 2004-05 (i.e., past) fiscal year **for future operations are the balances of (\$8,525) and \$312,873 totaling \$304,348.** This excludes the **\$21,513 amount invested in capital assets, and the \$280,000 internally restricted** (by the Directors) for specific purposes. It is proposed that this \$304,348 general fund(s) balance will be partially drawn down in the coming fiscal year according to the Budget.

## Summarized Statement of Operations and Changes in Fund Balances All Funds Combined

For the Year Ended March 31, 2005

	"A" BIOCAP Canada Funds @ Queen's University - Kingston		"C" "D" Outside Queen's (separate legal entities)		"E" Combined All Funds	"G" Combined All Funds		
	Env. Can. Queen's / BIOCAP Fund	BIOCAP @ Queen's University Fund	BIOCAP Canada Foundation	BIOCAP Canada Charitable Foundation	Managed by BIOCAP Canada Foundation	Managed by BIOCAP Canada Foundation		
	to account for the F.G.C.A.	in the direct support of the F.G.C.A.	to manage extend the F.G.C.A.	to extend the F.G.C.A.	<b>Total</b> <b>2005</b> <b>Actual</b>	<b>Total</b> <b>2004</b> <b>Actual</b>		
					(A+B+C+D)	(comparison)		
<b>Revenues</b>								
Contributions								
Federal government	\$2,000,001	--	--	--	2,000,001	74.8%	\$2,710,729	82.9%
Provincial governments	--	50,000	130,000	--	180,000	6.7%	130,000	4.0%
Industry	--	99,250	70,000	60,000	229,250	8.6%	179,250	5.5%
Individuals	--	--	--	--	--		1,000	
Queen's U. in-kind	--	70,000	--	--	70,000	2.6%	66,000	2.0%
Targetted	--	--	135,286	--	135,286	5.1%	173,160	5.3%
Other								
Investment income	--	--	11,330	435	11,765	0.4%	6,131	0.2%
Cost recoveries	--	500	45,618	--	46,118	1.7%	1,780	0.1%
	2,000,001	219,750	392,234	60,435	2,672,420	100%	3,268,050	100%
<b>Expenditures (by Functions)</b>								
Program Activities								
Research funding (Note)	1,302,908	--	11,000	--	1,313,908	50.0%	2,081,826	65.2%
Communication	224,114	203,493	112,948	--	540,555	20.6%	265,732	8.3%
Research networking	176,078	91,084	107,707	--	374,869	14.3%	384,706	12.1%
	1,703,100	294,577	231,655	--	2,229,332	84.9%	2,732,264	85.6%
Support activities (admin.) (note *)	301,960	5,177	88,841	1,090	397,068	15.1%	459,507	14.4%
	2,005,060	299,754	320,496	1,090	2,626,400	100.0%	3,191,771	100.0%
<b>Excess (deficiency) of revenues over expenditures</b>	(5,059)	(80,004)	71,738	59,345	46,020		76,279	
<b>Balance, beginning of year</b>	9,490	176,957	379,553	(6,159)	559,841		483,562	
<b>Balance, end of year</b>	<b>\$4,431</b>	<b>96,953</b>	<b>451,291</b>	<b>53,186</b>	<b>605,861</b>		<b>\$559,841</b>	

See accompanying notes to the financial statements

Note: \* Includes amortization of capital assets, excludes cap asset additions and disposals which are included in the balances

Note: These summarized financial statements have been prepared from information in the complete audited annual general purpose financial statements (which are available upon request) for each of the individual funds, and are consistent with them in all respects

Note: F.G.C.A. = Federal Government Contribution Agreement (between Environment Canada and Queen's U.) and managed by BIOCAP Canada Foundation

## Summarized Statement of Financial Position All Funds Combined

As at March 31, 2005

	BIOCAP Canada Funds @ Queen's University - Kingston		Outside Queen's (separate legal entities)		Combined	Combined
	Env. Can. Queen's / BIOCAP Fund	BIOCAP @ Queen's University Fund	BIOCAP Canada Foundation	BIOCAP Canada Charitable Foundation	All Funds Managed by BIOCAP Canada Foundation	All Funds Managed by BIOCAP Canada Foundation
	to account for the F.G.C.A.	in the direct support of the F.G.C.A.	to manage extend the F.G.C.A.	to extend the F.G.C.A.	<b>Total</b> <b>2005</b> (A+B+C+D)	<b>Total</b> <b>2004</b> (comparison)
<b>Assets</b>						
Current Assets	\$33,910	129,704	563,574	54,186	781,374	\$967,320
Capital Assets (note 2)	12,956	1,673	6,884	--	21,513	30,621
	46,866	131,377	570,458	54,186	802,887	997,941
<b>Liabilities and Net Assets</b>						
Current Liabilities						
Accounts payable and accrued liabilities	61,758	47,556	56,712	1,000	167,026	348,100
Deferred revenue	--	--	30,000	--	30,000	90,000
Due to (from) other funds	(19,323)	(13,132)	32,455	--	--	--
	42,435	34,424	119,167	1,000	197,026	438,100
<b>Net Assets:</b>						
Invested in capital assets	12,956	1,673	6,884	--	21,513	30,621
Externally restricted	<b>(8,525)</b>	--	--	--	<b>(8,525)</b> **	(7,120)
Internally restricted	--	105,000	175,000	--	280,000	270,000
Unrestricted	--	<b>(9,720)</b>	<b>269,407</b>	<b>53,186</b>	<b>312,873</b> **	266,340
	4,431	96,953	451,291	53,186	605,861	559,841
	\$46,866	131,377	570,458	54,186	802,887	\$997,941

See accompanying notes to the financial statements

**Note:** \*\* The operating fund balances as at March 31, 2005 bolded above total **\$304,348** which is carried forward to FY 2005-06 for operating budget purposes.

**Note:** These summarized financial statements have been prepared from information in the complete audited annual general purpose financial statements (which are available upon request) for each of the individual funds, and are consistent with them in all respects

**Note:** F.G.C.A. = Federal Government Contribution Agreement (between Environment Canada and Queen's U.) and managed by BIOCAP Canada Foundation

## BIOCAP Canada: Notes to Summarized Financial Statements

**BIOCAP Canada Foundation** (the "Foundation") was incorporated July 18, 2000 under the Canada Corporations Act, Part II without share capital. On December 20, 2002, the Minister of Industry issued Supplementary Letters Patent to change the objects of the corporation from those that were charitable to not-for-profit as provided in by-law no. 2. As part of the reorganization the **BIOCAP Canada Charitable Foundation** (the "Charitable Foundation") was incorporated January 10, 2003 under the Canada Corporations Act, Part II without share capital. The Foundation is a national university research funding organization, which directly through its own revenues, and through the management of the BIOCAP Canada Funds at Queen's University at Kingston, and the BIOCAP Canada Charitable Foundation brings together leading researchers and decision-makers from across Canada to find biology-based solutions to the challenge of climate change. There are separate audited financial statements for the BIOCAP Canada Funds at Queen's University at Kingston, BIOCAP Canada Foundation, and BIOCAP Canada Charitable Foundation which may be obtained upon request. Any excess of revenues over expenditures are to be used to promote the not-for-profit objects or charitable objects of the Foundation and Charitable Foundation respectively. The Foundation is a not-for-profit organization under paragraph 149(1)(i) of the Income Tax Act and, as such, is not subject to federal and provincial income taxes. Similarly, the Charitable Foundation qualifies for tax-exempt status as a registered charity under paragraph 149(1)(f) of the Income Tax Act.

### 1. Significant accounting policies:

#### (a) Basis of presentation:

All the BIOCAP Canada Funds and entities follow the accrual basis of accounting.

#### (b) Fund accounting:

BIOCAP Canada follows the restricted fund method of accounting for contributions.

Resources are classified for accounting and reporting purposes into funds that are held in accordance with their specified purposes, or legal obligations, or voluntary actions. All contributions are considered available for unrestricted use, unless specifically restricted by the donor or subject to other legal restrictions. BIOCAP Canada maintains three funds as described below:

- (i) **The Environment Canada – Queen's / BIOCAP Fund at Queen's University** represents the research, research networking, communications and support activities funded by the federal government related to the fulfillment of the contribution agreement(s) between the Minister of the Environment and Queen's University. Phase One of the original agreement, which ended March 31, 2004, provided a maximum contribution of \$6 million over three years. A new contribution agreement between the Federal Minister of the Environment and Queen's University, dated May 18, 2004 extends the federal government funding at a maximum amount of \$2 million per year for the 2004-05 and 2005-06 fiscal years to March 31st. This fund represents externally restricted resources.
- (ii) **The BIOCAP @ Queen's Fund** accounts for the research funding, research networking, communications and support activities funded by BIOCAP's charitable contributions through Queen's University. This fund represents unrestricted resources.

- (iii) **The BIOCAP Canada Foundation** accounts for the research funding, research networking, communications and support activities funded by the Foundation's non-charitable contributions. This fund represents unrestricted resources.
- (iv) **The BIOCAP Canada Charitable Foundation** was set up to account for BIOCAP's charitable contributions and activities that did not go through Queen's University. This fund represents unrestricted resources.

**(c) Recognition of revenue:**

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. All other restricted contributions are recognized as revenue of the appropriate restricted fund in the period received. If there is no corresponding restricted fund, contributions are recognized as revenue in the particular fund in the same period as the related expenses using the deferral method. This is the case for general operating contributions by sponsors restricted for a future period.

**(d) Capital assets:**

Purchased capital assets are recorded at original cost. The original cost does not reflect replacement cost or market value upon liquidation. Contributed capital assets are recorded at fair value at the date of contribution. Repairs and maintenance costs are charged to expense. Betterments, which extend the estimated life of an asset, are capitalized. When a capital asset no longer contributes to the Organization's ability to provide services, its carrying amount is written down to its residual value.

Capital assets are amortized on a straight-line basis using the following annual rates:

<b>Asset</b>	<b>Useful life</b>
Computer hardware	3 years
Equipment and furniture	5 years

**(e) 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 amounts of revenues and expenses during the period. Actual results could differ from those estimates.

**(f) Research Grants:**

Research grants are reflected as research funding expenses in the year of payment as approved by the Board of Directors.

## BIOCAP Canada: Notes to Summarized Financial Statements

### 2. Capital assets:

			2005	2004
	Cost	Accumulated amortization	Net book value	Net book value
Computer hardware	\$ 70,742	59,318	11,424	\$ 14,970
Equipment and furniture	27,811	17,722	10,089	15,651
	\$ 98,553	77,040	21,513	\$ 30,621

Cost and accumulated amortization as of March 31, 2004 was \$91,422 and \$60,801 respectively.

### 3. Related party transactions:

On December 18, 2001, the Foundation entered into a Memorandum of Understanding with Queen's University for BIOCAP Canada Fund's administrative offices and certain services provided by the University. Under the terms of the Memorandum of Understanding, the Environment Canada – Queen's/BIOCAP Fund is required to pay overhead to the University of \$99,291 (2004 - \$123,217). The amount due to the University at Kingston related to overhead at March 31, 2003 is \$28,577 (2004 - \$46,046). The Memorandum of Understanding may be cancelled by the Foundation or the University on three month's notice.

There are amounts due to and (from) the each of the various funds as disclosed on the Statement of Financial Position. These are for expenses in the normal course of business.

### 4. Inter-fund transfers and internally restricted net assets:

During the year, the Board of Directors internally restricted an additional \$10,000 (2004 - \$90,000) to be used for specific purposes. These internally restricted amounts are not available for other purposes without approval of the Board of Directors.

### 5. Commitments:

As at March 31, 2005, the BIOCAP Canada Funds had approved research funding as follows:

2006 - \$592,111 where all the conditions are met; and

2007 - \$151,000 that is dependent upon BIOCAP Canada Funds having sufficient and appropriate long-term funding

### 6. Statement of cash flows:

The changes in cash flows are readily apparent from the financial statements and as such a statement of cash flows would not provide additional useful information.

**7. Fair value of financial assets and financial liabilities:**

The carrying value of the current assets, accounts payable and accrued liabilities and due to Queen's University of Kingston approximate their carrying values due to(from) other funds the relatively short periods to maturity of the instruments.

**8. Comparative figures:**

Certain 2004 comparative figures have been reclassified to conform with the financial statement presentation adopted for 2005.

## IN RECOGNITION



### The BIOCAP Staff

Left to right: (Back row) **Sue Gora**, Executive Assistant; **Jamie Stephen**, Research and Communications Coordinator; **John Telgmann**, Financial Officer; **David Layzell**, CEO and Research Director; **Sarah Bates**, Science Writer; **Janice Mady**, Director of Operations; **Viviane Paquin**, Network Facilitator Forestry and Natural Ecosystems; **Lisa Jones**, Administrative and Financial Assistant; (Front row) **Lisa Doulas**, Communications Manager; **Susan Wood**, Associate Research Director; **Katie Lundy**, Network Support.

### Researchers affiliated with BIOCAP research networks and projects

Adamowicz, V	University of Alberta	Baker, L	McGill University
Ahern, F	Terre Vista	Bakhshi, N.	University of Saskatchewan
Aitken, S	University of British Columbia	Barichello, R	University of British Columbia
Amiro, B	Canadian Forest Service	Barr, A	Meteorological Service of Canada
Apps, M	Canadian Forest Service	Baylis, K	University of British Columbia
Arain, M.A.	McMaster University	Beall, F	Canadian Forest Service
Armstrong, G	University of Alberta	Beaudoin, A	Canadian Forest Service
Arp, P	University of New Brunswick	Belcher, K	University of Saskatchewan
Auger, M	Quebec Ministry of Forests	Bernier, P	Canadian Forest Service



Bhatti, J	Canadian Forest Service	Fox, G	University of Guelph
Bigras, F	Canadian Forest Service	France, J	University of Guelph
Black, A	University of British Columbia	Fulton, M	University of Saskatchewan
Boocock, D	University of Toronto	Furtan, H	University of Saskatchewan
Bourbonniere, R	Environment Canada	Gervais, J.-P.	University of Laval
Bourque, C	University of New Brunswick	Gillis, M	Canadian Forest Service
Boutin, S	University of Alberta	Grant, R	University of Alberta
Bremer, G	Tembec Inc.	Gray, R	University of Saskatchewan
Bull, G	University of British Columbia	Grayston, S	University of British Columbia
Bunnell, F	University of British Columbia	Gulati, S	University of British Columbia
Burnsdon, B	Irving Inc.	Guthrie, R	McGill University
Burton, D	Nova Scotia Agricultural College	Guy, R	University of British Columbia
Butterworth, E	Ducks Unlimited	Hauer, G	University of Alberta
Cameron, D.A	Canadian Forest Service	Hawari, J	McGill University
Carter, N	New Brunswick, Ministry of Natural Resources	Hertz, P	University of Saskatchewan
Chen, H	Lakehead University	Hintz, W	University of Victoria
Chen, J	University of Toronto	Hobbs, J	University of Saskatchewan
Cicek, N	University of Manitoba	Hubbes, M	University of Toronto
Clark, S	Nova Scotia Agricultural College	Isaac, G	University of Saskatchewan
Cloutier, M	Université du Quebec à Montreal	Jäeger, W	University of Alberta
Cooke, B	Canadian Forest Service	Janzen, H	Agriculture and Agri-Food Canada
Cox, R	Canadian Forest Service	Jeffrey, S	University of Alberta
Crowe, K	Lakehead University	Johnson, G	University of Manitoba
Crummey, H	Newfoundland Department of Natural Resources	Junkins, B	Agriculture and Agri-Food Canada
Cumming, S	Boreal Ecosystems	Kadla, J	University of British Columbia
Dalai, A	University of Saskatchewan	Karan, K	Queen's University
Daugulis, D	Queen's University	Kates, M	University of Ottawa
Davies, D	Forest Protection Ltd.	Kay, B	University of Guelph
DeLong, C	British Columbia Ministry of Forests	Kennett, S	Canadian Institute of Research Law
DeYoe, D	Ontario Ministry of Natural Resources	Kerr, W	University of Saskatchewan
Drury, C	Agriculture and Agri-Food Canada	Kettela, E	Canadian Forest Service
Dube, M	University of Ottawa	Klein, K	University of Lethbridge
Duff, S	University of British Columbia	Kozinski, J	McGill University
Duinker, P	Dalhousie University	Kulshreshtha, S	University of Saskatchewan
Dumas, M	Canadian Forest Service	Kurz, W	Canadian Forest Service
Dunfield, K	University of Guelph	Laaksonen-Craig, S	University of Toronto
Elgie, S	University of Ottawa	Lafleur, P	Trent University
Ellis, J	McGill University	Lantz, V	University of New Brunswick
Ellis, N	University of British Columbia	Larue, B	University of Laval
Farnese, P	University of Saskatchewan	Lavigne, M	University of New Brunswick
Farrell, R	University of Saskatchewan	Lemke, R	Agriculture and Agri-Food Canada
Feng, Y	University of Alberta	LeRoy, D	University of Lethbridge
Flanagan, L	University of Lethbridge	Lessard, J	University of Sherbrooke
		Levin, D	University of Victoria

Livingston, N	University of Victoria	Saville, B	University of Toronto
Lobb, D	University of Manitoba	Scarr, T	Ontario Ministry of Natural Resources
Lucas, A	University of Calgary	Schlaf, M	University of Guelph
MacDonald, P	Moose Cree First Nation	Schmiegelow, F	University of Alberta
MacLean, D	University of New Brunswick	Si, B.C.	University of Saskatchewan
Malcolm, J	University of Toronto	Siciliano, S	University of Saskatchewan
Marceau, S	University of Lethbridge	Smith, K	University of British Columbia
Margolis, H	University of Laval	Sokhansanj, S	University of British Columbia
McCaughey, H	Queen's University	Sparling, R	University of Manitoba
McDougal, R	Ducks Unlimited	Spittlehouse, D	British Columbia Ministry of Forests
McIntosh, R	Saskatchewan Environment	St-Onge, B	Université du Quebec à Montreal
McLaughlin, J	Ontario Ministry of Natural Resources	Stull, R	University of British Columbia
Mclean, D	University of Ottawa	Tenuta, M	University of Manitoba
McLean, G	University of Victoria	Ternan, M	University of Ottawa
McRae, D	Canadian Forest Service	Thomassin, P	McGill University
Meng, F.-R.	University of New Brunswick	Thomson, M	University of Toronto
Messier, C	Université du Quebec à Montreal	Treitz, P	Queen's University
Mohn, W	University of British Columbia	Tremblay, A	University of Ottawa
Moore, T	McGill University	Trofymow, T	Canadian Forest Service
Moranville, D	Société de Protection des Forêts Contre les Insectes et Maladies	Tulip, J	University of Alberta
Morrison, I	Canadian Forest Service	Turpin, D	University of Victoria
Murkin, H	Ducks Unlimited	Van Kooten, G.C.	University of Victoria
Noble, B	University of Saskatchewan	Van Rees, K	University of Saskatchewan
Novak, M	University of British Columbia	Vercammen, J	University of British Columbia
Oberle, F	Daishowa Marubeni International	Vertinsky, I	University of British Columbia
Olfert, M	University of Saskatchewan	Vingy, T	Canfor Ltd.
Ono, H	Alberta Sustainable Resource Development	Voroney, P	University of Guelph
Papakyriakou, T	University of Manitoba	Wagner-Riddle, C	University of Guelph
Pare, D	Canadian Forest Service	Wang, J	Lakehead University
Payne, N	Canadian Forest Service	Wang, S	Natural Resources Canada
Peng, C	Université du Quebec à Montreal	Warland, J	University of Guelph
Pennock, D	University of Saskatchewan	Watkinson, P	University of British Columbia
Peppley, B	Royal Military College of Canada	Webb, J	Little Red River/Tall Cree Nation
Porter, K	Canadian Forest Service	Weersink, A	University of Guelph
Prescott, C	University of British Columbia	Weetman, G	University of British Columbia
Price, D	Canadian Forest Service	West, G	University of Laval
Quiring, D	University of New Brunswick	Whiticar, M	University of Victoria
Rempel, R	Ontario Ministry of Natural Resources	Wilman, E	University of Calgary
Richard, P	Université du Quebec à Montreal	Wulder, M	Canadian Forest Service
Romain, R	University of Laval	Yanchuk, A	British Columbia Ministry of Forests
Roulet, N	McGill University	Yang, W	University of Guelph
Roy, R	University of Victoria	Yiridoe, E	Nova Scotia Agricultural College
Saddler, J	University of British Columbia		
Sain, M	University of Toronto		

## Board of Directors *(as of March 31, 2005)*

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Agriculture and Agri-Food Canada (Research Branch)

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University of Guelph

Board Members who served for part of 2004/05

**Henry Benskin** (to January 2005)  
Director, Research Branch  
British Columbia – Ministry of Forests

**Note:** EC = Executive Committee Member, HR = Human  
Resource Committee Member and AF = Audit and Finance  
Committee Member

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CEO and Research Director  
BIOCAP Canada

**Doug Beever**  
For Canadian Fertilizer Institute  
Manager, Public Relations  
Agrium Inc.

**David Burton**  
Climate Change Research Chair  
Nova Scotia Agricultural College

**Richard Butts** (alternate for Wayne Lindwall)  
Director, Forest Carbon Project  
British Columbia – Ministry of Forests

**Graham Campbell**  
Director General  
Office of Energy Research and Development  
Natural Resources Canada

**Jim Fyles**  
Director  
Sustainable Forest Management NCE  
Professor, McGill University

**Art Jaques**  
Chief, Greenhouse Gas Division  
Environment Canada

**Mark Johnston**  
Manager, Forest Ecosystems Branch  
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National Science Program  
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Environment Canada

**Gordon Miller** (alternate for Geoff Munro)  
Director General, Canadian Forest Service  
Natural Resources Canada

**Geoff Munro**  
Director General, Canadian Forest Service  
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Ontario Field Crop Research Coalition

**Gordon Neish**  
Director General, Bioproducts & Bioprocesses  
National Science Program  
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Professor, Department of Geography  
McGill University

**Gilles Saindon** (alternate for Gordon Neish)  
A/Director General, Bioproducts & Bioprocesses  
National Science Program  
Agriculture and Agri-Food Canada

**Barb Thomas**  
Geneticist and Poplar Farm Research Coordinator  
Genstat Consulting

**Jack Saddler**  
Dean, Faculty of Forestry  
University of British Columbia

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## Research Partners

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**Note:** BIOCAP partners are defined as organizations which are providing cash and/or in-kind contributions to BIOCAP-funded research projects or initiatives and include current partners and those who have committed into the future.

**“BIOCAP is certainly well positioned to help Canada capture its Green Advantage due to its breadth and depth of understanding of not only the challenges of climate change but of possible solutions.”**

**M. Alison Thompson**  
*Manager, Technology,  
Strategy and Development  
Suncor Energy Inc.*

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*For present and future funding commitments*

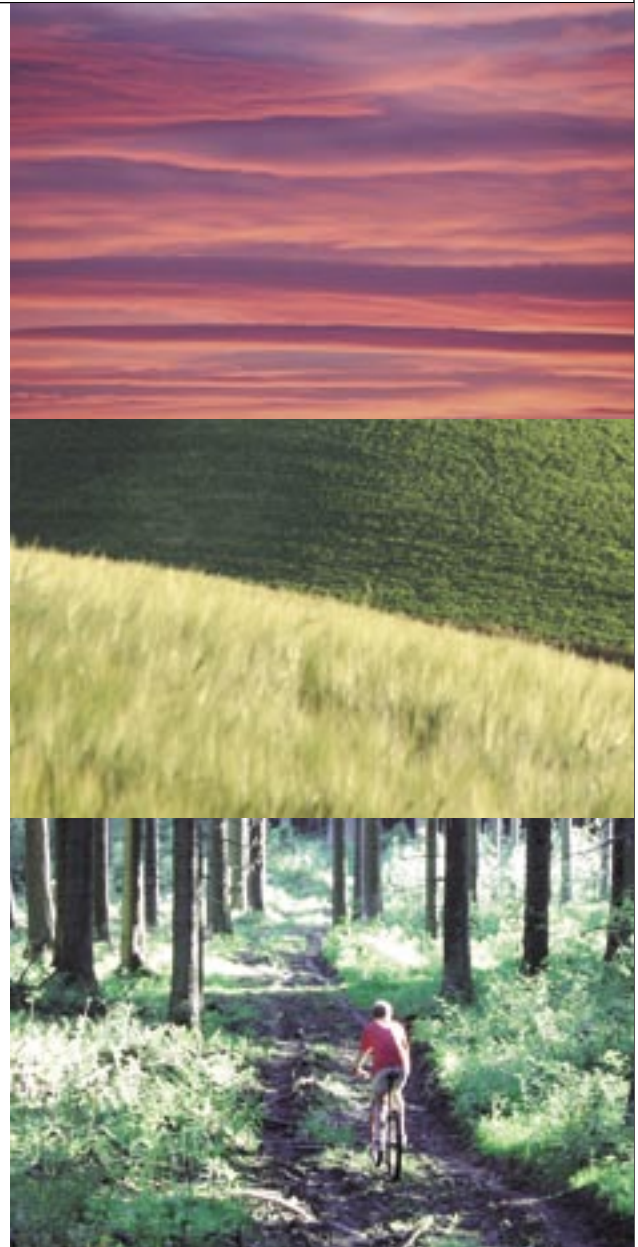
Dalhousie University  
Lakehead University  
McGill University  
McMaster University  
Nova Scotia Agricultural College  
Queen's University  
Saint Mary's University  
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University of Ottawa  
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University of Waterloo  
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With heartfelt appreciation we thank the following individuals for their dedication and friendship to the BIOCAP Canada Foundation – Thank you!

**Bob Mitchell** – Consultant, Alberta

**Bruce Hutchinson** – Retired, Kingston



## Contact Information

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