

CANADIAN WATER NETWORK *bringing research to life*
2003-04 ANNUAL REPORT



CANADIAN WATER NETWORK
RÉSEAU CANADIEN DE L'EAU

bringing research to life



To create a national partnership in innovation that promotes environmentally responsible stewardship and opportunities with respect to Canada's water resources resulting in sustained prosperity and improved quality of life for Canadians CWN MISSION

The Canadian Water Network (CWN) will achieve its mission through:

- > providing credible and trusted sources of expert knowledge on water issues;
- > building scientific and human resource capacity to address water issues and;
- > building a network that serves as a connector and catalyst to capitalize on opportunities, leverage resources and translate scientific research and knowledge into action.

The CWN was created in 2001 as one of Canada's Networks of Centres of Excellence (NCE), to build a network that develops opportunities related to the provision of safe, clean water. In collaboration with universities, governments and industry, the CWN has initiated a variety of creative scientific projects and initiatives that address key water-related issues facing Canadians. Building on this excellence the CWN is creating an integrated national "innovation knowledge network" that embraces strong multidisciplinary and multi-sectoral partnerships.


The CWN applies scientific excellence, communication and network activities within three Programs that focus on national issues of strategic importance to the Canadian economy and public good:

- > Protecting Watersheds and Ecosystems;
- > Protecting Public Health;
- > Ensuring Sustainable Water Infrastructure.

OUR VISION

A future with an abundant, sustainable supply of clean water, supporting healthy, prosperous communities throughout Canada, achieved through the creation and application of knowledge.

The CWN will use strong partnerships to promote innovation and achieve its Mission. By strategically focusing, managing and leveraging resources, the CWN will add value that will allow it to achieve important outcomes and have an impact on sustained prosperity and quality of life for Canadians.

An aerial photograph of a forest with a stream. The water in the stream is clear, revealing the rocks and pebbles underneath. A vibrant rainbow is visible in the upper right portion of the image, arching over the water. The surrounding forest is dense and green, with some trees appearing darker due to shadows.

“We are building a dynamic national research network that will promote quality of life and have enormous benefits for Canadians and the global community.” BILL BORLAND



A LETTER FROM BILL BORLAND AND MARK SERVOS

Three years into our mandate, we have built a national network of exceptional people dedicated to the globally significant water issues facing our nation. Over the past three years, we have recruited an outstanding array of researchers, students and partners committed to excellence in science, research and innovation. We could not be better positioned for the future.

As the result of an inclusive, national dialogue, the CWN has revised our comprehensive strategic plan to position us for a strong and vibrant future. We are now prepared to build on our origins to create a truly integrated national “innovation knowledge network” that embraces strong partnerships as the key to success.

These partnerships will accelerate the exchange of knowledge and technology by organizations that can harness them for Canadian and global social and economic benefit. We are excited about the opportunities for the CWN to act as a connector and catalyst to capitalize on opportunities, leverage resources and translate scientific research and knowledge into benefits for Canadians. Critically important to our success as a Network, we have begun the important work of developing innovative partnerships among governments, the private sector and our national team of researchers.

As a part of our new strategic direction, we have streamlined our organization from seven theme areas to three Water Innovation Programs. This change reflects the strategic priorities and challenges identified as critical areas for research,

training and innovation needed to ensure sustainable water supplies and protect human and ecosystem health. The CWN will facilitate nationwide, multidisciplinary, multi-sectoral partnerships to integrate unique initiatives that maximize value and impact.

As we move toward a truly national network, we couldn't be more pleased with the enthusiasm and excitement of the researchers, members and partners who helped us through this dynamic evolution. They have had a critical role in shaping our future and have embraced the new challenges for the CWN.

Looking forward, we are extremely enthusiastic about the benefits our new focus will ensure: greater collaboration and a dynamic national research network that will promote quality of life and have enormous benefits for Canadians and the global community. The Canadian Water Network is truly bringing research to life.

A handwritten signature in black ink, appearing to read "Bill Borland".

BILL BORLAND, Chairperson
Board of the Canadian Water Network

A handwritten signature in black ink, appearing to read "Mark Servos".

MARK SERVOS, Ph.D., Scientific Director
Canadian Water Network

“Water is a driving force for sustainable development including environmental integrity and the eradication of poverty and hunger, indispensable for human health and welfare.” MINISTERIAL DECLARATION, 3RD WORLD WATER FORUM

PROTECTING WATERSHEDS AND ECOSYSTEMS

In the spring of 2004, I and 28 other graduate students and young professionals were invited to take part in a watershed workshop organized by the Canadian Water Network. Over the course of a week, we travelled the 290 km length of the Grand River from its headwaters to its discharge into Lake Erie.

The course examined an impressive array of watershed management issues from the perspectives of biology, economics, ecology, engineering, hydrogeology and public policy. As young professionals and future water resource users and managers, we are going to make and inform decisions that involve multiple public and environmental demands for water. Through hands-on experience gained during the workshop, we learned to apply practical skills needed to augment theoretical watershed issues.

The true advantages of the CWN are the broad, national expertise that they have attracted to the Network and their commitment to an integrated approach to water issues. Their researchers and partners are dedicated to solving the key water-related issues that we face in Canada. We were fortunate to spend a week with nearly 20 guest experts from a wide variety of backgrounds who were able to translate research issues to practical environmental and public health concerns along the Grand River. From water treatment and wastewater plants to bottled water facilities, from farm run-off to pathogens and chemicals in our rivers, those involved in the workshop now have a clearer, more practical understanding of watershed management issues.

Through the process of developing a more integrated understanding of water issues we also learned many of the leadership skills necessary to translate our knowledge into action. This will ensure our ability to protect public and environmental health and ensure the economic well-being of our communities. The connections that we made over the week and the lessons that we learned, both from the guest experts and one another, are certain to have a lasting impact on our future careers and collaborations.

The Grand River Watershed workshop broadened my professional horizons, heightened the potential for multidisciplinary collaboration with the other graduate students and helped me to renew my focus on research. In addition to aiding my development as a young professional, the CWN is playing a critically important role in ensuring the health, safety and abundance of our national water supply through its outstanding programs.

The workshop was an indication of the CWN's commitment to developing highly qualified people and building a national network of researchers, students, partners and members dedicated to the health of Canada's watersheds and ecosystems.

RAINIE SHARPE
Ph.D. Candidate, University of New Brunswick



bringing research to life



Responsible stewardship of our water resources is a significant challenge. It requires that we balance social, economic and environmental needs and recognize the long-term impacts of decisions on the quality and quantity of our water resources. The Protecting Watersheds and Ecosystems Program focuses on providing both the sound understanding of watershed systems and the decision-making tools needed to address these complex and multi-jurisdictional issues at the watershed scale. The Program targets leading-edge policy mechanisms, research, and technology to enable solutions that integrate land and water use, minimize adverse impacts from existing and past practices, and maximize both socio-economic and environmental benefits.

“The keynote in the future should be vigilance.”

THE HONOURABLE DENNIS R. O’CONNOR

PROTECTING PUBLIC HEALTH

As Canadians, we are very fortunate to have nearly 10% of the world’s fresh water supply while making up less than one half of one percent of the world’s population. Conversely, one third of the world’s population is now living under moderate or severe water stress. In light of this, we have a great responsibility to act as stewards of this globally critical resource.

Through our work with the Canadian Water Network, we are committed to developing leading-edge environmental technologies to ensure a long-term strategy for a clean, safe and plentiful water supply. In the fall of 2002, Trojan Technologies approached the Canadian Water Network. We were looking for a way to initiate research and needed the assistance of world-class researchers to help us identify the best and most efficient means of integrating our technologies with others in a multi-barrier approach to improve public health through the treatment of drinking water.

Together with the CWN and CRESTech, an Ontario Centre of Excellence and their national network of partners, we brought together an amazing, multidisciplinary team from across Canada to help us address these questions. Researchers from the Universities of Toronto, Ottawa, Waterloo and Dalhousie have combined their outstanding expertise to help us better understand and prepare for a future with a safe and sustainable supply of water, both in Canada and abroad.

Equally important to the research component, the CWN and CRESTech were able to attract a wide variety of partners like Health Canada, the Canadian Institute for Health Research – Institute of Infection and Immunity and other industry players. These partnerships helped to broaden the research to ensure that our technical results were considered in light of broader socio-economic issues such as economics, public policy and regulatory concerns.

We have been fortunate to partner with the CWN as it has played a key role in developing a national network of researchers, students, partners and members committed to excellence in scientific research. Trojan Technologies approached the CWN specifically because of their excellent national network and dedication to outstanding water-related research.

The water treatment industry now plays a significant and growing role in contributing to improved global health. With the assistance of the Canadian Water Network and its research partners, we will improve on existing technologies and develop new technologies to hasten the eradication of drinking water scarcity and waterborne diseases.

MARVIN DeVRIES, President and CEO
Trojan Technologies Inc. London, ON



bringing research to life



The World Health Organization estimates that 3.4 million people die annually from water-related diseases. By comparison, Canadians enjoy access to remarkably safe, clean water. Yet, tragedies like Walkerton demonstrate that failure to recognize the importance of safe water can foster complacency resulting in disaster. The increasing demands on our limited water resources and the continued under-funding of water infrastructure raise the prospect of outbreaks of both recognized and emerging water-related diseases. The Protecting Public Health Program focuses on ensuring public health protection by providing water purveyors and public health agencies with the most effective management and technological tools to identify and reduce water-related health risks.

“The trouble with water is that they’re not making any more of it.” MARQ DE VILLIERS

ENSURING SUSTAINABLE WATER INFRASTRUCTURE

Our Canadian Water Network research has the potential to dramatically change water infrastructure around the world. Infrastructure problems are indeed daunting. Water and wastewater treatment and related infrastructure are crumbling at an alarming rate. Canada alone is estimated to have a \$50 billion water infrastructure deficit. Unless we are able to find new and innovative ways to move forward, neither Canada nor other industrialized nations may ever make up this staggering deficit.

What started with a research proposal to the CWN has become a national collaborative project with the scope and vision to dramatically change the way that infrastructure in Canada is developed, replaced and renewed. New contacts have been forged and new opportunities to work and collaborate with industry and related researchers have become routine.

Our project encompasses seven inter-related research components. Unique for a project of this nature, our researchers have expertise in environmental and energy issues, public health and economics. While our focus continues to be on Canadian issues, we are incorporating outstanding research expertise from around the world.

Important to our research are the partnerships that our project has developed. With our industry partners, our team has created the Centre for Advanced Research into Water Supply Management. SaskWater has provided access to one of its rural water distribution systems and ten years of operational funding while SaskTel is providing ten years

of data collection support. A research centre using such a commercial supply system is unprecedented. This unique partnership provides us with a real-world laboratory that would cost over \$17 million to reproduce. While this partnership is exciting, the more important development is the practical, real-world scope it provides, allowing translation of our results to other treatment and delivery systems in Canada and abroad.

Space limitations do not permit full justice to the range of connections that the CWN has fostered but suffice it to say that our research is having a dramatic impact in Canada and around the world. Ultimately, our collaboration with the Canadian Water Network will lead to reduced energy and treatment costs for municipal utilities, a better understanding of infrastructure design to more cost-effectively deliver water and better ways for municipalities to finance delivery infrastructure, and to a more rational evaluation of the costs and benefits of water-related infrastructure investments.

Involvement with the CWN has been one of the most rewarding aspects of my academic life. Our collaboration is leading to unique partnerships and delivering outstanding results that will have positive outcomes for all people. It is only one example of the dynamic partnerships that the Canadian Water Network is fostering to ensure a better, safer, more prosperous future for Canadians.

PROFESSOR BRYAN KARNEY, Ph.D.
University of Toronto, Department of Civil Engineering



bringing research to life



The sustainability of water supplies depends on water usage, its method of delivery, and its condition when returned to the environment. The delivery of water and wastewater requires an extensive network of pipes, pumping stations and water treatment technologies, known as "water infrastructure." In Canada, much of this water infrastructure is nearing the end of its functional life, leading to an "infrastructure deficit" of over \$50 billion. The Ensuring Sustainable Water Infrastructure Program fosters development of the innovative technologies and management strategies needed to address this infrastructure deficit. The large global market for this technology and expertise also provides an opportunity for Canada to reduce the global water infrastructure deficit.

The Canadian Water Network has been fortunate to attract a broad cross-section of exceptional Canadians to guide the organization. The Board of Directors, the Scientific Advisory Committee and the Program Management Committee have been instrumental in helping the CWN build on its successful origins to create a truly integrated national “innovation knowledge network” that embraces strong partnerships as the key to success.

BOARD OF DIRECTORS

WILLIAM BORLAND, Chairperson, Canadian Water Network, Director of Environmental Affairs, J.D. Irving, Limited

SUSAN M. TILL, Ph.D., Assistant Deputy Minister, National Land and Water Information Service, Agriculture and Agri-Food Canada

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RON NIELSEN, P.Eng., Director, Sustainability and Strategic Partnerships, ALCAN Inc.

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GABRIEL MEUNIER, P.Eng., M.Sc.A., President, Gestion Gabriel Meunier Inc.

LAWRENCE IGNACE, Senior Policy Analyst – Environment, Assembly of First Nations

MICHAEL HEALEY, Ph.D., Professor – Institute for Resources, Environment and Sustainability, University of British Columbia

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LINDA GOWMAN, Ph.D., P.Eng., Vice-President, Research, Trojan Technologies Inc.

PAUL GLOVER, M.B.A., Director General, Safe Environments Programme, Health Canada

RICK FINDLAY, Director, National Water Program, Pollution Probe

JOHN CAREY, Ph.D., Director General, National Water Research Institute, Environment Canada

LELAND JACKSON, Ph.D., Associate Professor, Department of Biological Sciences, University of Calgary

MARK SERVOS, Ph.D., Scientific Director, Canadian Water Network, Professor, Department of Biology, University of Waterloo

BERNADETTE CONANT, M.Sc., Executive Director, Canadian Water Network

JEAN SAINT-VIL, Program Officer, Networks of Centres of Excellence

SCIENTIFIC ADVISORY COMMITTEE

WALTER GIGER, Ph.D., Swiss Federal Institute for Environmental Science and Technology

TIMOTHY HENNESSEY, Ph.D., Professor, Political Science, Department of Marine Affairs, Research Associate, Coastal Resources Centre, University of Rhode Island

JOAN ROSE, Ph.D., Professor, Homer Nowlin Chair in Water Research, Michigan State University

WARREN W. WOOD, Ph.D., John Hannah Professor of Integrative Studies, Michigan State University

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PROGRAM MANAGEMENT COMMITTEE

MARK SERVOS, Ph.D., Committee Chairperson, Scientific Director, Canadian Water Network, Professor, Department of Biology, University of Waterloo

GRAHAM DABORN, Ph.D., Co-Chair, Director, Arthur Irving Academy for the Environment, Acadia University

PROTECTING WATERSHEDS AND ECOSYSTEMS PROGRAM LEADERS

KELLY MUNKITTRICK, Ph.D., Professor, Canada Research Chair in Ecosystem Health Assessment, Department of Biology, University of New Brunswick, Associate Director of the Canadian Rivers Institute

HANS SCHREIER, Ph.D., Institute for Resources Environment & Sustainability, University of British Columbia

PROTECTING PUBLIC HEALTH PROGRAM LEADERS

STEVE E. HRUDEY, Ph.D., Professor of Environmental Health, Department of Public Health Sciences, University of Alberta

PIERRE PAYMENT, Ph.D., Professor, Institut national de la recherche scientifique – Institut Armand-Frappier, Université du Québec

ENSURING SUSTAINABLE WATER INFRASTRUCTURE PROGRAM LEADERS

MOHAMMED H.I. DORE, D.Phil. (Oxon), Professor of Economics, Department of Economics, Brock University

GRAHAM GAGNON, Ph.D., Canada Research Chair in Water Quality and Technology, Centre for Water Resources Studies, Dalhousie University

MEMBERS

PATRICIA CHAMBERS, Ph.D., Project Chief, National Water Research Institute, Environment Canada

RALPH DALEY, Ph.D., International Network on Water, Environment and Health, United Nations University

HADI HUSAIN, Ph.D., P.Eng., Director, Process R&D, ZENON Environmental Inc.

JOHN COOPER, Ph.D., Director, Water Quality and Health Bureau, Health Canada

DAN MCGILLIVRAY, Ph.D., Director of Business Development, OCE – CRESTech

CHRIS PACI, Ph.D., Manager Lands and Environment Program, Dene Nation

STEPHEN STANLEY, Ph.D., P.Eng., Vice-President, EPCOR Water Services

LES WHITNEY, Manager, Innovation Acceleration Centre, Natural Resources Canada

ASIT MAZUMDER, Ph.D., NSERC – Senior Research Chair and Professor Water and Watershed Research Program, University of Victoria

JEAN SAINT-VIL, Program Officer, Networks of Centres of Excellence Directorate

BERNADETTE CONANT, M.Sc., Executive Director, Canadian Water Network

“Canada will secure its competitive advantage in the global knowledge-based economy by maximizing its capacity to innovate.”

THE INNOVATION STRATEGY: ACHIEVING EXCELLENCE 2002

THE CANADIAN WATER NETWORK: CREATING VALUE FOR CANADIANS

Canadians have made major investments in basic research in recent years that are ensuring excellence, a continued flow of knowledge, and highly trained people on which our future depends. We are now moving as a Network to get the ideas and innovations out of our minds and laboratories and into practice in both the private and public sectors.

The Canadian Water Network is a critical element of supporting the vision of a prosperous, healthy future. While addressing the challenges of safeguarding our environment and public health, the CWN is taking a leadership role in the development and exploitation of technologies that will stimulate further innovation, new opportunities and cleaner, healthier communities. By creating a dynamic national “innovation knowledge network”, the CWN has enabled its researchers and partners to create enormous benefits for Canadians. The CWN promotes innovation through effective networking, communication and management while building multidisciplinary, multi-sectoral partnerships. The Network is creating a long-term legacy of knowledge and relationships that will ensure an abundant supply of clean water that supports healthy ecosystems and prosperous communities across Canada.



"I'm excited by the impressive network that you have created. I see the Canadian Water Network as a partnership of exceptionally capable people dedicated to improving living conditions for people everywhere. I challenge you to find ways to transfer the innovation and technologies you develop here at home to improve human health around the world."

STEPHEN LEWIS, Chair of the Board, Stephen Lewis Foundation

"The Canadian Water Network understands the value of putting money, people and resources together and stirring well."

GEORGE DIXON, Dean of Science, University of Waterloo

"We all gain from each other's expertise, which is what makes us a multidisciplinary network."

MOHAMMED DORE, Professor, Department of Economics, Brock University

"Some people are good at what they do, but only a few people can teach you. CWN allows you to meet these people so that you can integrate the various disciplines."

AMAR SHANGHAVI, International Student, Tanzania

"A very active research community on water has been developing throughout Canada. Most researchers would still be unknown to each other had it not been for the Toronto gathering meeting in 2000 and the following birth of the CWN."

PIERRE PAYMENT, Professor, Institut national de la recherche scientifique – Institut Armand-Frappier, Université du Québec

RESEARCH PROJECTS

CANADIAN WATER NETWORK INC./RÉSEAU CANADIEN DE L'EAU INC.

PROTECTING WATERSHEDS AND ECOSYSTEMS

- > Forecasting Climate Change Impacts on Regional Hydrology and Water Supply in Canada/**James Byrne**, *University of Lethbridge*; **Mohammed Dore**, *Brock University*
- > Understanding Potential Impacts of Development in Pristine Arctic Environments on Water Quality Using Nested Hydrological Studies/**Mike English**, *Wilfrid Laurier University*; **Sherry Schiff**, *University of Waterloo*
- > Human Impacts on Water Quantity and Quality, the Implications for Ecological and Socio-economic Processes, and Policy Development: From Glaciers to Oceans in the Saskatchewan River Basin/**Leland Jackson**, **Edward McCauley** and **John Post**, *University of Calgary*
- > The Influence of Agricultural and Industrial Emissions on Metal Toxicity in the Great Lakes and the Grand River Basin/**David Lean**, *University of Ottawa*; **Chuni Chakrabarti**, *Carleton University*
- > Estimating the Assimilative Capacity of the Saint John River/**Kelly Munkittrick**, *University of New Brunswick*
- > Surface and Groundwater Management in the Oil Sands Industry/**George Dixon** and **James Barker**, *University of Waterloo*
- > Non-Point Sources of Pollution, Cumulative Effects and Mitigation in Urban/Rural Fringe Watersheds/**Ken Hall** and **Hans Schreier**, *University of British Columbia*
- > Impacts of Manure Management Practices on Regional Water Resources: Priority Areas, Alternative Management Approaches, Economic Implications/**David Rudolph**, *University of Waterloo*
- > Building Local Capacity to Provide Clean Water/**Rob de Loë** and **Reid Kreutzwiser**, *University of Guelph*; **Graham Daborn**, *Acadia University*

- > Coupling Between Rivers and Alluvial and Fractured Bedrock Groundwater Flow Systems/**Tom Al** and **Kerry MacQuarrie**, *University of New Brunswick*
- > Permeable Reactive Barriers for Treatment of Dissolved Metals/**David Blowes**, *University of Waterloo*; **Réjean Samson**, *École Polytechnique de Montreal*
- > Contaminant Fate and Transport in Integrated Fractured Rock Subsurface and Surface Water Systems/**Jon Sykes** and **Edward Sudicky**, *University of Waterloo*

PROTECTING PUBLIC HEALTH

- > Novel Polar Disinfection Byproducts and Health Risk Tradeoffs for Drinking Water Disinfection/**Steve Hrudehy** and **Ken Froese**, *University of Alberta*; **Susan Andrews**, *University of Waterloo*
- > Watershed Events and Waterborne Transmission of Cryptosporidiosis/**Judy Isaac-Renton**, *University of British Columbia*
- > Speciation of Arsenic in Drinking Water and Health Effects from Arsenic Exposure/**X. Chris Le**, *University of Alberta*
- > Agriculture, Ecology and Urban/Industrial Activities – Cause and Effect Associations in the Occurrence of Waterborne Pathogens/**James Byrne**, *University of Lethbridge*
- > Improving Disinfection Process Controls for Pathogen Inactivation Through the Use of Integrated Disinfection Design Framework and Standardized Bench-Scale Assays/**Raymond Desjardins**, *École Polytechnique de Montréal*
- > Pathogen Loadings at Drinking Water Intakes on a Heavily Impacted River: Assessing Urban and Agricultural Inputs/**Peter Huck**, *University of Waterloo*

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- > Molecular-Based Detection of Waterborne Pathogens: *Cryptosporidium parvum*/ **Hung Lee** and **Jack Trevors**, *University of Guelph*
- > Innovative Methods for the Detection of Pathogens and Evaluation of the Fecal Indexes of Microbial Pollution/**Pierre Payment**, *INRS-Institut Armand-Frappier*; **Roland Brousseau**, *NRC-Biotechnology Research Institute*
- > Understanding the Biologic Mechanism for a Relationship Between Exposure to Trihalomethanes and Adverse Pregnancy Outcomes/**Linda Dodds**, *Dalhousie University* and **Will King**, *Queen's University*
- > Microbial Risk Assessment as a Foundation for Informed Decision-Making/ **Mansel Griffiths**, *University of Guelph*
- > Integrated Disinfection Optimization Strategies/**Ron Hofmann**, *University of Toronto*
- > Governance and Policy Making for the Great Lakes Basin/**Mark Sproule-Jones**, *McMaster University*
- > Health and Social Benefits of Pathogen Reduction by Drinking Water Treatment/ **Diane Dupont**, *Brock University*; **Pierre Payment**, *INRS-Institut Armand-Frappier*
- > Water Infrastructure: Long-term Supply and Demand Management, and Planning/**Bryan Karney**, *University of Toronto*; **Mohammed Dore**, *Brock University*
- > Impact of Infrastructure Management on the Contamination of Drinking Water with Pathogens/**Michèle Prévost**, *École Polytechnique de Montreal*

ENSURING SUSTAINABLE WATER INFRASTRUCTURE

- > Small-Scale Rural Wastewater Solutions Initiative/**Robert Gordon**, *Nova Scotia Agricultural College*; **Graham Gagnon**, *Dalhousie University*
- > Applications and Barriers to Innovation in Use of Advanced Oxidation Processes in Management of Wastewater/**Cooper Langford**, *University of Calgary*
- > Waterborne Pathogens: Occurrence in Wastewater, Removal by Treatment and Risk Assessment of Their Effect on Public Health/**Pierre Payment**, *INRS-Institut Armand-Frappier*
- > Multiple Objective and Multiple Stakeholder Decision Making in Water Resources Management/**Keith Hipel**, *University of Waterloo*

The Canadian Water Network is fostering multidisciplinary collaborations among government, industry partners, students and researchers at renowned universities and research institutions across Canada. The Network promotes excellence in research by developing highly qualified people and tapping into broad, national expertise to address watershed, public health, water supply and water quality issues that improve quality of life for Canadians.

FINANCIAL STATEMENTS

CANADIAN WATER NETWORK INC./RÉSEAU CANADIEN DE L'EAU INC.

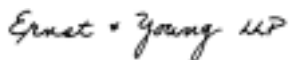
March 31, 2004

AUDITORS' REPORT

To the Board of Directors of Canadian Water Network Inc./Réseau canadien de l'eau Inc. We have audited the statement of financial position of Canadian Water Network Inc./Réseau canadien de l'eau Inc. ["CWN"] as at March 31, 2004 and the statements of operations and net assets and cash flows for the year then ended. These financial statements are the responsibility of CWN'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 Canadian Water Network Inc./Réseau canadien de l'eau Inc. as at March 31, 2004 and the results of its operations and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.



ERNST AND YOUNG LLP
Chartered Accountants

June 2, 2004
Kitchener, Canada

STATEMENT OF FINANCIAL POSITION

As at March 31	2004	2003
ASSETS		
Current assets		
Funds held by the University of Waterloo	\$ 3,472,136	\$ 2,245,428
Accounts receivable	–	76,094
Other receivables	2,185	–
Prepaid expenses	10,750	–
Total assets	\$ 3,485,071	\$ 2,321,522
LIABILITIES AND NET ASSETS		
Current liabilities		
Accounts payable	\$ 22,479	\$ 183,902
Due to the University of Waterloo	–	374,491
Total current liabilities	22,479	558,393
Deferred contributions [note 3]	3,355,176	1,659,142
	3,377,655	2,217,535
Net assets		
Unrestricted	107,416	103,987
Total liabilities and net assets	\$ 3,485,071	\$ 2,321,522

See accompanying notes

STATEMENT OF OPERATIONS AND NET ASSETS

Year ended March 31	2004	2003
REVENUE		
Amortization of Network Centres of Excellence grants	\$ 1,626,966	\$ 3,663,734
Other grants and conference fees	25,000	111,273
	<u>1,651,966</u>	<u>3,775,007</u>
EXPENSES		
Research projects [note 4]	\$ 753,709	\$ 3,016,134
Networking and partnerships	285,192	337,641
Training – highly qualified personnel	8,950	–
Network management	600,686	317,794
	<u>1,648,537</u>	<u>3,671,569</u>
Excess of revenue over expenses	3,429	103,438
Net assets, beginning of year	\$ 103,987	\$ 549
Net assets, end of year	<u>107,416</u>	<u>103,987</u>

See accompanying notes

STATEMENT OF CASH FLOWS

Year ended March 31	2004	2003
OPERATING ACTIVITIES		
Excess of revenue over expenses	\$ 3,429	\$ 103,438
Changes in operating assets and liabilities		
Decrease (increase) in accounts receivable	76,094	(51,094)
(Increase) in other receivables	(2,185)	–
(Increase) in prepaid expenses	(10,750)	–
(Decrease) increase in accounts payable	(161,423)	91,344
(Decrease) increase in due to the University of Waterloo	(374,491)	57,071
Increase (decrease) in deferred contributions	1,696,034	(442,734)
Cash provided by (applied to) operating activities	<u>\$ 1,226,708</u>	<u>\$ (241,975)</u>
Funds held by the University of Waterloo, beginning of year	2,245,428	2,487,403
Funds held by the University of Waterloo, end of year	<u>\$ 3,472,136</u>	<u>\$ 2,245,428</u>

See accompanying notes

NOTES TO FINANCIAL STATEMENTS

CANADIAN WATER NETWORK INC./RÉSEAU CANADIEN DE L'EAU INC.

March 31, 2004

1. DESCRIPTION

Canadian Water Network Inc./Réseau Canadien De L'eau Inc. ["CWN"] commenced operations on March 1, 2001 and was incorporated under the Canada corporations Act on August 8, 2003.

CWN is one of 20 research networks funded by the Canadian Network Centres of Excellence ["NCE"] program. CWN's mission is to ensure Canada's leadership role in the management and sustainable use of water resources, in the protection of human and aquatic ecosystem health and in sustaining economic growth in the technology and services sector. CWN fulfils its mission by developing, supporting and publicizing research initiatives on water-related issues important to Canada. The research is carried out by university investigators at numerous Canadian universities; financial support for the research is transferred from the Administrative Centre based at the University of Waterloo, to the investigators' universities. Prior to August 7, 2003, CWN was not incorporated as a separate legal entity, but functioned as a unit within the University of Waterloo.

CWN does maintain separate reporting and management functions from the University of Waterloo, but continues to use the University of Waterloo's accounting processes. CWN develops and supports diverse, multidisciplinary research projects addressing critical water issues. Research undertaken by CWN is grouped into seven theme areas: Policy and Governance, Water Resources Management, Safe Drinking Water, Water and Public Health, Wastewater Management, Infrastructure, and Groundwater and Sediment: Protection and Remediation. There is an emphasis on the importance of considering the socio-economic aspects of water management in conjunction with scientific research.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The following is a summary of the significant accounting policies followed in the preparation of the accompanying financial statements.

Funds held by the University of Waterloo

CWN deposits its cash funds with the University of Waterloo. The funds are disbursed by the University of Waterloo on behalf of CWN.

Prior to incorporation, administrative expenses were paid originally by the University of Waterloo. These expenses were repaid annually by CWN and are presented as a Due to the University of Waterloo in these financial statements. These funds bear no interest in accordance with the agreement with the University of Waterloo.

Revenue recognition

CWN follows the deferral method of accounting for contributions, which include donations and NCE program grants. Unrestricted grants or fee contributions are recognized as income in the year when received or receivable, if the amount to be received has been committed in the year, can be reasonably estimated, and collection is assured. Restricted NCE grants and other restricted contributions are recognized as income in the year in which the related expenses are incurred.

Expenses

Research projects are recorded as an expense in the year that the funds are disbursed to the various research institutions, as approved by the CWN research management committee.

Networking and partnerships represents costs of web site design and maintenance, communications, CWN research management committee meetings, board of director meetings, annual general meetings and symposiums.

Training of highly qualified personnel represents costs of training and developing highly qualified personnel and includes such items as workshops, internships and initiatives targeted at training.

Network management represents costs related to managing CWN such as salaries, consulting, and office overhead.

All expenses are recorded on an accrued basis of accounting.

Use of estimates

The preparation of the financial statements, in conformity with Canadian generally accepted accounting principles, requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

3. DEFERRED CONTRIBUTIONS

	2004	2003
Balance, beginning of year	\$ 1,659,142	\$ 2,101,876
Add amounts received in the year	3,323,000	3,221,000
Less amounts amortized to revenue in the year (1,626,966)	(3,663,734)	
Balance, end of year	<u>\$ 3,355,176</u>	<u>\$ 1,659,142</u>

The following deferred contributions have been committed to specific projects to be paid in the following fiscal years:

2004-2005	\$ 2,722,650
2005-2006	100,000
Total committed deferred contributions	<u>\$ 2,822,650</u>

4. RESEARCH PROJECTS

During the fiscal year ending March 31, 2004, CWN distributed research funds in the amount of \$753,709 [2003 – \$3,016,134]. Funds were distributed in accordance with the board of director's approval and the research management committee's review and approval of research projects.

5. RELATED PARTIES

[a] The University of Waterloo is party to the NCE funding agreement and functions as the network host for purposes of administration of the grant funding.

UW provides accounting and administrative support services as well as office space without charge to CWN.

[b] CWN paid a total of \$134,199 [2003 – \$568,452] in research project grants to the University of Waterloo for approved research activities.

[c] As detailed in the funding agreement signed among CWN, the University of Waterloo and the NCE, external funds received by CWN are held in trust by the University of Waterloo.

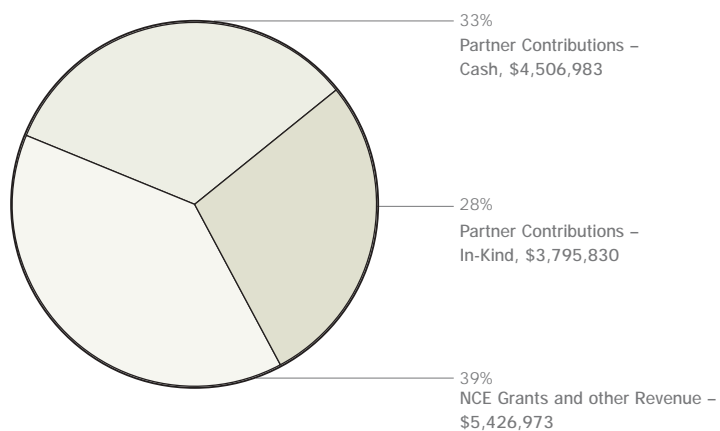
6. INCOME TAXES

CWN is a non-profit organization under Section 149 of the Income Tax Act and is, therefore, exempt from income taxes. Prior to incorporation, CWN operated as a unit within the University of Waterloo. The University of Waterloo is a registered charity under Section 149 of the Income Tax Act and CWN was, therefore, exempt from income taxes.

INVESTING RESOURCES TO BRING RESEARCH TO LIFE

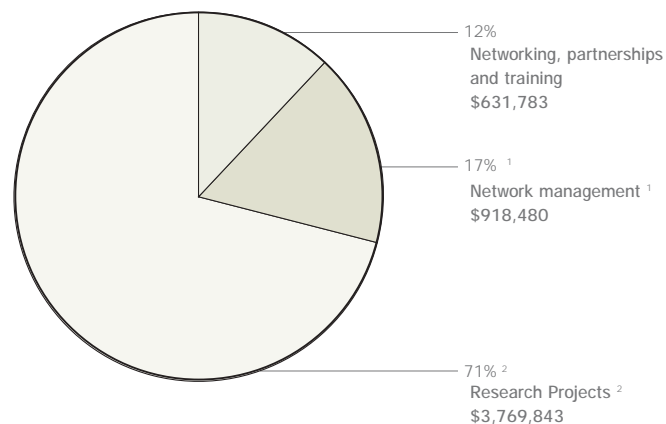
2 YEARS OF ATTRACTING PARTNER CONTRIBUTIONS 2002-03 TO 2003-04

156 PARTNERS CONTRIBUTING TO SCIENTIFIC EXCELLENCE



CWN Project Leaders have successfully attracted public and private sector support.

2 YEARS OF NETWORK BUILDING 2002-03 TO 2003-04



Total expenditures for the CWN over two fiscal years.

¹ Investment in network building and a commitment to keep its costs to 20% or less.

² Thirty networked projects across Canada, with 232 researchers, students and technical staff.

REPORTING RESPONSIBILITY

The accompanying financial statements and supporting schedules are the responsibility of the management of the Canadian Water Network. The financial statements have been prepared in accordance with generally accepted accounting principles.

Management of the CWN, in furtherance of the integrity and objectivity of data in the financial statements, works with the University of Waterloo to develop and maintain a comprehensive system of internal accounting controls, which relate to the CWN. Management believes that this system of internal accounting controls provides reasonable assurance that financial records are reliable and form a proper basis for preparation of financial statements and that assets are properly accounted for and safeguarded. Management exercises judgment in determining that a reasonable balance is maintained between the costs of such controls and the benefits to be derived from them. The financial statements necessarily include some amounts that are based on management's best estimates and judgments. The internal accounting control process includes management's communication to employees and researchers of policies, which govern ethical business practice.

The Board of CWN carries out its responsibility for the financial statements principally through its Finance and Executive Committees.



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BERNADETTE CONANT, Executive Director



DONALD BROOKES, Manager of Business Operations

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Munkittrick, Kelly

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Lee, Lucila

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Ottawa, Ontario

Canadian Agricultural Rural Communities Initiative

Guelph, Ontario

Department of Fisheries and Oceans – Gulf Fisheries Centre

Moncton, New Brunswick

Environment Canada

Gatineau, Quebec

Environment Canada – Meteorological Service of Canada

Ottawa, Ontario

Environment Canada, NWRI – Fredericton

Fredericton, New Brunswick

Geological Survey of Canada (Atlantic)

Dartmouth, Nova Scotia

Health Canada

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Human Resources

Development Canada

Hull, Quebec

Indian and Northern Affairs Canada

Yellowknife, Northwest Territories

Pacific Biological Station

Nanaimo, British Columbia

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Alberta Environment

Edmonton, Alberta

Alberta Health & Wellness

Edmonton, Alberta

Alberta Research Council

Edmonton, Alberta

Alberta Sustainable Resource Development

Edmonton, Alberta

British Columbia Provincial Government

Victoria, British Columbia

Ministère de l'environnement du Québec

Montreal, Quebec

Ministry of Natural Resources

Peterborough, Ontario

NB Department of Environment and Local Government

Fredericton, New Brunswick

NB Department of Natural Resources and Energy

Fredericton, New Brunswick

NS Environmental Farm Plan Program

Truro, Nova Scotia

NS Federation of Agriculture

Truro, Nova Scotia

NS Soils Institute

Truro, Nova Scotia

ON Federation of Agriculture

Bowmanville, Ontario

ON Ministry of Agriculture

Guelph, Ontario

ON Ministry of the Environment

Toronto, Ontario

Ontario Ministry of Agriculture and Food

Guelph, Ontario

Ontario Ministry of Agriculture and Food – New Directions

Guelph, Ontario

PEI Department of Agriculture

Charlottetown, Prince Edward Island

PEI Department of Environment

Charlottetown, Prince Edward Island

Premier's Research Excellence Award

Toronto, Ontario

Saskatchewan Agricultural

Development Fund

Regina, Saskatchewan

LOCAL GOVERNMENTS

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Boisbriand, Quebec

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St–Laurent, Quebec

O Transit inc.

Montreal, Quebec

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Guelph, Ontario

Ontario Pork Growers

Ayr, Ontario

Ontario Power Generation Inc.

Toronto, Ontario

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Vancouver, British Columbia

Polar Continental Shelf Project

Yellowknife, Northwest Territories

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Clear Water Legacy

Burlington, Ontario

NON–GOVERNMENTAL ORGANIZATIONS

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Oldman River Water Quality

Lethbridge, Alberta

Agriculture Adaptation Council

Guelph, Ontario

Atlantic Salmon Federation

Charlottetown, Prince Edward Island

Climate Change Action Fund

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Augusta, Maine

New Brunswick Innovation Foundation

Fredericton, New Brunswick

Resources for the Future

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Reston, Virginia

Water Environment Research Foundation

Alexandria, Virginia

Hamilton Health Sciences Corporation

Hamilton, Ontario

CRESTech Divison of OCE Inc.

Toronto, Ontario

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Saskatoon, Saskatchewan

Grand River Conservation Authority

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Saint John

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ACKNOWLEDGEMENTS



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