Preface

Shalu Darshan*

McLaughlin Centre for Population Health Risk Assessment,
Faculty of Medicine,
University of Ottawa,
Room 216, 600 Peter Morand Crescent, Ottawa,
Ontario K1G 3Z7, Canada
Email: sdarshan@uottawa.ca
*Corresponding author

Donald Caleb Lawton

Earth Sciences 216,
University Research Centre, 2E-313,
University of Calgary,
2500 University Drive NW Alberta T2N 1N4, Canada
Email: lawton@ucalgary.ca

James Meadowcroft

School of Public Policy and Administration,
Carleton University,
5139 River Building, 1125 Colonel by-Drive, Ottawa,
Ontario K1S 5B6, Canada
Email: james.meadowcroft@carleton.ca

Michael Mehta

Department of Geography and Environmental Studies,
Thompson Rivers University,
805 TRU Way, Kamloops, British Columbia, V2C 0C8, Canada
Email: mmehta@tru.ca

Biographical notes: Shalu Darshan works at the McLaughlin Centre for Population Health Risk Assessment, University of Ottawa. Her academic background includes a PhD in Chemistry and Interdisciplinary Training in Population Health Risk Assessment and Management. Her research interests include risk management and policy of prion diseases, along with management strategies for developing countries to deal with the challenges posed by prion diseases, chemical and food toxicology, and profiling carcinogens in Canadian markets. She served as the Project Manager on the CCS project funded by Carbon Management Canada (CMC), a Network of Centres of Excellence supported by three major granting councils in Canada.

Donald Caleb Lawton is a geophysicist and expert in acquisition, processing and interpretation. He is a Professor from the Department of Geology and Geophysics at the University of Calgary in Alberta. His personal research contributions include writing and developing pre-stack depth migration and multi-component survey design code, developing anisotropic velocity models in areas of geological dip to precisely image subsurface structures of economic interest, assessing the potential for monitoring CO_2 storage in Redwater Reef and demonstrating the challenge of time-lapse monitoring in a clastic reservoir. He currently serves as the Director from the Containment and Monitoring Institute, Carbon Management Canada.

James Meadowcroft is a Professor from the School of Public Policy and Administration and in the Department of Political Science, Carleton University, where he holds a Canada Research Chair in Governance for Sustainable Development. His research is focused on how governments are adjusting their practices and policies in order to cope with the emergence of problems of the environment and sustainable development. His recent work focuses on energy and the transition to a low carbon society, and includes publications on carbon capture and storage, smart grids, the development of Ontario's electricity system, the politics of socio-technical transitions, and negative carbon emissions. He previously served as the team leader for risk management under Carbon Management Canada.

Michael Mehta is a Professor of Geography and Environmental Studies at Thompson Rivers University. He is a social scientist who focuses on environmental and health risk issues. He was Dean of the Faculty of Arts at Thompson Rivers University, Principal of Richardson College for the Environment at the University of Winnipeg, Executive Director of the Population Research Laboratory at the University of Alberta, and Chair of a program on the social, ethical, political and legal impacts of biotechnology at the University of Saskatchewan. His current research is on air pollution.

Carbon capture and storage (CCS), often referred to as carbon capture and geological storage, represents a mitigation strategy to decrease anthropogenic sources of greenhouse gas emissions. CCS involves capturing carbon dioxide emissions from large point sources such as power plants and industries, compressing it, and transporting it to a suitable storage site where it is injected into geological formations such as oil/gas and deep saline reservoirs. This special issue of the *International Journal of Risk Assessment and Management* (*IJRAM*) comprises papers focusing on potential geotechnical and other risks pertaining to CCS, as well as strategies to guide the safe and effective deployment of this technology.

This work was funded by Carbon Management Canada (CMC), a Network of Centres of Excellence supported by the three major granting councils in Canada. The overarching objective of this project is to develop an integrated risk management framework (IRMF) for CCS in a Canadian context. This transdisciplinary collaborative research effort included investigators from three Canadian universities (University of Ottawa, University of Waterloo, and University of Calgary).

The introductory paper by Leiss and Krewski sets the background for this work by discussing the major issues pertaining to implementation of CCS. These issues are discussed within three main categories, namely: government and industry factors; environmental risk factors; and socio-economic factors. The next two papers by Larkin et al. discuss the development of frameworks for environmental and human health risk

assessment and risk management for CCS projects and describe the evolution of regulatory practices for CCS in Canada.

Bankes examines legal aspects associated with establishment of CCS storage facilities, including post-closure transfer of liability from project developers to the government. Alberta has established a Post-Closure Stewardship Fund under which operators are liable to pay fees per tonne of CO_2 injected during operation, which may fund the cost of future post-closure operations and mitigation of potential risks of orphan sites.

Heyes and Urban investigate the economic viability of CCS using cost-benefit analysis. Based on the estimated value of social cost of carbon, commonly used as a policy input in Canada and the USA, the authors conclude that the benefits tend to be lower than costs for large-scale CCS undertakings by a small margin at this time.

Campbell-Árvai et al. discuss the challenges faced by decision makers in carbon management. These challenges range from systematic biases stemming from behavioural and perceptual deterrents and complexities associated with carbon management, such as overlooking the objectives and broad range of options, and not evaluating tradeoffs when choosing among alternatives. The authors illustrate through examples that a structured decision-making process might be most effective in improving decision-making pertaining to carbon management.

Sarkarfarshi et al. discuss the geological and pathway issues to monitor general site selection practices to reduce georisks. The authors discuss potential hazards associated with the main components of CCS with respect to the following four North American CCS sites: Shell QUEST Project (Canada); Project Pioneer (Canada); Weyburn Project (Canada); and FutureGen Project (USA).

Leiss and Larkin emphasise the importance of risk communication and public engagement and how it can aid in shaping public acceptance of risk issues arising from CCS projects. The next two contributions from Larkin et al. use structured expert elicitation exercises to draw from the expertise of international CCS experts on hazard and risk issues in injection and storage and risk management of low probability high impact events.

The final paper by Larkin et al. proposes an IRMF for CCS that provides a prototype to ensure that all relevant information on risk is considered in developing risk management strategies for CCS. This integrated framework envisages important roles for national and international bodies, and other key stakeholders and/or interested parties. The framework emphasises consultation and communication to facilitate productive interactions among all parties involved in the decision-making process.