UNIVERSITY OF SASKATCHEWAN

School of Environment and Sustainability

Annual Report

2009 - 2010

www.usask.ca/sens

On the cover:

Students from the School of Environment and Sustainability:

Clockwise from upper left: MES student Shannon Dyck, MSEM student Christine Markel, and MES student Jania Chilima

School of Environment and Sustainability

Annual Report

2009 - 2010

School of Environment and Sustainability

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Introduction

The School of Environment and Sustainability (SENS), founded in July 2007, underwent significant growth and change during 2009 - 2010. Its student body quadrupled in size, growing from ten graduate students to forty-one; the School's Centennial Chair, Douglas Clark, joined the faculty; the School's first Executive Director, Karsten Liber, was appointed; and, the School moved to its permanent home in Kirk Hall. The School also hosted a major outreach event in September 2009, in the form of a public forum and invitation-only workshop, collectively entitled *Shifting Sands: Shaping Sustainability in Northwestern Saskatchewan*. In May 2010, an announcement was made that Dr. Howard Wheater, renowned expert in sustainable water resource management, would join the School's faculty in October 2010 as the University of Saskatchewan's Canada Excellence Research Chair.

This growth was accompanied by the development and approval of many governance and policy documents, which have better delineated the School's structure and operation. Given the interdisciplinary focus of the School, these documents have been carefully considered, allowing for the participation of faculty from a broad range of disciplines and traditions.

Strategic planning continued during 2009 - 2010, with the first draft of a strategic plan in development. A curriculum review was held late in the academic year. Given the dynamic character of "environment and sustainability" as an evolving subject in academia, the School's curriculum will also evolve to keep pace.

Vision

We will create and integrate multiple understandings of natural and human environments and be internationally known for innovative, provocative, and wide-ranging approaches to environmental sustainability.

Mission

We enable sustainable communities and environments through collaborative research and teaching, graduate student engagement, and community involvement. We broaden understanding and develop champions of environmental sustainability by creating, exchanging, and translating knowledge using diverse perspectives.

Core Values

As a School, we value:

- Scholarly dialogue and debate regarding environment and sustainability
- Interdisciplinary and transdisciplinary scholarship
- Innovation and academic excellence among students and faculty
- Student growth and success
- Systems and holistic approaches to environmental sustainability
- Working on a variety of spatial and temporal scales
- Collaboration in teaching, research, and engagement
- Consultative and cooperative decision-making
- Respectful and substantive engagement with wide communities
- Inclusion of different ways of knowing

- Supporting sustainable and healthy communities and environments
- Making a difference through public discourse, deliberative processes, and informed citizenship
- Leading by example through attention to our own environmental footprint

Strategic Priorities

The faculty of the School of Environment and Sustainability continued to develop the School's strategic plan in 2009 – 2010. Progress to date was reviewed, and the strategic priorities were further refined, culminating in a draft strategic plan to be considered by faculty in 2010 – 2011.

The following strategic priorities were developed based on the discussion of the faculty held in February 2010. These are in draft form, with final wording yet to be approved. However, they capture the spirit of the discussions and the general priorities of the School.

The success of the School depends on the success of its people.
Given the collaborative nature of interdisciplinary activities, and the integrative nature of the training which the School aims to provide to its students, a team-based approach is vital to the success of many SENS activities. The success of teams (research, teaching, committees, etc.) depends upon the willingness and ability of individual faculty, staff, and students to contribute meaningfully to them. The fostering of linkages between SENS and the wider community of environmental and sustainability stakeholders will also be important.

SENS will champion interdisciplinary approaches to academic programming, providing students with a rich interdisciplinary learning environment.
Although difficult to define, sustainability is often considered to include three dimensions: environmental, social, and economic, although the emphasis is often on the environmental aspect. Students at the School of Environment and Sustainability are trained to address problems in interdisciplinary ways, and this requires interdisciplinary approaches to program delivery. The School will therefore strive to deliver its core courses in a team-taught format (with two faculty in the classroom at all times, sharing their different disciplinary perspectives on the subject matter). Students are encouraged to question the status quo, think broadly, and to consider and accept multiple ways of knowing to determine appropriate responses to environmental challenges.

Research activities at SENS will be collaborative, relevant, and interdisciplinary. Given the broad scope of inquiry in the field of environment and sustainability, only research which meets these criteria is sufficient to fully address the breadth and depth of possible research topics in the area. For SENS to be truly successful in its research endeavours, its focus must be on those projects which no one area of expertise can address alone – research efforts must, then, be collaborative and interdisciplinary. In addition, emphasis will be placed on projects that are environmentally and socially relevant, both regionally and globally. Possible areas for research collaboration include Biological and Cultural Diversity, Environmental Governance and Degraded Environments.

In its outreach activities, SENS will encourage and participate in the translation and exchange of knowledge with the wider community. Knowledge translation and exchange is a key feature of SENS' outreach activities. In order for the results of both basic and applied research to truly influence decisions and behaviours in the wider community, they need to be made available in a practical format that is accessible beyond the School. SENS makes a commitment to ensure that research efforts and results do not "end with publishing," but, rather, that an effort is made to mobilize the knowledge gained and to exchange it with learning from the broader community.

The School will work to build strong and meaningful partnerships within the institution, while being an advocate for interdisciplinarity. This work is done through the engagement of associate faculty with the activities of the School, developing partnerships regarding course delivery, and collaborating on interdisciplinary research projects.

Programs Offered

The School of Environment and Sustainability offers three interdisciplinary graduate programs:

- **Master of Sustainable Environmental Management** (MSEM): an interdisciplinary, course-based, professional-style program that can be completed in one year of full-time study. Students enrolled in this program will be required to complete 24 credit units of course work and a 6 credit unit independent project, and to participate in the Seminar in Environment and Sustainability. This program is intended to provide prospective or current environmental practitioners a post-graduate learning opportunity in sustainable environmental management.
- **Master of Environment and Sustainability** (MES): an interdisciplinary, thesis-based program that can be completed within two years of full-time study. Students enrolled in this program will be required to complete 12 credit units of course work and a thesis based on original research, and to participate in the Seminar in Environment and Sustainability.
- **Doctor of Philosophy** (PhD): an interdisciplinary, research-based program that can be completed within three years of full-time study. Students enrolled in this program will be required to complete a qualifying examination, 6 credit units of course work, a comprehensive examination, and a dissertation based on original research, and to participate in the Seminar in Environment and Sustainability.

Courses

The following courses were offered by the School of Environment and Sustainability during the 2009 - 2010 academic year.

Core Courses

ENVS 801.3 Ecosystem Science and Sustainability
Instructors: Josef Schmutz and Vladimir Kricsfalusy
An introduction to how principles and concepts of ecology and ecosystems science are applied to advance environmental sustainability. Students will gain a solid understanding of how natural systems function, and how scientists apply their understanding and uncertainties about ecosystems to address environmental management problems and to advance environmental sustainability.

ENVS 802.3 Human Dimensions of Environmental Change
Instructor: Geoff Cunfer
This course explores the past and present interactions between people and the natural world. It addresses ways that environment has molded human societies and ways that people have altered nature. Contemporary concerns for environmental sustainability are introduced by examining human entanglement with a range of natural and modified systems.

ENVS 803.3 Research in Environment and Sustainability
Instructor: Maureen Reed and Cherie Westbrook, Department of Geography and Planning, College of Arts and Science
The purpose of this course is to introduce graduate students to conceptual, practical, and ethical issues in conducting interdisciplinary research about environment and sustainability. By the end of the course, students will have a research plan from which their proposal and research activities can be developed.

ENVS 804.3 Decision-Making for Environment and Sustainability
Instructor: Douglas Clark
Intended to enhance students' professional and scholarly effectiveness, this course introduces an interdisciplinary approach to environmental conservation problems (from the policy sciences) that enables them to critically appraise and constructively engage with environmental and sustainability policy processes, and develop functional understanding of conventional institutional approaches to environmental management and new emergent approaches.

ENVS 805.3 Environmental Data Analysis and Management
Instructor: Bing Si
Environmental data management is complex because of its volume, qualitative and quantitative forms, and temporal and spatial characteristics. This course introduces students to statistical, qualitative, and visual methods of problem solving and data reduction and representation and describes methods for managing large and complex data sets.

ENVS 990 Seminar in Environment and Sustainability
The ENVS 990 Seminar Series features topics relevant to environment and sustainability. In addition to speakers from a variety of academic and non-academic backgrounds, MES and PhD students are required to present their research in the seminar.

ENVS 992.6 Project in Environment and Sustainability
Required For MSEM Program

ENVS 994 Research in Environment and Sustainability (Thesis)
Required For MES Program

ENVS 996 Research in Environment and Sustainability (Dissertation)
Required for PhD Program

Restricted Electives

ENVS 821.3 Sustainable Water Resources
Instructor: Monique Dubé
This course will rigorously explore water resource sustainability in western Canada from physical, chemical, biological, socio-economic, and technological perspectives. Biophysical influences on water abundance and quality, current threats to water resources, and efforts to provide for sustainable management of water resources will be examined.

ENVS 831.3 Current Issues in Land Reclamation and Remediation
Instructor: Charles Maulé
Current issues in land reclamation and remediation are examined. The impact of human activity in a variety of environments is examined and strategies for reclamation and remediation are investigated. Biophysical factors are the emphasis of the course, however the context of social and economic issues are incorporated.

ENVS 898.3 Environmental Economics and Policy Making
Instructor: Ken Belcher
This course is offered in conjunction with BPBE 430 in the Department of Bioresource Policy, Business, and Economics.
This course focuses on developing a formal understanding of natural resource use and resource and environmental policy using economic models. The focus of the course will be on renewable resources with some consideration of the unique characteristics of non-renewable resources. The course will develop detailed analyses of existing and proposed natural resource and environmental policy using the economic framework to evaluate the structure, efficiency, effectiveness and flexibility of these policies.

ENVS 898.3 Legal Issues and the Environment
Instructor: Marie-Ann Bowden
This course examines the role of Canadian legal institutions in securing sustainability goals. It canvasses the constitutional jurisdiction of the four levels of government, and critically examines the jurisprudence and legislation directed at environmental protection and management in Canada. The role of the SENS graduate within this legal rubric will also be discussed.

Other Elective Courses

ENVS 898.3 Biodiversity Conservation and Sustainability
Instructor: Vladimir Kricsfalusy
This course is designed to introduce students, in an integrative manner, to the field of biodiversity conservation and various aspects of sustainable development. Understanding biodiversity and its management requires an interdisciplinary approach with particular reference to mechanisms of change and human impacts on the environment.

ENVS 898.3 Droughts Impacts - Science and Social Costs
Instructor: Suren Kulshreshtha
This course provides the student with basic knowledge about the role of climate and economics in global to local change. We begin with an overview of the science of climate change, including causes, attributions, predictions, and scaling issues. Then climate impacts are considered, with emphasis on drought. Impacts on physical and biological aspects include effects on water supplies, vegetation, fire, pests, and diseases. Socio-economic impacts considered include health, income, employment, communities, and GDP. Methods and data for impact, adaptation and vulnerability assessment are studied and applied. Although the regional and community scales are emphasized, the global scale context is also examined. A research framework to integrate these concepts is developed and applied.

ENVS 898.3 Qualitative Research Methodologies and Methods
Instructor: Marcia McKenzie
The purpose of this course is to explore ways of approaching practical research projects from a variety of theoretical perspectives. Because practical research methods are built upon sophisticated philosophical foundations, understanding research means understanding how inquiry is conceptualized, contextualized, represented, and legitimated. What people do in research is influenced by their assumptions about knowledge and their understandings about the ways that knowledge is produced or constructed.

ENVS 898.3 Restoration Ecology: Principles, Practices, and Promise Toward Sustainability

Instructor: Josef Schmutz

This course is designed to expand graduate students' backgrounds in the area of restoration ecology. Course readings, discussions, and assignments will be based on ecological principles in terrestrial ecosystems including wetlands but not directly addressing lakes or ocean environments. Study will concentrate on the ecological principles that inform restoration ecology, on successful practices, and limitations. It will utilize case studies to emphasis these principles and practices. The course will also examine the need for ecological restoration and its potential role and promise toward sustainability.

ENVS 990: Seminar in Environment and Sustainability, 2009 - 2010

- From Uneven Environmental Management to Just Sustainability: A Tale of Canadian Biosphere Reserves, Maureen Reed, September 11, 2009
- What Is Sustainability?, moderated by Douglas Clark and Charles Maulé, September 18, 2009
- Sustainability Assessment: Understanding the Big Picture, Robert Gibson, University of Waterloo, September 25, 2009
- Climate Change and Saskatchewan Public Policy, ENVS 992 Presentation, Peter Prebble, and Green Management Matters: Academy of Management 2009 Conference Report, Al Scholz, MSEM Candidate, and Niran Harrison, Department of Human Resources and Organizational Behaviour, Edwards School of Business, October 9, 2009
- Research Ethics and Ethical Research with Humans, Diane Martz, Director, Ethics Office, October 16, 2009
- Classics Revisited: Rachel Carson's *Silent Spring*, moderated by Maureen Reed, October 30, 2009
- Mountains That See, and That Need To Be Seen: Indigenous Concerns Over Degrading Visibility in BC's Lower Mainland/Fraser Valley, Keith Carlson, Department of History, College of Arts and Science, November 13, 2009
- Encounters with Conservation and Development in Suriname: How Indigenous Peoples Are Trying to Make Things "Right," Bethany Haalboom, Indigenous Land Management Institute, College of Agriculture and Bioresources, November 20, 2009
- From Endangered Peoples to Endangered Worldviews: The Place of Indigenous Being in Restoring Ecological Health, Lewis Williams, Ashgate International Human Ecology Networking Project, and Rose Roberts, College of Nursing and School of Public Health, November 27, 2009
- Tree Rings and Soil Chemistry: A Case Study of Pollution from the Sydney Steel Plant, Colin Laroque, Department of Geography and Environment, Mount Allison University, January 15, 2010
- Evaluating the Social Capital Accrued in Large Research Networks: The Case of the Sustainable Forest Management Network (1995-2009), Nicole Klenk, Post-Doctoral Fellow, Universities of Waterloo and Saskatchewan, January 22, 2010
- Holocene Paleoenvironments and Past Human Occupation of the Northern Plains: The View From the Cypress Hills, Liz Robertson, Department of Archaeology and Anthropology, College of Arts and Science, January 29, 2010
- Tools and Collaborative Approaches: Toward Bridging the Communication Gap Between Scientists and Rural and Northern Communities, Ryan Brook, Department of Animal and Poultry Science, College of Agriculture and Bioresources, February 12, 2010
- Can We Make A Difference? Perfluorinated Compounds in the Environment, Paul Jones, February 26, 2010
- Integrating Biodiversity Conservation with Sustainable Development: Can We Achieve a Balance?, Vladimir Kricsfalusy, March 12, 2010
- ENVS 992 Proposal Symposium, March 19, 2010
- Institutional Requirements for Watershed Cumulative Effects, Poornima Sheelanere, MES Candidate, and Large-Scale Wind Energy in Saskatchewan: Case Studies in Public and Political Decision-Making, Garrett Richards, MES Candidate, March 26, 2010

People

Administration

- Jim Basinger (BSc, Alberta; MSc, Alberta; PhD, Alberta), Acting Associate Vice-President Research, Executive Sponsor (*to October 2009*)
- Karsten Liber (BSc, Guelph; PhD, Guelph), Acting Director (*July 2008 – September 2009*); Executive Director (*starting October 2009*)

Faculty

Standard Appointments

- Douglas Clark, Assistant Professor and Centennial Chair in Human Dimensions of Environment and Sustainability (BSc, Victoria; MSc, Alberta; PhD, Wilfrid Laurier) (*starting August 2009*)
- Monique Dubé, Associate Professor and Canada Research Chair in Aquatic Ecosystem Health Diagnosis (BSc, British Columbia; MSc, Saskatchewan; PhD, New Brunswick) (*on leave January – December 2009*)
- Vladimir Kricsfalusy, Associate Professor (MSc, Uzhgorod; PhD, Uzhgorod and the Academy of Sciences of Ukraine)
- Karsten Liber, Professor (BSc, Guelph; PhD, Guelph) (*starting October 2009*)
- Paul Jones, Associate Professor (BSc, Otago; PhD, Otago) (*starting October 2009*)

Primary Joint Appointments

- Maureen Reed, Professor (BSc, Victoria; MA, Toronto; PhD, Waterloo) (70% SENS; 30% Department of Geography and Planning, College of Arts and Science) (*on leave September 2008 – August 2009*)

Secondary Joint Appointments

- MJ Barrett (BAS, Harvard; BEd, Queen's; MES, York; PhD, Regina) (25% SENS, 75% Department of Curriculum Studies, College of Education) (*starting January 2010*)
- Ken Belcher, Associate Professor (BSA, Manitoba; MNRM, Manitoba; PhD, Saskatchewan) (30% SENS; 70% Department of Bioresource Policy, Business, and Economics, College of Agriculture and Bioresources) (*on leave January – June 2010*)
- Marie-Ann Bowden, Professor (BA, Mount Allison; LLB, Queen's; LLM, Osgoode Hall) (25% SENS, 75% College of Law)
- Geoff Cunfer, Associate Professor (BA, North Carolina; MA, Texas Tech; PhD, Texas) (25% SENS; 75% Department of History, College of Arts and Science)
- Charles Maulé, Professor (BSc, British Columbia; MSc, Alberta; PhD, Alberta) (33% SENS; 67% Department of Agricultural and Bioresource Engineering, College of Engineering)
- Marcia McKenzie, Assistant Professor (BSc, British Columbia; MEd, Brock; PhD, Simon Fraser) (25% SENS; 75% Department of Educational Foundations, College of Education)
- Bram Noble, Associate Professor (BA, Memorial; MES, Wilfrid Laurier; PhD, Memorial) (30% SENS; 70% Department of Geography and Planning, College of Arts and Science)
- John Pomeroy, Professor and Canada Research Chair in Water Resources and Climate Change (BSc, Saskatchewan; PhD, Saskatchewan) (10% SENS; 90% Department of Geography and Planning, College of Arts and Science) (*on leave July 2009 – June 2010*)
- Todd Pugsley, Professor (BSc, New Brunswick; MSc, Calgary; PhD, Calgary) (30% SENS; 70% Department of Chemical Engineering, College of Engineering) (*to May 2010*)
- Bing Si, Associate Professor (BSc, Hebei Agricultural; MSc, Hebei Agricultural; PhD, Guelph) (30% SENS; 70% Department of Soil Science, College of Agriculture and Bioresources)

Associate Appointments

- Angela Bedard-Haughn, Assistant Professor (BSc, Saskatchewan; MSc, Saskatchewan; PhD, California – Davis), Department of Soil Science, College of Agriculture and Bioresources
- Scott Bell, Associate Professor (BEd, British Columbia; MA, California – Santa Barbara; PhD, California – Santa Barbara), Department of Geography and Planning, College of Arts and Science
- Michael Gertler, Associate Professor (BES, Waterloo; MSc, McGill; PhD, Cornell), Department of Sociology, College of Arts and Science
- Jill Gunn, Assistant Professor (BA, Saskatchewan; MSc, Northern British Columbia; PhD, Saskatchewan), Department of Geography and Planning, College of Arts and Science
- Xulin Guo, Associate Professor (BSc, Beijing; MSc, Beijing; PhD, Kansas), Department of Geography and Planning, College of Arts and Science
- Hayley Hesseln, Associate Professor (BComm, Saskatchewan; PhD, Colorado), Department of Bioresource Policy, Business, and Economics, College of Agriculture and Bioresources
- Jeff Hudson, Associate Professor (BSc, Trent; MSc, Guelph; PhD, Waterloo), Department of Biology, College of Arts and Science
- Susan Kaminskyj, Professor (BSc, Toronto; MSc, Toronto; PhD, York), Department of Biology, College of Arts and Science
- Suren Kulshreshtha, Professor (BSc, Agra; MSc, Agra; PhD, Manitoba), Department of Bioresource Policy, Business, and Economics, College of Agriculture and Bioresources
- Ted Leighton, Professor (AB, Cornell; DVM, Saskatchewan; PhD, Cornell; DACVP), Department of Veterinary Pathology, Western College of Veterinary Medicine
- Yen Han-Lin, Professor (BSc, National Taiwan Institute of Technology; PhD, Rensselaer Polytechnic Institute), Department of Chemical Engineering, College of Engineering
- Janet McVittie, Assistant Professor (BSc, Saskatchewan; BEd, Saskatchewan; PhD, Saskatchewan), Department of Curriculum Studies, College of Education
- David Natcher, Associate Professor (BA, Alberta; MA, Alaska; PhD, Alberta), Department of Bioresource Policy, Business, and Economics, College of Agriculture and Bioresources
- Mehdi Nemati, Associate Professor (BSc, Amirkabir; MSc, Amirkabir; PhD, Manchester), Department of Chemical Engineering, College of Engineering
- Aloysius Newenham-Kahindi, Assistant Professor (BA, Pontifical Urbaniana Universitat; MSc, University College Dublin; PhD, University College Dublin), Department of Human Resources and Organizational Behaviour, Edwards School of Business
- Robert Patrick, Assistant Professor (BA, British Columbia; BEd, Dalhousie; MA, Simon Fraser; PhD, Guelph), Department of Geography and Planning, College of Arts and Science
- Greg Poelzer, Associate Professor (BA, Alberta; MA, Carleton; PhD, Alberta), Department of Political Studies, College of Arts and Science
- Elizabeth Robertson, Assistant Professor (BSc, Alberta; MA, Queen's; PhD, Alberta), Department of Archaeology and Anthropology, College of Arts and Science
- Vladimir Vujanovic, Associate Professor (BSc, Zagreb; MSc, Belgrade; PhD, Belgrade), Department of Food and Bioproduct Sciences, College of Agriculture and Bioresources
- Bill Waiser, Professor (BA, Trent; MA, Saskatchewan; PhD, Saskatchewan), Department of History, College of Arts and Science
- Yangdou Wei, Associate Professor (BSc, Huazhong; MSc, Huazhong; PhD, Copenhagen), Department of Biology, College of Arts and Science
- Karen Wiebe, Professor (BSc, Simon Fraser; PhD, Saskatchewan), Department of Biology, College of Arts and Science

Adjunct Appointments

- Murray Bentham (BSc, Saskatchewan; MSc, Saskatchewan; PhD, Saskatchewan), Specialist, Agri-Environmental Modelling, Agriculture and Agri-Food Canada
- Biplob Das (BSc, Chittagong; MSc, Chittagong; MSc, Alberta; PhD, Victoria), Senior Aquatic Scientist, Science Support Unit, Saskatchewan Environment
- John-Mark Davies (BSc, Saskatchewan; MSc, Manitoba; PhD, Victoria), Water Quality Scientist, Saskatchewan Watershed Authority
- Annette Desmarais (BA, Simon Fraser; MA, Sussex; PhD, Calgary), Associate Professor, International Studies Program, Faculty of Arts, University of Regina
- Steven E. Franklin (BES, Waterloo; MA; Waterloo; PhD, Waterloo), President and Vice-Chancellor, Trent University
- Michael Hill (BSc, North Carolina State; MSc, Eastern Kentucky; PhD, Western Ontario), Head of Wetland Restoration, Ducks Unlimited
- Richard Robarts (BSc, Victoria; MSc, Waterloo; PhD, Rhodes), Director, UNEP/GEMS Water Programme, National Water Research Institute, Environment Canada
- Josef Schmutz (BSc, Wisconsin; MSc, Alberta; PhD, Queen's; BEd, Saskatchewan), Prairie Ecodesign
- Garth van der Kamp (BSc, British Columbia; MSc, British Columbia; PhD; Free University, The Netherlands), Research Scientist, National Hydrology Research Centre, Environment Canada
- Elaine Wheaton (BSc, Saskatchewan; MSc, Saskatchewan; PhD, Saskatchewan), Climatologist, Saskatchewan Research Council

Sessional Lecturers

- Josef Schmutz (BSc, Wisconsin; MSc, Alberta; PhD, Queen's; BEd, Saskatchewan)

Staff

- Sharla Daviduik, Administrative Officer (BSc, Saskatchewan; MRM, Simon Fraser; CEPIT)
- Twyla Slipiec, Financial Officer (BComm, Saskatchewan) (*starting June 2010*)
- Irene Schwalm, Graduate Secretary

Joint Positions shared with the School of Public Health and the Johnson-Shoyama Graduate School of Public Policy:

- Pam Larson, Financial Officer (BComm, Saskatchewan, CMA) (*to April 2010*)
- Erica Schindel, Communications and Marketing Specialist (BComm, Saskatchewan)

Students

Master of Sustainable Environmental Management Candidates

- Andrew Cameron (BComm, Queen's)
- Xing Chen (BE, Tianjin University of Technology)
- Gelman Cortes (BE, Universidad Libre de Colombia)
- Colin Gibb (BSc, Saskatchewan)
- Emily Heffring (BA, Alberta)
- Matthew Hiltz (BSc, Saskatchewan)
- Chad Jackson (BComm, Saskatchewan; BSc, Saskatchewan)
- Jasper Johnson (BA, Bishop's)

- Cara Klassen (BA, Saskatchewan)
- Michel Lavallée (BSc, Alberta)
- Rita Marcinowski (BSc, Saskatchewan)
- Christine Markel (BSc, Saskatchewan)
- Caitlin Mroz (BSc, McMaster)
- Mindy Neufeldt (BA, Saskatchewan)
- Peter Prebble (BBA, Prince Edward Island; MEd, Saskatchewan)
- Al Scholz (BSA, Saskatchewan; BEd, Saskatchewan)
- Nicholas Trevisan (BSc, Guelph)
- Victoria Worm (BSc, Western Washington)
- Brienne Young (BA, Saskatchewan)

Master of Environment and Sustainability Candidates

- Saima Abbasi (MSc, NWRP Agricultural University, Pakistan)
- Åsa Almstedt (BA, Stockholm)
- Jania Chilima (BSc, Trent)
- Chelsea Dale (BA, Malaspina)
- Shannon Dyck (BA, Saskatchewan)
- Yekaterina Dobrovolskaya (BE, Kazakh-British Technical University, Kazakhstan)
- Tobi Jeans (BA, Memorial)
- Vijayalakshmi Kalagnanam (BEd, Saskatchewan)
- John Kearns (BA, Carleton)
- Skye Ketilson (BSA, Saskatchewan)
- Vernon Kiss (BA, Saskatchewan; LLB, Saskatchewan)
- Garrett Richards (BSc, Saskatchewan; BA, Saskatchewan)
- Poornima Sheelanere (BSc, Mysore; MSc, Mysore, India)
- Yimin Sun (BSc, East China Normal University; MSc, East China Normal University)

Doctor of Philosophy in Environment and Sustainability Candidates

- Julia Baird (BSc, Alberta; MSc, Saskatchewan)
- Dennis Duro (BA, British Columbia; MGIS, Calgary)
- Colleen George (BA, McMaster; BSc, McMaster; MES, Lakehead)
- Allison Henderson (BSc, Saskatchewan; MSc, Simon Fraser)
- Jean Kayira (BEd, Malawi; MA, Clark, USA)
- Lindsay Tallon (BSA, Saskatchewan; MSc, Saskatchewan)
- Arcadio Viveros Guzman (MSc, Colegio de Postgraduados; MEd, Saskatchewan)
- Lisa White (BSc, Saskatchewan; MSc, Saskatchewan)

Student Demographics

Admissions

The admissions statistics for 2009 - 2010 are summarized in Table 1. A total of ninety-eight applications were received for the School's three graduate programs, with fifty-one offers of admission made. Thirty new students began graduate programs in SENS in autumn 2009, and one student began in January 2010.

Table 1 – Admissions 2009 - 2010

Program	Applications Received	Offers of Admission	Transfers from Other Units	Total Offers of Admission and Transfers	Students Who Registered	Reasons Applicants Did Not Register
MSEM	40	28	0	28	16	6 deferrals; 4 declined; 1 discontinued; 1 retraction
MES	44	17	1	18	11	2 deferrals; 2 declined; 3 discontinued
PhD	14	6	0	6	4	1 declined; 1 retraction
Total	98	51	1	52	31	21

The admission grade point averages for students registering in the three programs in 2009 - 2010 were:

- MSEM – 73.9%
- MES – 80.2%
- PhD – 84.3%

A total of forty-one graduate students were registered in SENS at the end of the 2009 - 2010 academic year, as summarized in Table 2. The size of the SENS student body quadrupled in size, going from ten students registered at the end of the 2008 - 2009 academic year, to forty-one registered at the end of the 2009 - 2010 year.

Table 2 – Total Number of SENS Students, By Program

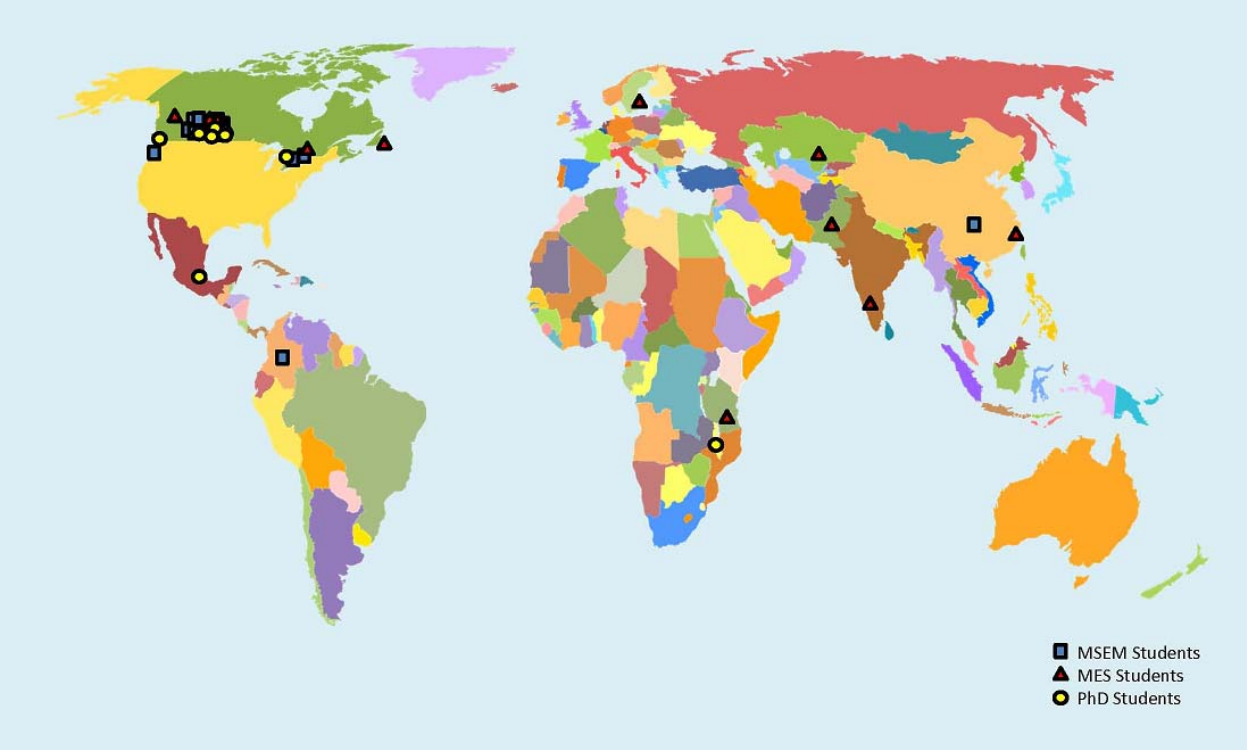
Program	2008 - 2009 Intake	2009 - 2010 Intake	Total
MSEM	3	16	19
MES	3	11	14
PhD	4	4	8
Total	10	31	41

These forty-one students came to the School from around the world, although nearly half of them identify Saskatchewan as home:

- Saskatchewan – 18 students (43.9%)
- Other Canadian Provinces/Territories – 15 students (36.6%)
- International – 8 students (19.5%)

This distribution is shown in Figure 1. In 2009 - 2010, the SENS student body represented eight countries: Canada, Mexico, Colombia, Sweden, Kazakhstan, China, India, and Malawi.

Figure 1 – SENS Student Geographic Origins, 2009 - 2010



Poornima Sheelanere was the first Master of Environment and Sustainability student to defend her thesis; this occurred in June 2010. The School anticipates that a number of MSEM students will complete their degree requirements by August 2010. The first SENS students to receive their degrees will graduate at the convocation ceremony in October 2010. The School will then develop and implement an alumni engagement strategy to maintain contact with these important members of the SENS community.

Scholarships, Awards and Student Funding

Depending on their program, SENS students are eligible to receive funding from a variety of sources:

- SENS Scholarship Funding – this funding is provided to the School by the College of Graduate Studies and Research, specifically to support SENS graduate students.
- Other University of Saskatchewan Funding – this includes funding provided to students from other academic units, and includes campus-wide awards administered by the College of Graduate Studies and Research, such as Dean's Scholarships and the Robson Bursary.
- Tri-Council Funding – students in thesis programs are eligible to apply for SSHRC or NSERC scholarships, depending on the focus of their research. Students may also be supported by Tri-Council funds received by their supervisor.

- Other External Funding – this includes funding from provincial government sources, non-Tri-Council federal government funding, awards administered by agencies external to the University of Saskatchewan, industry funding, and funding from other faculty research grants.

Several SENS students received major Tri-Council scholarships for the 2009 - 2010 academic year:

- Julia Baird, PhD candidate, held a SSHRC Canada Graduate Scholarship from 2007 to 2010.
- Allison Henderson, PhD candidate, held an NSERC Postgraduate Doctoral Scholarship in 2008 and 2009.
- Garrett Richards, MES candidate, received a SSHRC Joseph-Armand Bombardier Canada Graduate Scholarship for 2009 - 2010.
- Lindsay Tallon, PhD candidate, received a NSERC Industrial Postgraduate Scholarship in 2009.

A Dean's Scholarship, a major University of Saskatchewan scholarship, was received by MES candidate Yekaterina Dobrovolskaya.

Student Initiatives

The School of Environment and Sustainability Students' Association (SEnSSA) expanded its executive in 2009 - 2010, with Allison Henderson returning as President. Dennis Duro moved to the Vice-President role, with the duties of Secretary fulfilled by Brienne Young and Nicholas Trevisan. Andrew Cameron served as Treasurer and John Kearns served as Webmaster. A new campus liaison committee was struck, with Emily Heffring, Colleen George, and Shannon Dyck as its members. The group also revised its constitution.

SEnSSA endorsed and participated in a major campaign to promote the implementation of sustainable water practices on the University of Saskatchewan campus. Entitled *Better Than Bottled*, this campaign has two goals: to improve the access to clean, safe, public drinking water to members of the University of Saskatchewan community, and to compile information regarding whether the use of bottled water is necessary on campus, along with an examination of the environmental and social impacts of bottled water.

A number of events were hosted by SEnSSA over the 2009 - 2010 year. Several students attended the re-introduction of the black-footed ferret into its natural habitat at Grasslands National Park in October 2009. SEnSSA also hosted a speaker from the Pembina Institute and participated in the 350.org climate change event that month. In December 2009, the group hosted a webcast of the Munk Debate on Climate Change, and in March 2010, it hosted a year-end social for members of the SENS community.

Research and Scholarly Work

This summary represents the research and scholarly work of those faculty holding standard, primary-joint, or secondary-joint appointments in the School of Environment and Sustainability during 2009 - 2010. While all research grants listed may not have been managed through the School, the research often involves SENS graduate students.

Books, Chapters in Books, Expository and Review Articles

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Bowden, M.A. 2010. Co-Editor. The Demise of Environmental Assessment in Canada. Journal of Environmental Law and Practice: 21. Special Issue.

Cunfer, G., ed. 2010. *As a Farm Woman Thinks: Life and Land on the Texas High Plains, 1890 – 1960*. Lubbock: Texas Tech University Press.

Duncan, L.F., and **M.A. Bowden**. 2010. *A Legal Guide to Aboriginal Drinking Water: A Prairie Province Perspective*. Tomorrow Foundation; Alberta Law Foundation; Walter and Duncan Gordon Foundation.

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McAfee, B., R. de Camino, P. Burton, B. Eddy, L. Fähser, C. Messier, **M. Reed**, T. Spies, and R. Vides. 2010. "Managing Forested Landscapes for Socio-Ecological Resilience." In: *Forests and Society – Responding to Global Drivers of Change*, G. Mery, P. Katila, G. Galloway, R. Alfaro, M. Kanninen, M. Lobovikov, and J. Varjo (editors). IUFRO World Series Volume 25. Vienna, Austria: IUFRO.

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Noble, B.F. 2010. "Strategic Environmental Assessment." In: *The Canadian Encyclopedia*. Ottawa, ON: Historica Foundation of Canada.

Pomeroy, J.W., as a member of The Expert Panel on Groundwater. 2009. *The Sustainable Management of Groundwater in Canada*. Ottawa: Council of Canadian Academies. 254 pages.

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Reed, M.G. 2009. "Environmental Governance and Gender in Canadian Resource Industries and Communities." In: *Resource and Environmental Management in Canada: Addressing Conflict and Uncertainty*, 4th Edition, B. Mitchell (editor). Don Mills: Oxford University Press.

Reed, M.G. 2009. "Environmental Justice and Community-Based Ecosystem Management." In: *Speaking for Ourselves: Environmental Justice in Canada*, R.J. Agyeman, P. Cole, R. Haluza-Delay, and P. O'Riley (editors). Vancouver: UBC Press. Pp. 163-180.

Reed, M.G. 2010. "Conserver Society." In: *The Canadian Encyclopedia*. Toronto: The Historica-Dominion Institute.

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Chang, H., Y. Wan, J. Naile, X. Zhang, S. Wiseman, M. Hecker, M.H.W. Lam, J.P. Giesy, and **P.D. Jones**. 2010. Simultaneous quantification of multiple classes of phenolic compounds in blood plasma by liquid chromatography-electrospray tandem mass spectrometry. *Journal of Chromatography A* 1217(4):506-513.

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Ellis, C.R., **J.W. Pomeroy**, T. Brown, and J. MacDonald. 2010. Simulation of snow accumulation and melt in needleleaf forest environments. *Hydrology and Earth System Sciences* 14:925-940.

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Fang, X., and **J.W. Pomeroy**. 2009. Modelling blowing snow redistribution to Prairie wetlands. *Hydrological Processes* 23(18):2557-2569.

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Harriman Gunn, J. and **B. Noble**. 2009. Integrating cumulative effects in regional strategic environmental assessment frameworks: lessons from practice. *Journal of Environmental Assessment Policy and Management* 11(3):267-290.

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Shook. K. and **J.W. Pomeroy**. 2010. Hydrological effects of the temporal variability of the multiscaling of snowfall on the Canadian prairies. *Hydrology and Earth System Science Discussions* HESS-2010-30.

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Contributed (Non-Invited) Papers/Abstracts in Published Conference Proceedings

Anderson, J., S. Wisement, E. Franz, G.M. El-Din, J.W. Martin, **P. Jones**, **K. Liber**, and J.P. Giesy. 2010. Growth of *Chironomus dilutus* larvae exposed to ozone-treated and untreated oil sands process water. Society of Environmental Toxicology and Chemistry – Prairie Northern Chapter, 1st Annual Meeting, Saskatoon, SK.

Ball, M. and **B.F. Noble**. 2010. Indicators for watershed cumulative effects assessment: an analysis of environmental impact statements in the South Saskatchewan River Basin. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Biswas, A., and **B.C. Si**. 2009. Scaling analysis of irregularly sampled soil properties using second generation wavelet. International Annual Meetings of American Society of Agronomy – Crop Science Society of America – Soil Science of America, Pittsburgh, PA, USA.

Biswas, A., and **B.C. Si**. 2009. Elucidation of controls of soil water storage in the landscape using Hilbert-Huang Transform. International Annual Meetings of American Society of Agronomy – Crop Science Society of America – Soil Science of America, Pittsburgh, PA, USA.

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He, Y., S.B. Wiseman, M. Hecker, **P. Jones**, M. Gamel El-Din, J.W. Martin, and J.P. Giesy. 2009. Effects of ozone-treated and untreated sediment-free oil sand processed water on *in vitro* steroidogenesis. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

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Kricsfalusy, V. 2010. Invasion success of *Cynanchum rossicum* (Kleopow) Borhidi: do habitat affinities and species traits matter? IX International Conference on Anthropization and Environment of Rural Settlements, Flora and Vegetation. M.G. Kholodny Institute of Botany NAS of Ukraine, Kyiv.

Kricsfalusy, V., and N. Trevisan. 2010. Threat status assessment and geographic distribution patterns of rare and endangered plants. Biodiversity 2010 and Beyond: Science and Collections. 2010 Society for the Preservation of Natural History Collections and the Canadian Botanical Association Joint Conference, Ottawa, ON.

Naile, J.E., S.B. Wiseman, **P. Jones**, and J. Giesy. 2009. Effects of PFCs on gene expression of the H4IIE rat hepatoma cell line. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Naile, J.E., J. Khim, T. Wang, C. Chen, B. Kwon, C. Koh, **P. Jones**, Y. Lu, and J. Giesy. 2009. Perfluorinated compounds in environmental samples collected from the estuarine and coastal areas of Korea. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Nasen, L., and **B.F. Noble**. 2009. Environmental effects assessment of oil and gas activity on a semi-native grassland in southwest Saskatchewan. Proceedings of the 2009 Annual General Meeting and Conference, Canadian Land Reclamation Association, Quebec City, QC.

Nasen, L., and **B.F. Noble**. 2010. The status of EIA follow-up and reclamation practices for grassland oil and gas development in Saskatchewan. 2010 Conference and Annual General Meeting of the Canadian Land Reclamation Association, Red Deer, Alberta.

Oellers, J., D. Vardy, A. Thompsett, J. Doering, H. Hollert, **K. Liber**, J.P. Giesy, and M. Hecker. 2010. Acute toxicity of lead and copper to early life-stages of white sturgeon (*Acipenser transmontanus*) and rainbow trout (*Oncorhynchus mykiss*). Society of Environmental Toxicology and Chemistry – Europe, 20th Annual Meeting, Seville, Spain.

Parrott, J.L., D. Turcotte, L.M. Hewitt, **K. Liber**, J.P. Sherry, and J. Headley. 2009. Effects of oil sands pond sediments in fish. 36th Annual Aquatic Toxicity Workshop, La Malbaie, QC.

Puttaswamy, N. and **K. Liber**. 2009. Identification of causes of oil sands coke leachate toxicity. 36th Annual Aquatic Toxicity Workshop, La Malbaie, QC.

Puttaswamy, N. and **K. Liber**. 2010. Identification of causes of oil sands coke leachate toxicity. Society of Environmental Toxicology and Chemistry – Prairie Northern Chapter, 1st Annual Meeting, Saskatoon, SK.

Schiffer, S.T., L.E. Doig, and **K. Liber**. 2010. Diatom analysis of Ross Lake sediments. Society of Environmental Toxicology and Chemistry – Prairie Northern Chapter, 1st Annual Meeting, Saskatoon, SK.

Seitz, N.E., C.J. Westbrook, and **B.F Noble**. 2010. Bringing science into river systems cumulative effects assessment practice. 36th Annual Scientific Meeting of the Canadian Geophysical Union, Ottawa, ON.

Toor, N., X. Han, E. Franz, M. MacKinnon, J. Martin, and **K. Liber**. 2009. Persistence and toxicity of naphthenic acids in oil sands process-affected waters and commercial mixtures: understanding wetland bioremediation. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Turcotte, D., M. Kautzman, K. Peru, J. Headley, and **K. Liber**. 2009. Characterizing the toxic interactions between salinity and naphthenic acids in the toxicity of oil sands process water to freshwater invertebrates. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Wan, Y., S.B. Wiseman, H. Chang, X. Zhang, **P. Jones**, M. Hecker, K. Kannan, J. Hu, M. Lam, and J. Giesy. 2009. Origin of hydroxylated brominated diphenyl ethers: natural compounds or man-made flame retardants? Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Wiseman, S.B., Y. Wan, X. Zhang, H. Chang, M. Hecker, **P. Jones**, M. Lam, and J. Giesy. 2009. Mechanism of biotransformation of methylated-PBDEs to hydroxylated-PBDEs. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Yang, Y., S.B. Wiseman, J. Herve, R. Farmahin, T.B. Fredricks, P.W. Bradley, A. Cohen-Barnhouse, Y. Wan, **P. Jones**, J. Newsted, S.W. Kennedy, M. Zwiernik, S. Bursian, and J. Giesy. 2009. Effects of chlorinated dioxins and furans on Japanese quail, common pheasant and domestic chicken: insights from *in ovo* studies. Society of Environmental Toxicology and Chemistry 30th Annual Meeting, New Orleans, LA, USA.

Technical Reports Relevant to Academic Field

Barrett, M.J. 2009. *Spring into Action: At the Intersections of Education, Environment, and Aboriginal Perspectives*. University of Saskatchewan. Report prepared following two-day workshop hosted June 8 – 9, 2009 by the Regional Centre of Expertise in Education for Sustainable Development, University of Saskatchewan College of Education and School of Environment and Sustainability.

Clark, D. 2010. *Socio-Economic Impact Assessment of the Aishihik Wood Bison Transplant*. Technical report to Environment Yukon and Environment Canada. 66 pages.

Dias, V., and **K. Belcher**. 2010. *Study on the Public Policy Implications of Ecological Goods and Services (EG&S) Programs*. Progress report submitted to Ministry of Agriculture, Government of Saskatchewan. 31 pages.

Dougan J. et al., incl. **V. Kricsfalusy**. 2009. "Terrestrial Resources." In: *Red Hill Creek Valley Integrated Monitoring Plan*. AMEC/Philips. Prepared for City of Hamilton, Ontario, p. 1-49.

Dubé M. 2010. *Canada's Waters – An Opportunity for National and International Leadership*. Report prepared upon request by the Honorable Leader of the Opposition, Dr. Michael Ignatieff and the Honorable Ralph Goodale, MP for Regina-Wascana.

Dubé M., M. Johnston, E. Wheaton, K. Wallace, A. Harwood, and V. Wittrock. 2010. *Development of a Framework for Cumulative Effects Assessment and an Ecological Monitoring Plan for Northwest Saskatchewan*. Report Prepared for Ministry of Environment, Government of Saskatchewan, SRC Publication No. 12782-1E10.

Dubé M. and Schryer Environmental Consulting. 2010. *Dryden Pulp and Paper Mill Environmental Effects Monitoring*, Cycle 5. Final interpretative report. Submitted to Environment Canada for Domtar Pulp and Paper Products Inc., Dryden, ON.

Dubé M. and A. Harwood. 2010. *Conformity Analysis for the Matoush Underground Exploration Program*. Report Prepared for Cree Regional Authority, SRC Publication No. 10432-3E10.

Dubé M. and A. Harwood. 2010. *Development of Site-Specific Water Quality Guidelines for Prairie Creek, NWT*. Report Prepared for Canadian Zinc Corporation, SRC Publication No. 10432-1E10.

Krasznai, A., and **K. Belcher**. 2010. *Perceptions on Recreational Leases in Rural Saskatchewan*. Submitted to Ministry of Agriculture, Government of Saskatchewan, 69 pages.

Munkittrick K., A. Harwood, and **M. Dubé**. 2010. *Concept Paper for a Cumulative Effects Monitoring Framework for the Beaufort Sea*. Report prepared for Indian and Northern Affairs Canada, SRC Publication No. 12946-1E10.

Pomeroy, J., X. Fang, C. Westbrook, A. Minke, X. Guo and T. Brown. 2009. *Prairie Hydrological Model Study Draft Comprehensive Report,* October 2009. Centre for Hydrology Report No. 6. Centre for Hydrology, University of Saskatchewan, Saskatoon. 109 pages.

Pomeroy, J., X. Fang, C. Westbrook, A. Minke, X. Guo and T. Brown. 2010. *Prairie Hydrological Model Study Final Report*. Centre for Hydrology Report No. 7. Centre for Hydrology, University of Saskatchewan, Saskatoon. 127 pages.

Reed, M.G., S. Daviduik, G. Richards, M. Neufeldt, P. Sheelanere, J. Kayira, **B. Noble**, **M.A. Bowden**, **K. Liber**, and E. Schindel. 2010. *Shifting Sands: Shaping Sustainability in Northwestern Saskatchewan. Report on a Public Outreach Workshop September 23-24, 2009*. Saskatoon, SK: School of Environment and Sustainability, University of Saskatchewan, Saskatoon, SK.

Thompson, L., M. Hill, (**K. Belcher**, J. Bruynooghe, C. Christensen, K. Larson, M. Tremblay, S. Wright, (Steering Committee)). 2010. *The Value of Saskatchewan's Forage Industry: A Multi-Level Analysis*. Saskatchewan Forage Council, Saskatoon, SK.

Invited Lectures (Outside the U of S) and Invited Conference Presentations

Bowden, M.A. 2010. Aboriginal drinking water. Aboriginal Peoples and the Future of Water Management in Alberta, Canadian Institute of Resources Law, University of Calgary, Calgary, AB.

Clark, D. 2010. Socio-economic impact assessment of the Aishihik wood bison transplant. Presentation to the Yukon Wood Bison Technical Team, Whitehorse, YT.

Cunfer, G. 2010. Agricultural land use and environmental change in the American Great Plains, 1860 – 2010. Economic History Seminar, University of Barcelona, Spain.

Dubé, M. 2009. Experimental designs using mesocosms to address cause for metal mine effluents. Environmental Effects Monitoring Investigation of Cause Workshop for Metal Mining, Environment Canada and The Mining Association of Canada, Gatineau, QC.

Dubé, M. 2009. Aquatic research priorities in Canada – moving southern US success stories to northern climates. Petroleum Environmental Research Form (PERF), Industry-University Collaboration Meeting, Rice University, Houston, Texas.

Dubé, M. 2009. A framework for watershed-based cumulative effects assessment. Canadian Water Network Water Security Workshop, Vancouver, BC.

Dubé, M. 2009. Cumulative effects assessment of water and the important role for women. Keepers of the Water IV Conference, Hatchet Lake Denesuline First Nation, Wollaston Lake, SK.

Dubé, M. and **T. Pugsley**, 2009. The water-energy interface. Sustainable Water & Sustainable Energy Conference, Saskatoon, SK.

Dubé, M. 2010. Development of THREATS for assessing and managing cumulative effects on Canadian freshwaters. Regional Managers Water Quality Monitoring Branches, Environment Canada, Saskatoon, SK.

Dubé, M. 2010. Development of THREATS for assessing and managing cumulative effects on Canadian freshwaters. Canadian Water Network Principal Investigators Meeting, Toronto, ON.

Dubé, M., R. Robarts, and N. Nadorozny. 2010. GEMS/WATER – Moving Global Water Science into Service. UNEP and Environment Canada GEMS Water Strategic Planning Meetings, Nairobi, Kenya.

Dubé, M., and R. Robarts. 2010. GEMS/Water – Monitoring global water health. UNEP World Water Day, Nairobi, Kenya.

Dubé, M. and A. Harwood. 2010. Integrated science approach to monitoring cumulative effects. Atomic Energy of Canada Limited, Saskatchewan Research Council, Saskatoon, SK.

Liber, K., and L. Doig. 2010. Is *Hyallela azteca* an appropriate model organism for laboratory sediment toxicity tests? US Environmental Protection Agency workshop on the use of the amphipod *Hyallela azteca* as a model organism in aquatic toxicity assessment. Chicago, IL, USA.

Noble, B.F. 2009. Evaluating the efficacy of strategic EA: lessons from a national review of Canadian systems and practices. International workshop of the Effectiveness of Environmental Assessment. Swedish EIA Centre, Uppsala, Sweden.

Noble, B.F. 2010. Cumulative environmental effects and the tyranny of small decisions. Natural Resource and Environmental Studies Institute Annual Lecture, University of Northern British Columbia, BC.

Noble, B.F. 2010. Comfort monitoring? Privatization and environmental assessment follow-up in Saskatchewan's uranium industry. Natural Resource and Environmental Studies Institute Research Colloquium Series, University of Northern British Columbia, BC.

Noble, B.F. 2010. Strategic environmental assessment state of the art. Presentation to the Canadian Environmental Assessment Agency, workshop on strategic environmental assessment. Ottawa, ON.

Ouellet J., S. Niyogi, and **M. Dubé**. 2009. Investigation of causes of metal mine effluent reproductive effects: fathead minnow (*Pimephales promelas*) exposures to copper at metal mine effluent concentrations. 36th Annual Aquatic Toxicity Workshop, La Malbaie, Quebec.

Pomeroy, J.W. 2010. Partnership Group on Sciences and Engineering, "Bacon and eggheads." Presentation to MPs and Senators, Parliament of Canada, Ottawa, ON.

Rozon-Ramilo L.D., **M.G. Dubé**, S. Niyogi, and C.J. Rickwood. 2009. Using a field-based multi-trophic artificial stream bioassay to assess the effects of complex mining mixtures. 36th Annual Aquatic Toxicity Workshop, La Malbaie, Quebec, QC.

Contributed (Non-Invited) Papers/Abstracts at Conferences

Almstedt, Å, and **M.G. Reed**. 2010. Adaptive governance for wildfire management in Saskatchewan: coordinating wildfire management planning across jurisdictions. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Barrett, M.J. 2009. Finding 'cracks in consent:' discourses that enable and constrain. Animism as a path to decolonizing the academy, 3rd International Conference of the International Society for the Study of Religion, Nature and Culture, Amsterdam, The Netherlands.

Barrett, M.J., B. Green, and L. White. 2010. Learning through spirit and place. Awâsis Aboriginal Education Conference. Saskatoon, SK.

Bullock, R., **M.G. Reed**, and J. Parkins. 2010. Transformations in rural environments: identity, citizenship, and collective response. (I: Concepts and frameworks; II: Case studies; III: Governance; IV: Panel discussion). Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Davis, E.M., and **M.G. Reed**. 2010. Social resilience and the challenges of environmental governance: addressing identity and memory in British Columbia's interior forests. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Driessnack, M.K., **M.G. Dubé**, L. Rozon-Ramilio, R. Pollock, and **P.D. Jones**. 2009. Use of field-based mesocosms to assess uranium mill effluent exposure pathways to fathead minnow (*Pimephales promelas*). 36th Annual Aquatic Toxicity Workshop, La Malbaie, QC.

Driessnack, M.K., **M.G. Dubé**, L. Rozon-Ramilo, R. Pollock, I. Pickering, C. Wirmanaden, and **P.D. Jones**. 2009. The use of field-based mesocosms to assess uranium mill effluent exposure pathways to fathead minnow (*Pimephales promelas*). SETAC North America 30th Annual Meeting, New Orleans, LA, USA.

Dubé, M. 2009. A framework for watershed-based cumulative effects assessment. Canadian Water Network Student Retreat, Saskatoon, SK.

Farnese, P., A. De Laporte, A. Weersink, and **K. Belcher**. 2010. The role of wetland definition in effective wetland conservation policy. Canadian Agricultural Economics Society Workshop on Wetlands Management, Economics, and Policy, Victoria, BC.

George, C., and **M.G. Reed**. 2010. Problems of fit: applying sustainable development criteria and indicator frameworks to institutional objectives in Atlantic Canada. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Goertzen, M., M. Driessnack, J. Phibbs, **M.G. Dubé**, L. Weber, and D. Janz. 2009. Swim performance and bioenergetic effects of metal milling effluent exposure in two native fish species. SETAC North America 30th Annual Meeting, New Orleans, LA, USA.

Kearns, J., and **M.G. Reed**. 2010. The evolution of northern research protocols in Canada: demonstrating leadership in the circumpolar North. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Klenk, N., and **M.G. Reed**. 2010. Changes in the socio-economic status of Canadian Model Forest Regions (1996 – 2006): using a gender lens to assess adaptive capacity. Annual Meeting of the Canadian Association of Geographers, Regina, SK.

Krausmann, F., and **G. Cunfer**. 2009. Agroecosystems on the American frontier: material and energy systems and sustainability. 1st World Congress of Environmental History, Copenhagen, Denmark.

McKenzie, M., A. Morehouse, P. Hart, P. White, D. Greenwood, S. Thompson, R. Manning, and D. Williams. 2009. Socioecological pedagogies: current research and practice. North American Association for Environmental Education, Portland, OR, USA.

McKenzie, M. 2010. Critical approaches to issues of methodology. American Educational Research Association, Denver, CO, USA.

McKenzie, M., E. Tuck, and G. Ford. 2010. De-metaphorizing "complex ecologies:" justice, knowledge, and place. American Educational Research Association, Denver, CO, USA.

McKenzie, M. 2010. Distinguishing the means and ends of critical education: theorizing experience as productive iterative practice. Theorizing Education Conference, the Stirling Institute of Education, Stirling, Scotland.

McKenzie, M. 2010. Politics of inhabitation: the interscaler contexts of socio-ecological learning. Theorizing Education Conference, the Stirling Institute of Education, Stirling, Scotland.

Noble, B.F. 2010. Enabling value-added SEA follow-up: a case study of Saskatchewan's forest sector. International Association for Impact Assessment, Geneva, Switzerland.

Noble, B.F., A. Aitken, and G. Poelzer. 2010. Regional strategic environmental assessment: roles and stakes in Arctic oil and gas development. Inuvik Petroleum Show, Inuvik, NWT.

Noble, B.F. and J. Gunn. 2010. Efficacy of EA beyond the individual project. International Association for Impact Assessment, Geneva, Switzerland.

Noble, B.F., R. Patrick, **M. Dubé**, P. Sheelanere, and M. Ball. 2010. Toward watershed cumulative effects assessment. International Association for Impact Assessment, Geneva, Switzerland.

Rozon-Ramilo, L.D., **M.G. Dubé**, C.J. Rickwood, and S. Niyogi. 2009. Effects of complex metal mining mixtures on fathead minnow (*Pimephales promelas*) using field-based multi-trophic artificial streams in Sudbury, Ontario, Canada. SETAC North America 30th Annual Meeting, New Orleans, LA, USA.

Squires, A.J. and **M.G. Dubé**. 2009. Assessment of water quality trends contributing to cumulative effects in the Athabasca River Basin using a fathead minnow bioassay. 36th Annual Aquatic Toxicity Workshop, La Malbaie, QC.

Ibid. 2009. Assessment of water quality trends contributing to cumulative effects in the Athabasca river basin using a fathead minnow bioassay. SETAC North America 30th Annual Meeting, New Orleans, LA, USA.

Turcotte, D., M. Kautzman, P. Wojnarowicz, J. Cutter, E. Bird, and **K. Liber**. 2009. Investigating salt and napthenic acids interactions in the toxicity of oil sands process water to freshwater invertebrates. 36th Annual Aquatic Toxicity Workshop, La Malbaie, QC.

Yu, J., and **K. Belcher**. 2010. An economic analysis of landowners' willingness to adopt riparian wetland conservation management: a Saskatchewan case study. Canadian Agricultural Economics Society Workshop on Wetlands Management, Economics, and Policy, Victoria, BC.

Research Grants and Contracts

Barbour, L. and **B.C. Si.** 2010. Interpretation of cover performance monitoring on Suncor coke watershed. SUNCOR Energy.

Barrett, M.J. 2010. Project Grant. Design and facilitate one professional development workshop for Branch staff. Government of Saskatchewan, Ministry of Education, First Nations, Métis, and Community Education Branch.

Belcher, K., and J. Baird. 2010. Linking the Environment with Agriculture Research Network (LEARN) – Agriculture – Environment Policy Research Network.

Bharadwaj, L., et al. including **Noble, B.F.** (co-investigator). 2009 – 2011. Safe water for health research network. Saskatchewan Health Research Foundation.

Clark, D. 2010. Understanding the effects of environmental change on governance for northern species and ecosystems. SSHRC, Standard Research Grant.

Clark, D. 2009. Travel funding for Clark and MSEM student (Lavallée), Environment Canada's Aboriginal Fund for Species-At-Risk grant to Carcross-Tagish First Nation.

Clark, D. 2010. Travel funding. Yukon Environment.

Cunfer, G. 2010-2011. Canada Foundation for Innovation Infrastructure Operating Fund.

Danylkiv, I., et al. including **V. Kricsfalusy** (Canadian collaborator). 2010 – 2011. Monitoring of natural restoration of devastated territories in Subcarpathian region in Ukraine. STC Ukraine and DFAIT Canada, Global Partnership Program.

Dubé, M. (principal investigator), K. Munkittrick (co-investigator), L. Jackson (co-investigator), **B. Noble** (co-investigator), P. Duinker (co-investigator), C. Westbrook (co-investigator), M. McMaster (co-investigator). 2008 – 2012. Development of

the healthy river ecosystem assessment system (THREATS) for assessing and adaptively managing the cumulative effects of man-made developments on Canadian freshwaters. Canada Water Network.

Dubé, M., M. Johnston, E. Wheaton, K. Wallace, and D. Natcher. 2009. Development of a framework for cumulative effects assessment and an ecological monitoring plan for northwest Saskatchewan. Saskatchewan Environment.

Dubé, M., M. Driessnack, K. Doerksen, and T. Kwan. 2009. Key Lake mesocosm study of selenium effects, uptake and assimilation. Cameco Corporation, SK.

Dubé, M., **T. Pugsley**, and R. Robarts. 2009 – 2012. Development of the GEMS/water decision support software for assessing potential water liabilities associated with new and emerging energy technologies. Western Diversification.

Dubé, M., K. Doerkson, M. Moody, J. Pretorius, and A. Rodrigez. 2009 – 2012. Remediation of selenium using microalgae. SRC Innovation Fund.

Dubé, M., G. Putz, and K. Mazurek. Improving capacity for assessment and management of water development of The Healthy River Ecosystem Assessment System (THREATS) for Saskatchewan. Saskatchewan Environment.

Dubé, M. 2010 – 2011. Beaufort regional environmental assessment cumulative effects assessment. Indian and Northern Affairs Canada.

Dubé, M. 2010 – 2011. Test protocol development for a reproductive bioassay for sculpin. BC Environment.

Dubé, M. and **T. Pugsley**. 2010 – 2011. Global indices to assess water-food security and water-energy security and to implement GEMS Water Program components. United Nations Environment Programme.

Giesy, J., and **K. Liber** (project co-leader). 2008 – 2010. Establishment of a novel toxicology research and development centre. Western Economic Diversification Canada.

Giesy, J., **P.D. Jones**, and S. Wiseman. 2008-2011. Remediation of oil sands process water and predicting and monitoring of environmental effects. Alberta Water Resource Institute.

Hanna, K. and **B.F. Noble** (co-investigator). 2009 – 2012. Effectiveness and Canadian environmental impact assessment. Social Sciences and Humanities Research Council of Canada.

Jones, P. 2010. Impacts of environmental contaminants and cold adaptation in northern organisms. University of Saskatchewan NSERC Bridge Funding.

Jones, P. 2011 – 2012. Contamination of country foods by emissions from Alberta tar sands industry. Pew Charitable Trusts, Oak Foundation, Boreal Birds Initiative.

Kovach, M. (principal investigator), J. Carriere (co-investigator), **M.J.Barrett** (collaborator), and M. Montgomery (collaborator). 2010. Removing the invisibility cloak: the impact of professional schools of education and social work on the lives of Aboriginal children and youth through their instructional and curricular choices. SSHRC Standard Grant.

Kricsfalusy, V. 2010 – 2011. Advancing biodiversity conservation and sustainable management in the Canadian prairies and Ukrainian steppes by enhancement of international research partnerships. International Development Research Centre.

Kricsfalusy, V. 2010 – 2012. Threat syndromes, biodiversity patterns and conservation of indigenous temperate grasslands. University of Saskatchewan, President's NSERC Fund.

Liber, K. 2005 – 2010. Evaluation of approaches for the derivation of defensible sediment quality guidelines for uranium mines. Cameco Corporation, SK.

Liber, K. 2005 – 2010. Evaluation of metal releases from oil sands coke: an assessment of ecotoxicological hazard and risk to aquatic organisms. Syncrude Canada Ltd., Suncor Energy, and Canadian Natural Resources Ltd.

Liber, K. (co-principal investigator). 2006 – 2010. Carbon dynamics, food web structure and reclamation strategies in Athabasca oil sands wetlands. Syncrude Canada Ltd., Suncor Energy, Canadian Natural Resources Ltd., and Albion Sands.

Liber, K. (co-principal investigator). 2008 – 2011. Carbon dynamics, food web structure and reclamation strategies in Athabasca oil sands wetlands. NSERC- CRD.

Liber, K. (co-investigator). 2008 – 2009. Toxicological assessment of white sturgeon (*Acipenser transmontana*) in the Upper Columbia River – water related issues. Teck-Cominco Metals Ltd., Trail, BC (via ENTRIX, Inc.).

Liber, K. (co-investigator). 2009 – 2010. Assessment of surface water toxicity to white sturgeon (*Acipenser transmontana*) in the Upper Columbia River. Teck-Cominco Metals Ltd., Trail, BC (via ENTRIX Inc.).

Liber, K. (co-investigator). 2008 – 2011. Safe, secure water supplies for Alberta. Alberta Water Research Institute, Edmonton, AB.

Liber, K. (co-principal investigator). 2007 – 2010. Investigation of temporal and spatial distribution, fate and biological effects of selenium in a boreal aquatic ecosystem. Cameco Corporation, SK.

Liber, K. (co-principal investigator). 2008 – 2011. Investigation of temporal and spatial distribution, fate and biological effects of selenium in a boreal aquatic ecosystem. Natural Sciences and Engineering Research Council of Canada - CRD.

McKenzie, M. 2009. Transcultural youth, sense of place, and educational policy and practice. Research Acceleration Program, University of Saskatchewan.

McKenzie, M. 2010. Transcultural youth orientations to place and implications for environment-related educational policy and practice: a pilot study. Global Partners II, University of Saskatchewan.

McKenzie, M. 2010. Learning to teach for social and ecological justice. Tri-Council Bridge Funding, University of Saskatchewan.

Noble, B.F. (principal investigator), R. Patrick (co-investigator), **M. Dubé** (collaborator), R. deLoe (collaborator), and H. Schrier (collaborator). 2009 – 2012. Institutional arrangements for watershed-based cumulative effects assessment. Social Sciences and Humanities Research Council of Canada, Canadian Environmental Issues Grants.

Noble, B.F. (principal investigator), A. Aitken (collaborator), and G. Poelzer (collaborator). 2009 – 2012. Strategic environmental assessment in Arctic oil and gas development. Social Sciences and Humanities Research Council of Canada, Northern Communities Grants.

Pomeroy, J. (principal investigator). 2006 – present. Improved processes and parameterization for prediction in cold regions. Canadian Foundation for Climate and Atmospheric Sciences, Network Grant.

Pomeroy, J. (principal investigator). 2007 – present. Drought Research Initiative. Canadian Foundation for Climate and Atmospheric Sciences, Network Grant.

Pomeroy, J. (principal investigator). 2007 – present. SGI Canada Hydrometeorology Programme. SGI Canada.

Pomeroy, J. (principal investigator). 2009 – 2014. Snow hydrology. Natural Sciences and Engineering Research Council of Canada, Discovery Grant.

Reed, M.G. (principal investigator) and R. Gibson. 2009 - 2012. Environmental governance for sustainability and resilience: innovations in Canadian biosphere reserves and model forests. Social Sciences and Humanities Research Council, Canadian Environmental Issues.

Reed, M.G. (principal investigator) with **M.A. Bowden**, **B. Noble**, N. Harrison, **K. Liber**, and **G. Cunfer**. 2009. Shifting sands: shaping sustainability in northwestern Saskatchewan. Social Sciences and Humanities Research Council, Public Outreach Grant.

Reed, M.G., (principal investigator), with the Prince Albert Model Forest and R. Brook, S. Carr, N. Carriere, **D. Clark**, H. Hesseln, M. Johnston, L. Jougda, C. Keskitalo, **V. Kricsfalusy**, A. Löf, M. Manseau, D. Natcher, C. Sandström, P. Sandström, the University of the Arctic, and Vilhelmina Model Forest. 2009. Learning from our Elders: Aboriginal perspectives on climate change and caribou/reindeer habitat in the circumboreal forest. Natural Resources Canada.

Sawicki, C. (principal investigator), including **D. Clark** (collaborator). 2009 – 2011. Community adaptation to pipeline development in the Yukon. Social Sciences and Humanities Research Council of Canada, Outreach Grant.

Si, B.C. 2010 – 2014. Soil water redistribution and the fate and transport of chemicals in nonlevel landscapes. NSERC, Discovery Grant – Category I.

Si, B.C., and L. Barbour**.** 2010 – 2011. Observations of soil moisture dynamics associated with hydrocarbon affected and layered coarse texture soils through column testing. Syncrude.

Unterschultz, J., S. Jeffrey and **K. Belcher**. 2010. Watershed evaluation of BMPs (WEBs) project evaluating BMPs for the prairie pothole region at Pipestone Creek, SK in southeastern Saskatchewan. Agriculture and Agri-Food Canada.

Public and Community Outreach

Outreach is a key component of the activities of the School of Environment and Sustainability. The School's efforts in this area will expand with the establishment of the Outreach and Engagement Committee in early 2010.

The following is a summary of the School's outreach activities in 2009 - 2010.

Events and Activities Within the Campus Community

- Tony Allan visit to the University of Saskatchewan, September 9 – 10, 2009 – co-sponsorship of two public lectures: "Doing the Right Things a Little Badly: Water Security in a Global Context" and "Water and Energy: Three Weddings and Avoiding Two Funerals." Hosted by the Toxicology Centre with co-sponsorship from the School of Environment and Sustainability and the Johnson-Shoyama Graduate School of Public Policy
- "Want To Learn More About Employment in the Environment Industry?" – presentation by ECO Canada, September 30, 2009
- Green Yourself Week, October 19 – 23, 2009
- University of Saskatchewan Graduate Fair, November 17 – 18, 2009
- Harry Toop Science for Saskatchewan Lecture, featuring Mark Jaccard – November 30, 2009
- "Exploring Adaptability to Climate Change in Swedish Reindeer Husbandry" – seminar by Annette Löf, PhD Candidate, Political Science, Umeä University – May 11, 2010

Events and Activities Beyond Campus

- Shifting Sands: Shaping Sustainability in Northwestern Saskatchewan, September 23 – 25, 2009. This event, which received major funding from the Social Sciences and Humanities Research Council of Canada, consisted of a public forum and an invitation-only workshop. The forum, which focused on the Alberta experience with oil sands development, was held on the evening of September 23, 2009, at the Delta Bessborough Hotel in Saskatoon. Approximately one hundred twenty-five people were in attendance. Dr. Robert Gibson from the University of Waterloo moderated the forum, while three speakers, award-winning journalist Andrew Nikiforuk, Simon Dyer (The Pembina Institute), and George Poitras (Mikisew Cree First Nation), described experiences from the perspective of environment and community, and then participated in a panel discussion. Representatives from industry and government were not able to participate. The three speakers encouraged residents of Saskatchewan to think and act like owners of the province's resources and to become leaders in determining the future for northwestern Saskatchewan. On Thursday, September 24, 2009, stakeholders from academia, industry, communities, and governments were invited to participate in sequential workshop sessions. Topics included biophysical and social conditions in northwestern Saskatchewan, as well as industry, environment, community, and policy perspectives on potential oil sands development. Faculty members from the School served as discussion leaders in each session. On Friday, September 25, 2009, keynote speaker, Dr. Bob Gibson, identified key considerations when undertaking a regional sustainability assessment.
- Visit from Umeä Delegation. In January 2010, several SENS faculty participated in a visit, arranged by the International Centre for Northern Governance and Development, by a delegation from universities in Umeä, Sweden. As a result of this visit, SENS is working to develop a student and faculty research exchange program with the Swedish University of Agricultural Sciences.
- Memorandum of Understanding with Saskatoon Public School Division #13. This memorandum between SENS and the Saskatoon Public School Division describes opportunities for interdisciplinary engagement and learning related to environment and sustainability with the Earthkeepers Program at Aden Bowman Collegiate. This memorandum was developed in early 2010 and will be in effect for 2010 - 2011.
- Task Force on City-University Sustainability Initiatives. The School's Executive Director is a member of this Task Force, which includes representatives from the University of Saskatchewan Facilities Management Division, Office of Sustainability, and the College of Engineering. Membership from the City of Saskatoon includes representatives from Infrastructure Services, Utility Services, and Environmental Services. Administrative support is provided by the School. The Task Force's mandate is to provide advice and input to the City of Saskatoon and the University of Saskatchewan on the potential for and strategies associated with joint sustainability initiatives that can improve the quality of the local environment and contribute to innovation in a manner that is socially acceptable, environmentally sound, and economically feasible. Examples of initiatives include the implementation of "green" purchasing policies and testing recycled materials for use in road paving. The Task Force met once during the 2009 – 2010 year, on February 4, 2010.

Governance

Committees

The School of Environment and Sustainability follows a collegial model of decision-making, where committees are responsible for overseeing the development of policies and procedures, with final approval from the faculty as a whole. Two major committees, the Admissions and Awards Committee and the Academic Programs Committee, were struck in 2008 - 2009. The School struck three new committees in 2009 - 2010: Interdisciplinary Research, Seminar and Special Lectures, and Outreach and Engagement. Membership was as follows:

Admissions and Awards Committee

- Ken Belcher, Associate Professor, Graduate Chair (*from July – December 2009*)
- Bing Si, Professor, Acting Graduate Chair (*from January – June 2010*)
- MJ Barrett, Assistant Professor

- Marie-Ann Bowden, Professor
- Vladimir Kricsfalusy, Associate Professor

Academic Programs Committee

- Charles Maulé, Professor, Chair
- Bram Noble, Associate Professor
- Maureen Reed, Professor

Interdisciplinary Research Committee

- Maureen Reed, Professor, Chair
- Monique Dubé, Associate Professor
- Douglas Clark, Assistant Professor
- Bram Noble, Associate Professor

Seminar and Special Lectures Committee

- Paul Jones, Associate Professor, Chair
- Vladimir Kricsfalusy, Associate Professor

Outreach and Engagement Committee

- Marcia McKenzie, Assistant Professor, Chair
- Douglas Clark, Assistant Professor

Finances

School of Environment & Sustainability
Consolidated Statement of Operations
For the Period From May 1, 2009 to April 30, 2010

Fund balances, beginning of year	$	203,936.04
Revenue (1)		
Student Fees		2,731.94
Operating Allocation		671,419.92
Internal Transfers		
Graduate Scholarship Allocation		140,000.00
Capital Equipment Allocation		8,000.00
Centennial Chair Allocation		81,426.81
Total Funds Available	**$**	**1,107,514.71**
Expenses		
Salaries		502,426.88
Employee Benefits		54,134.92
Operational Supplies and Expenses		26,472.90
Travel		17,385.56
Maintenance, Rental and Renovations		0
Scholarships, Bursaries and Prizes		63,000.00
Capital Assets		6,849.15
Transfers to other funds (2)		41,356.59
Total Expenses	**$**	**711,626.00**
Fund balances, end of year	**$**	**395,888.71**

(1) Only operating funding is summarized; research funding for the School of Environment and Sustainability is not included.

(2) Relates to funding provided by the School of Environment and Sustainability for New Faculty Equipment, Deans' & Senior Administrators' Expenses (DSAE), RCE Workshop, Shifting Sands Workshop and Policy Delphi Workshop.