



Newsletter / Bulletin

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Webmaster: Shawn Martin • Email: smartin@gartnerlee.com

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NATIONAL EXECUTIVE 2007

President: Shawn Martin
(Work) 403-262-4299 Ext. 5440
(E-mail) smartin@gartnerlee.com

1st Vice-President: Brian Free
(Work) 780-427-7765; (Fax) 780-422-4086
(E-mail) bfree@casahome.org

2nd Vice-President: Natalie Helferty
(Work) 416-460-2460
(E-mail) nhelferty@rogers.com

Secretary/Treasurer: Jacquelyn Spry
(Work) 902-497-8456; (Fax) 902-883-8969
(E-mail) sprytech@ns.sympatico.ca

Newsletter Editor : Gary Ash
(Work) 780-930-8666; (Fax) 780-483-1574
(E-mail) gash@golder.com

Immediate Past-President: Patrick Ryan
(Home) 709-334-2962
(E-mail) patrickr@mun.ca

Membership: Gary Ash
(Work) 780-930-8666; (Fax) 780-483-1574
(E-mail) gash@golder.com

*Term of Directorship

REGIONAL DIRECTORS

Atlantic:
Patrick Stewart (2009)*
(Work/Fax) 902-798-4022
(E-mail) enviroco@ns.sympatico.ca

Québec:
Claude Delisle
(Work) 514-729-3142;
(E-mail) cedelisle@courriel.polymtl.ca

Ontario:
Denisa Necula
(Work) 416-750-2478
(E-mail) denisanecula@yahoo.ca

Natalie Helferty
(Work) 416-460-2460
(E-mail) nhelferty@rogers.com

Manitoba:
William Paton (2006)
(Work) 204-727-9783; (Fax) 204-727-1000
(E-mail) patonw@brandonu.ca

Doug Ramsey (2008)
(Work) 204-477-1848; (Fax) 204-475-1649
(E-mail) dramsey@seacorcanada.com

Saskatchewan:
Joseph Hnatiuk (2009)
(Work) 306-751-0120; (Fax) 306-585-0614
(E-mail) hnaj@sasktel.net

Jeff Hovdebo (2007)
(Work) 306-780-8107; (Fax) 306-780-8722
(E-mail) hovdeboj@dfo-mpo.gc.ca

Alberta:
Brian Free (2003)
(Work) 780-427-7765; (Fax) 780-422-4086
(E-mail) bfree@casahome.org

British Columbia:
Jim Armstrong (2010)
(Work) 604-436-6949; (Fax) 604-436-6811
(E-mail) jim.armstrong@gvrd.bc.ca

Territories:
Anne Wilson (2010)
(Work) 867-669-4735; (Fax) 867-873-8185
(E-mail) anne.wilson@ec.gc.ca

REGIONAL CHAPTERS

Newfoundland & Labrador
Contact: Pat Ryan
(Home) 709-334-2962
(E-mail) patrickr@mun.ca

Atlantic Chapter
Contact: Pat Stewart
(Work/Fax) 902-798-4022
(E-mail) enviroco@ns.sympatico.ca

Québec
Contact: Claude Delisle
(Work) 514-340-4962; (Fax) 514-340-5918
(E-mail) cedelisle@courriel.polymtl.ca

Ontario
Greater Toronto Area
Chairperson: Wendy Thomson
(Home) 905-723-9217
(E-mail) wendy@exworld.org

Manitoba
Contact: Douglas J. Ramsey
(Work) 204-988-0512; (Fax) 204-988-0546
(Cell) 204-792-3492
(E-mail) dramsey@seacorcanada.com

Saskatchewan
Chairperson: Robert Stedwill
(Work) 306-566-3587; (Fax) 306-566-3428
(E-mail) rstedwill@saskpower.com
Vice-chair: Jeff Hovdebo
(Work) 306-780-8107; (Fax) 306-780-8722
Treasurer: Brent Bitter

Alberta
Contact: Sheri Dalton
(Work) 780-479-9262; (Fax) 780-474-1933
(E-mail) sdalton@concordia.ab.ca

British Columbia - Pacific Chapter
Acting Chair: Vacant

Secretary: Diane Urban
(E-mail) dkurban@idmail.com

Treasurer: Jeff Matheson
(Work) 604-685-0275; (Fax) 604-684-6241
(E-mail) jmatheson@eba.ca

Membership: Vacant

Chapter Webmaster: Ajay Pradhan

Territories
Contact: Anne Wilson
(Work) 867-669-4735; (Fax) 867-873-8185
(E-mail) anne.wilson@ec.gc.ca

CSEB NEWSLETTER 2007

Vol. 64, Number 2 Summer 2007

The Canadian Society of Environmental Biologists Newsletter is a quarterly publication. The Newsletter keeps members informed of the Society's activities and updates members on the current affairs and advances in the field of environmental biology. This publication draws together the widely diverse group of Canadian environmental biologists through a national exchange of ideas. Members are invited to contribute papers, photos or announcements that are of a national biological and environmental interest. Letters to the editor are welcome. This is a volunteer non-profit organization and we rely on your participation to make the newsletter a productive forum for ideas and discussion.

All business correspondence, changes of address, undeliverable copies and membership applications should be sent to: CSEB National Office, P.O.Box 962, Station F, Toronto, ON., M4Y 2N9. **Editorial correspondence:** Gary Ash, Editor, e-mail: gash@golder.com

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LE BULLETIN de la SCBE 2007

Vol. 64, Nombre 2 Été 2007

Le Bulletin de la SCBE est une publication trimestrielle de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activités de la Société sur événements courants ainsi que les progrès qui font en sciences de l'environnement. Par un échange d'idées au niveau national, cette publication intéresse un groupe très diversifié d'environmentalistes Canadien. Les membres sont invités à contribuer des articles, photos (noir et blanc) ou des messages qui sont d'intérêt nationale en sciences biologiques et environnementales. Les lettres à l'éditeur sont bienvenues.

Tout la correspondance d'affaires, y compris les abonnements, les changements d'adresse, les exemplaires retournés et les formulaires: CSEB National Office, P.O.Box 962, Station F, Toronto, ON, M4Y 2N9. **Les lettres à l'éditeur:** Gary Ash, Editor, courriel: gash@golder.com

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The Canadian Society of Environmental Biologists**CSEB OBJECTIVES**

The Canadian Society of Environmental Biologists (CSEB) is a national non-profit organization. Its primary objectives are:

- to further the conservation of Canadian natural resources.
- to ensure the prudent management of these resources so as to minimize environmental effects.
- to maintain high professional standards in education, research and management related to natural resources and the environment.

OBJECTIFS de la SOCIÉTÉ

La Société Canadienne des Biologistes de l'Environnement (SCBE) est une organisation nationale sans but lucratif. Ses objectifs premiers sont:

- de conserver les ressources naturelles canadiennes.
- d'assurer l'aménagement rationnel de ces ressources tout en minimisant les effets sur l'environnement.
- de maintenir des normes professionnels élevés en enseignement, recherche, et aménagement en relation avec la notion de durabilité des ressources naturelles et de l'environnement, et cela pour le bénéfice de la communauté.

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John Lilley Bursary - Honouring A Former CSEB President



Back row: Jody, Nathan and David (son), baby Kaneya is in a sling over Jody's left shoulder and hidden), John, Margaret (daughter) holding Elizabeth and Stu (Jenn's boyfriend). Front row: Scott (Margaret's husband), Jenn (daughter) and Judianne.

As some CSEB members will know, the Alberta Chapter is establishing a bursary to recognize the many and long-time contributions of John Lilley. Although John has been fighting cancer off and on for the last ten years, the battle has become much more one-sided recently. Many newer CSEB members will have missed the privilege of working with John and benefiting from his leadership. This article is an attempt to share a little about the man in whose honour we are setting up this bursary.

Like many biologists, chemistry and beer played important roles in shaping John Lilley's career! At the University of Toronto in the mid-1960s, he planned to major in chemistry. But with the organic variety of the subject looming large (remember Morrison and Boyd?), in third year he switched to zoology. Shortly thereafter, John found himself in a bar with some biologists who were planning a national meeting. This was one of the early joint conferences between the CSEB and CCFR, with CSEB organizing the wildlife program and CCFR taking care of the fisheries. It sounded interesting and John's involvement with the CSEB was launched.

Field work between his third and fourth year with the CSEB's legendary Frank Maher sealed John's fate with plans for a Master's at York University to look at DDT in fish. But first there was the trip through Europe – the classic '60s wanderer complete with long hair, beard, wineskin and Canadian flag on his backpack. It was the flag that got the attention of Judianne Hastings

from Vancouver. Their short conversation at a train station in Scotland turned out to be the start of a long-distance – and long-lasting – relationship as they were married in 1972.

Graduate degree in hand, John landed a job at the Freshwater Institute and he and Judianne headed west. While nominally based in Winnipeg, fisheries studies on the Mackenzie River meant that they spent a lot of time in the Northwest Territories, particularly at a base camp near Fort Simpson. Their first daughter, Margaret, was born not long before the family moved to Calgary in 1975 where John worked for a year as a consulting fisheries biologist.

For the next 20 years, John was with the Environment Council of Alberta (ECA) in Edmonton and then the Alberta Water Resources Commission. A son, David, and another daughter, Jennifer, were born during this time. When the provincial government dissolved these two agencies in early 1995, John formed his own company, Lilley Environmental Consulting. As a consultant, he provided facilitation and writing services to a variety of clients in the environmental field, among them the City of Edmonton, the Clean Air Strategic Alliance, Alberta Environmental Protection, and Environment Canada. For several years, he also served as the part-time executive director of the Canadian Water Resources Association.

Since 1969, John has been involved with the CSEB, but his participation and leadership were particularly strong during the 1980s and 90s, while he was at the ECA. Following a term as vice-chair of the Alberta Chapter, he became chair in 1980. In 1983, with Gary Ash as president of the national body, John became first vice-president, then assumed the presidency in 1988, for two two-year terms. This was during the last period in which environmental issues were prominently on the minds of Canadians, and there was no lack of opportunity to comment on draft policies and plans by all levels of government.

In addition to the many day-to-day responsibilities of being on the executive of any organization, staying on top of current and emerging issues was a large job. John commented recently that one of the big challenges during those years was keeping the CSEB engaged while remaining professional and not getting politically embroiled in the issues. "We had a great deal to offer as environmental biologists and it was – and still is – important to provide our comments in a credible way that maintained and enhanced CSEB's reputation. We had good ideas and advice for protecting the environment, no matter which government was making the decisions."

Under John's leadership in Alberta and on the national stage, the CSEB prepared many submissions, bringing the perspective of environmental biologists to the attention of politicians and civil servants in Edmonton and beyond. These letters and briefs included praise and support where warranted, as well as criticism and, always, suggestions for improvement. John crafted many of these pieces, consulting with members who had knowledge and experience related to the topic at hand.

His personality made him well-suited to be a leader of an environmental organization at the time. "I was in the fortunate position of first being able to work in an area that strongly complemented my own values and beliefs. Secondly, the agencies I worked for, particularly the ECA, exposed my colleagues and me to a great range of issues and gave us so many opportunities to learn and gain new skills. I always kept an eye out for places where CSEB could add our voice and offer input, and there was never a shortage of occasions. The challenge then was to convince other knowledgeable and talented members to get involved, whether it was organizing a conference, drafting a brief, or making a presentation to a school."

John's commitment to the environment has been evident throughout his career, and according to some of his CSEB colleagues, that made it hard to say no when John suggested he or she was the right person to take on a particular task. Sheila Leggett, now a member of the National Energy Board, is a former Alberta Director. "I always regarded John as a trendsetter in the environmental field," she says. "With his sterling academic qualifications and passion for environmental protection, he led the way for many of us into the practice of applied environmental biology."

John's persistence, good common sense and solid grounding in the important things in life have made him a role model for CSEB members and others. In recent years, he's had a chance to play a new part – grandpa to his and Judianne's three grandchildren. John's ability to share his knowledge as well as his experience has made a big difference to his family and to so many of his friends and colleagues. The bursary in his name reflects the desire of the CSEB to help other young people expand their own horizons and, we hope, become part of the next generation of environmental leaders.

John passed away late Tuesday night, July 10, 2007 just before this newsletter came out, but the above article was shared with him and his family the week before his death. At his request, there will be no service.

If you would like to contribute to the John Lilley Bursary Fund, please make your cheque or money order payable to the University of Alberta with a note indicating it is a contribution to the John Lilley Endowment, and send it to the CSEB Alberta Chapter c/o Kim Sanderson, Green Planet Communications, Box 4118, Edmonton, AB T6E 4S8. If you need additional information, please contact Kim at kim.sanderson@gpcomm.ca. A tax deductible receipt, will be provided by the UofA.

NATIONAL

President's Report

*Submitted by: Shawn Martin, President (2006-2007)
Canadian Society of Environmental Biologists*

President's Message June 5, 2007

I would first like to thank Dr. Tom Northcote for acting as guest editor of the Spring 2007 Newsletter. The issue was a terrific presentation of the issues surrounding limnology. I'm sure all of our members were able to find an article of interest in the issue!

Planning for the 2007 conference in Halifax is well underway. The Board of Directors participated in our regularly scheduled conference call on June 5 to discuss progress. Pat Stewart has undertaken to work with the Conference Chair to finalize the description of the conference theme, construct a call for papers, and investigate several options relating to invited speakers and sponsorship ideas. If you are able to volunteer to help with the conference, please let Pat Stewart know. His contact information is available under Regional Directors, on the first page.

Please watch the website for updates!

British Columbia News

Submitted by: Jim Armstrong

Although a provincial meeting has not yet been scheduled, I have been discussing ideas for increasing the membership within British Columbia and making the BC Region more active within the CSEB. Dr. Ken Ashley has suggested that a regional meeting be scheduled for late 2007 when most members have completed the majority of work-related projects for the year and are likely to be available for a 1-2 day conference.

I have also been discussing with the University of the Fraser Valley, Kwantlen University College and Trinity Western University whether or not they would be interested in promoting student chapters within the Departments of Biology and Environmental Studies. The response has been positive and I will be scheduling presentations for early September at each of these institutes.

On the personal front, I am presently completing my Master of Science at Royal Roads University so the thesis research that I have been undertaking for the last two years is now in the final stage of being transferred from a database to a paper. Between writing on the "Effluent Characterization of Combined Sewer Overflows," "Assessment of marine benthic communities through video monitoring" and completing the report on the "Environmental Assessment of Combined Sewer Overflows on the Fraser River in New Westminster," I became a grandfather

in February with the birth of our grandson, Mason. As the elder of my RRU class, I have joined the select group of grandparents who are now completing post-graduate degrees that we postponed to raise families and pursue our careers.

A notice will be coming out to all BC CSEB members in July asking for their input into agenda and potential dates for the 2007 BC conference. I have talked to several members who have indicated that they are planning to attend the 2007 annual conference in the Maritimes. It will be good to place faces with names. More to come...

Alberta News

Fish & Wild Game Recipes Cookbook

Edmonton's Duane Radford, a previous Director of Fisheries in Alberta, has recently published a cookbook "From the field to the table... Fish & Wild Game Recipes" for those who like to eat what they harvest, featuring:

- fish, fowl and wild game
- 84 easy-to-prepare recipes
- 134 pages with colour photos
- coil bound for easy reading while cooking
- helpful tips and facts on preparing your harvest for the table

Radford credits Robert Miskosky, Publisher of Edmonton based Sport Scene Publications Inc., for his creative talents in publishing a cookbook with exceptional visual appeal and a great layout – he'll take credit for the content and photos!

The cookbook is a collection of recipes from Radford's "Fish and Wild Game Recipes: From the Field to the Table" column in the monthly Alberta Outdoorsmen magazine published by Mr. Miskosky.

As soon as she saw the new cookbook, a rancher's wife exclaimed, "Great, I don't have to drive to Edmonton for all the ingredients; I've got them in my pantry!" However, Duane has also included some recipes that call for a more eclectic list of ingredients to add some variety.

Shortly after the cookbook was published in November, 2006 Edmonton Sun reporter Neil Waugh wrote in his Outdoors Column, "If you are searching for that last-minute stocking-stuffer, I can't think of a better choice than my buddy Duane Radford's new book, Fish and Wild Game Recipes, put out by Edmonton's up-and-coming Sports Scene Publications Ltd. Not only does Duane lay down some interesting ways to prepare and cook your field-and-stream bounty (cognac-braised pheasant and garlic-and-rosemary roasted venison loin are both on my must-try list), the book is peppered with practical hunting, angling and field craft tips, to make you a better outdoorsman - and a better cook. Or as Radford in his introduction to his recipes explains, 'Your satisfaction will come in watching your dinner guests with their heads down, and later asking for second helpings.' For an outdoors chef, it doesn't get any better than that."

The cookbook has suggestions on side dishes to accompany each recipe, based on Radford's experience and those of others he's relied on for recipe ideas; this takes some of the guess work out of rounding off meals featuring fish, fowl and wild game and makes this particular cookbook unique.

Barbara Barnes, supervisor of the highly-popular series of Edmonton's ATCO Blue Flame Kitchen cookbooks commented that Radford's cookbook looks great, saying that it's nice

to recommend books with an Alberta connection. Her parting comments: "Great job!" Bob Scammell, venerable Alberta award-winning outdoors writer, has given the cookbook an excellent rating!

Radford is an award-winning member of the Outdoor Writers of Canada. He has two columns in the Alberta Outdoorsmen and resides in Edmonton, Alberta with his wife, Adrienne.

The cookbook is available from Sports Scene Publications Ltd. (Phone 780.413.0331 or sspl@telusplanet.net) and Alberta distributors in the attached ad.

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Saskatchewan News

Submitted by: Robert Stedwill
Chair – Saskatchewan Chapter CSEB

It seems like the issues never seem to go away.

We are experiencing some evidence of climatic change here in Saskatchewan, with some very unusual weather patterns. Whether they are directly attributable to climate change, or just the natural cycle of things, is hard to say; however, with severe flooding in the east-central part of the province resulting no crops being planted for two years now, and drought in the south-west, people are starting to sit up and take notice. Perhaps that is a good thing.

Ken Hall's article in the 2007 Spring Edition of the Newsletter on the effects of uranium mining on waterways was a much needed piece to bring attention to the issue, which is not unlike the attention needed long ago on oil sands in northern Alberta, which are affecting Saskatchewan's northern lakes. We can only hope that we as a province can learn what not to do from others. It would appear that Saskatchewan's future oil sands and uranium cycle opportunities will need due diligence on our part to ensure that exploitation of these resources occurs responsibly.

New Plan Attacks Climate Change In Saskatchewan

June 14, 2007



Saskatchewan has an aggressive new plan to address the major challenge of climate change and to continue growing its energy sector.

Premier Lorne Calvert, Industry and Resources Minister Maynard Sonntag and Environment Minister John Nilson released the Saskatchewan Energy and Climate Change Plan. The new strategy sets ambitious targets to cut

the province's greenhouse gas emissions by 32 per cent by 2020 and 80 per cent by 2050.

"Our vision is of a province that is a model of innovative and sustainable energy," Calvert said. "In realizing that vision, we recognize the current strengths we have as an energy powerhouse and the responsibilities that come with that strength. While contributing to our economic prosperity and quality of life, our energy industries also generate the majority of our greenhouse gas emissions. Change has to occur and this plan demonstrates our commitment to addressing climate change, and continuing to make Saskatchewan a great place for families today and building a stronger future here for our young people."

The plan's main targets include:

- Stabilizing the level of greenhouse gas emissions in Saskatchewan by 2010;
- Reducing emissions by 22 tonnes per person by 2020, which translates to a 32 per cent reduction from current (2004) levels and represents the largest per capita reduction in Canada; and
- Reducing emissions by 80 per cent from current levels by 2050, a decrease of 55 tonnes per capita.

The plan is built on five components, or "emissions reductions wedges" to enable Saskatchewan to move from an unchecked level of emissions and meet its 2020 and 2050 targets. These wedges include:

- Conservation and efficiency measures by industry, business and homeowners;
- Carbon dioxide capture and storage measures in Saskatchewan's oil and gas industry and in the province's electricity sector;
- Increased use of renewable energy, including wind, solar power and hydrogen, and further development of Saskatchewan's ethanol and biodiesel resources;
- Reduction of methane and other emissions in the oil and gas industry, and methane and nitrous oxide emissions in the agriculture industry; and
- Creation of more natural carbon sinks in Saskatchewan's forests and soils.

The 2007-08 Budget contains \$48 million to support various climate change initiatives. Crown Corporations will spend an additional \$49 million. The premier announced today an additional \$44.4 million over three years to fund emission reduction initiatives similar to projects that will receive support under the federal trust fund for clean air and energy efficiency projects.

The premier also noted officials in many other jurisdictions are taking action on climate change, including governors of western American states who at their Western Governors' Association meeting earlier this week discussed strategies related to renewable energy opportunities and climate change problems. Calvert attended the meeting in Deadwood, South Dakota and said Saskatchewan is joining the governors' Western Regional Climate Change Action Initiative as an observer, monitoring the work on common targets for emissions reductions, and participating where it can in discussions on shared approaches and actions to combat climate change.

"Saskatchewan has the most diverse primary energy resource base in Canada and exports nearly 90 per cent of the energy it produces," Sonntag said. "Through the stewardship of industry and government, we will reduce the environmental footprint of energy production and ensure that our economy continues to be green and prosperous."

"The Saskatchewan Energy and Climate Change Plan is about ensuring that future generations enjoy the benefits of a clean and healthy environment," Nilson said. "By working together, we will do our part to address the effects of climate change by making Saskatchewan a leader in environmental protection and the green economy."

Based on Environment Canada's Inventory of Greenhouse Gas Emissions, Saskatchewan generated 69.1 million tonnes of carbon dioxide equivalent in 2004. This represented 9.1 per cent of total Canadian emissions. The oil and gas industry accounted for 33 per cent of Saskatchewan's annual greenhouse gas emissions. Electricity production accounted for another 24 per cent; transportation 16 per cent; and agriculture 14 per cent. The remainder of provincial emissions came from residential and commercial heating and other industries.

The Saskatchewan Energy and Climate Change Plan can be found at <http://www.saskatchewan.ca/green>.

For more information, contact:

Traci Braaten
Environment Regina
Phone: 306-787-1611
E-mail: traci.braaten@gov.sk.ca
Cell: 306-536-3852



Roy Schneider
Industry and Resources Regina
Phone: 306-787-9694
E-mail: rschneider@ir.gov.sk.ca

Manitoba News

*Submitted by: Dr. Bill Paton,
CSEB Manitoba Director*

Climate Change

A very informative workshop on the impacts of climate change on the Assiniboine and Red Rivers was held in Winnipeg on June 21. Attendance was by invitation and representatives from a wide spectrum of provincial, federal and NGOs were present. Mr. Alf Warkentin, hydrologist/climatologist with the Manitoba Department of Conservation presented a wealth of data using various climate models as a backdrop to recent major climate events in the province. Already, some of the model predictions are being observed - less snow in the winter months; milder winters; more heavy rains in some years in June/July with summer flooding in the major rivers. In other years severe droughts are expected. Records are continually being broken. Other presenters addressed adaptation to expected climate change, however many in Manitoba are not convinced that climate change is real. Dr. Bill Buhay, University of Winnipeg, using isotope analysis techniques of water in the Red River and sediments of Lake Winnipeg identified major flood and drought events going back 1,000 years. The final presenter was Dr. David Brooks, Friends of the Earth Canada, who talked about soft path approaches to water conservation and protection.

Hog Farming and the Environment

Submissions to the Manitoba Clean Environment Commission on the Sustainability of the Hog Industry in Manitoba closed last month after several weeks of public hearings throughout the province. Manitoba now has approximately eight million hogs.

Bill Paton, Manitoba Director, presented a brief to the Commission, which is provided as a separate article in this newsletter.

Ontario News

*Submitted by: Natalie Helferty
CSEB Ontario Director & 2nd V.P.*

Some life changes for our Executive have occurred. Grant LaFontaine is departing from our Board, with a new job in the Muskokas two hours north of Toronto, with an accompanying move up there with his wife, and expectation of a little one on the way to keep him busy-busy! Thanks for your help Grant and we wish you many blessings for you and your family in future.

Denisa Necula is working as an Environmental Scientist (internship) for Earth Tech Canada Inc., since April 2007. Earth Tech is one of the largest full service engineering companies in Canada. Earth Tech has provided consulting engineering services since 1906 and has substantive experience across the firm's major sector practice groups - Environmental, Transportation, Facilities, and Water/Wastewater.

The internship is part of the PAIE (Professional Access and Integration Enhancement) program, organized by TRCA in partnership with ACCES, APGO, CIP, FES and OPPI. The program provides internationally trained professional planners and geoscientists with training and volunteer work in their respective fields with the goal of being certified by their professional bodies.

Denisa hopes at the end of the internship she will have hands-on experience in the Canadian environmental compliance field and environmental remediation solutions, so she can continue her environmental career.

Natalie Helferty has become the new Director of Policy and Campaigns for Ontario Nature, a 75 year old environmental non-profit group in Ontario that acts as the umbrella group for Naturalist clubs in Ontario. She looks forward to getting paid for all the work she was otherwise doing voluntarily as Past President of the Richmond Hill Naturalists, but doesn't look forward to the daily commute once again. She will be spending most of her time working on expanding protection of parks and promoting stewardship and added land protection to obtain a functional natural heritage system across Ontario, as well as dealing with boreal forest songbird protection in northern Ontario, as well as pushing for implementation of Recovery Strategies for endangered species under Ontario's revised Endangered Species Act.

Wendy Thomson is continuing to act as GTA Coordinator and she and Natalie have embarked on another joint project. This time for women only—sorry boys. They have co-founded the Women's Environmental Alliance (WEA) with other women involved in disparate fields, such as law, politics, arts, energy and social justice fields. If any CSEB members (of the female persuasion) are interested in attending informal monthly get-togethers for networking, chatting and having a drink and/or listening to guest speakers, please contact Wendy to be added to

our email list. Or register at <http://exworld.org/wea/>. An Ontario and BC Chapter have been established so far, but others are welcome to form naturally of their own accord.

Updated Endangered Species Act in Ontario

Ontario has recently passed an updated and improved Endangered Species Act on May 16, 2007, to be proclaimed on June 16, 2008. This is much improved from the Endangered Species Act as a one-pager passed in 1971 in Ontario, the first of its kind in Canada. The current legislation is without a doubt, the best in Canada, if not North America. A science-based assessment of species is primary, along with funding for stewardship implementation of Recovery Plans, now being written for all regulated species via volunteer committees comprised of scientists, government and non-government stakeholders with expertise on the species. (I sit on the Jefferson Salamander Recovery Team.)

The legislation is comprehensive in that it provides for permits and agreements to accommodate resource development under special circumstances, along with an \$18 million stewardship fund to help ensure that the cost of protecting species is not a burden placed on the shoulders of landowners. This is a step beyond the 'thou shalt not' approach to most other endangered species legislative approaches that has resulted in the 'shoot, shovel, shut-up' mentality of landowners in past, or has resulted in onerous legislation in the United States. The real test of the legislative framework will be whether its implementation actually results in improvements in species survival and recovery in the long term.

Atlantic News

Submitted by: Pat Stewart, CSEB Atlantic Director

The organizing committee for the CSEB 2007 conference has been making arrangements for a one-day conference to follow on the heels of the Canadian Aquatic Toxicity Workshop in early October. Conference theme will be "Habitat Challenges and Solutions," and will be held on October 4. We'll have a list of invited speakers to present perspectives on habitat in the ocean, in surface waters and on land, as well as submissions from members. We'll also have an open session for miscellaneous papers. A call for papers will be going out soon, but if you have a talk in mind you'd like to present, or subjects you think should be included, please email us (Pat Stewart, enviroco@ns.sympatico.ca) at your earliest convenience. A guided tour of the Bedford Institute of Oceanography, a harbour cruise, an outing along Nova Scotia's beautiful South Shore, a sustainable forest tour, or a visit to some of Nova Scotia's other natural wonders, are possible options to round out your visit to Nova Scotia.

Bottom Trawling Comment

Excerpted From the Editorial, The Telegram, St. John's, NL

October 11, 2006 - It's a strange day indeed when U.S. President George W. Bush appears to be a greater ally of conservation than Canada's own Department of Fisheries and Oceans. DFO, after

all, lists as "our vision" a goal of ensuring "the sustainable development and safe use of Canadian waters."



But late last week, DFO

Minister Loyola Hearn announced that this country would not support a ban on deep-sea bottom trawling at the United Nations, a ban that both Bush and the European Union have supported. In his statement announcing Canada's intention not to support the ban, Hearn went so far as to describe those who did as environmental extremists, a label that would seem almost ludicrous when applied to Bush.

The bottom-trawling ban, which would apply to the high seas and not to fishing within Canada's 200-mile economic zone, has been opposed from within DFO because support of a high-seas fishery ban might add fuel to calls for a bottom-trawling ban inside the economic zone as well. Canada does almost no deep-sea bottom trawling, but certainly feels the effects of the virtually constant trawling on the nose and tail of the Grand Banks.

You would think that the removal of scores of foreign bottom trawlers from just outside the 200-mile limit would be something that the federal Department of Fisheries would be leaping at.

But no — instead, Canada is opting for the status quo.

In refusing to support the ban, Hearn has argued that the proper place for conservation is in the hands of regional fisheries management agencies.

In other words, he suggested that the Canadian government believes the proper place for the discussion of conservation issues is the Northwest Atlantic Fisheries Organization.

Last time we looked, Hearn was not the Spanish minister of fisheries, nor the Portuguese minister of fisheries. But he is making remarkably similar arguments — unless he intended this all as a joke, the humour of which completely eludes us.

NAFO has a sterling record of providing decades of lip service to the goals of conservation, while in reality allowing member countries to set their own fishing quotas regardless of science.

For Hearn to now suggest that a United Nations ban on deep sea dragging is a mistake would certainly lead anyone to question whose interests he serves — it's abundantly clear that it's not the interests of conservation.

Strangely enough, this country will be partners with Spain in opposition to the ban, a partnership we will no doubt cherish as deep-sea overfishing — virtually without penalty — continues off our shores.

Territories News

Submitted by: Anne Wilson, CSEB Territories Director

Greetings! In the North, we have traded parkas and ice augers for bug dope and waders, and are enjoying the extra-long days of summer. Activity in the NWT and NU continues at full speed, and includes municipal initiatives, uranium exploration, mining, hydroelectric, oil and gas exploration, and the Mackenzie Gas Pipeline. (Please note, I know there are three territories, and I would welcome information to include from any Yukon colleagues!). Are you doing research in the North? My work is with environmental assessment, so I tend to focus on the various development projects underway, but I'd be very interested to hear about and report on other work going on north of 60. I would appreciate hearing from northern members with ideas about what we can initiate by way of CSEB activities along with information on activities to include in the newsletter. Please email your thoughts to me at anne.wilson@ec.gc.ca.

Industrial Activity

In the NWT, hearings continue for the Mackenzie Gas Project, and are expected to wind up over the next few months. The schedule and further information are available on line at <http://www.mackenziegasproject.com/>. This is by far the biggest project currently underway, and has taken longer in the process, and will cost much more than had been predicted initially (IF it proceeds – never a certainty!).

There are currently three producing diamond mines in Northern Canada (Ekati, Diavik, and Jericho), and a fourth is finishing construction shortly (Snap Lake). A fifth mine is proposed by DeBeers; the Gahcho Kué Diamond Mine project is currently undergoing an Environmental Impact Review (the equivalent of a CEAA panel process). DeBeers proposes to develop a large open-pit diamond mine, and what is interesting about this project is the proposal to dewater 80% of Kennady Lake, mine out three pits, and re-water the lake leaving two meromictic pit basins in the lake. We don't have much Canadian experience with pit lakes in the North, nor with meromictic lakes, other than Garrow Lake at the closed Polaris Mine site. Other diamond mines and a new gold mine in NU will also be proposing to use pit lakes for closure, and this will require that we gain a better understanding of local hydrology and groundwater regimes.

Tamerlane Ventures Inc. has applied for permits to extract a one-million tonne bulk sample of lead-zinc ore from the area of the closed Pine Point mine. The area has extensive groundwater flow and TVI proposes to test the use of a freeze curtain to segregate the underground works from groundwater. Similar technology has been used in other areas, and may make it economical for the company to proceed to mining of other deposits in the area. This project is currently undergoing environmental assessment by the Mackenzie Valley Environmental Impact Review Board.

Also targeting base metals, Canadian Zinc Corp. will be applying for permits for full-scale mining at the Prairie Creek mine site. The resource was originally permitted for mining

and milling in 1982 (following an environmental assessment), but the bankruptcy of the owners resulted in abandonment of a mine and mill that were about 85% complete. The leases are about 25 km north of the Nahanni National Park boundary, and the mine infrastructure is situated along Prairie Creek, which flows into the South Nahanni River 46 km downstream. CZN is currently working on rehabilitating sections of the winter road for use, following a successful court challenge of the need for a new Environmental Assessment of the winter road. The company's position is that development of an operating mine should also be "grandfathered" and would not need to be referred to Environmental Assessment. No doubt there will be some interested discussions on this point!

In Nunavut, mining is very active. Baffinland is ramping up work on the northern end of Baffin Island with their Mary River iron ore exploration moving to bulk sampling. There are two gold mines, Miramar's Doris North project and Cumberland's Meadowbank project, which have gone through Environmental Assessment, and are now proceeding to water licence hearings. Wolfden's High Lake property, which targets base metals, is in the environmental assessment process, and will be proceeding to public hearings late this year.

Hydroelectric projects are also on the table, with a proposed hydroelectric development near Iqaluit, NU and an expansion in the Taltson River area (ESE of Great Slave Lake), which could potentially reduce diesel use and emissions in the North.

Municipal:

An interesting initiative that is now getting off the ground is the investigation of municipal performance standards for the North. The Canada-wide Strategy for the Management of Municipal Wastewater Effluent was released in draft form last November, and is currently in the consultation stage. Under the proposed Strategy, the North is being given a five year period to determine how systems that face challenges of extreme climatic conditions, infrastructure limitations, and logistics, can meet national performance standards. The focus this year is on inventorying existing systems and their performance, so we can determine what standards would be reasonable for our infrastructure as well as protective of the pristine northern receiving environments. Further information on the Strategy is available on the CCME website at: http://www.ccme.ca/ourwork/water.html?category_id=81.



Lupin in bloom, Cantung Mine, June 2007



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The Sustainability of the Hog Production Industry in Manitoba

Presented to the Manitoba Clean Environment Commission on the Sustainability of the Hog Industry in Manitoba

Submitted by: Dr. Bill Paton, Professor of Botany/Biology, Brandon University

Numerous analyses of current environmental trends conclude that modern civilization is on a socio-economically and environmentally unsustainable course. Given the present trends, most scientific observers agree that humankind cannot continue along its current path without suffering severe social, economic and environmental disruptions.

The guiding principle of the Earth Summit in 1992 and many of the changes currently underway throughout the globe is a deceptively simple, yet *complex*, notion known as *Sustainable Development*. The World Commission on Environment and Development, whose book "Our Common Future" helped to ignite intense global interest in this idea, defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." The fundamental biological needs are clean air, water and healthy soils. The economic, social and scientific evidence to date on the hog industry, as currently carried out in Manitoba, indicates that these three fundamental biological needs are being severely compromised on both the local and provincial scale. Unless significant changes occur in the industry immediately to make it really sustainable the future for our surface and ground waters, our air and soils is grim.

Expanding on the idea, economist Robert Constanza defines sustainability as a relationship between dynamic human economic systems and larger dynamic ecological systems in which:

1. human life can continue indefinitely and in this case it will.
2. human individuals can flourish – when we look at rural communities, family farms and packing plant towns the evidence is negative.
3. human cultures can develop – again the evidence here and elsewhere is no.
4. the effects of human activities remain within bounds, so as not to destroy the diversity, complexity and function of the ecological support system. Again the evidence here and elsewhere is negative.

Sustainable development is not a revolutionary idea by any stretch of the imagination. In fact more than 90 years ago President Theodore Roosevelt noted in his State of the Union address that to waste our natural resources, to skin and exhaust the land instead of using it in a manner that increases its usefulness, will undermine the prosperity of future generations. President Roosevelt was clearly not the first to espouse this philosophy. Native American cultures and indigenous peoples around the world have long held a similar view – and engaged in lifestyles that were truly sustainable.

David McCloskey of Seattle U. said actions are sustainable if:

1. There is a balance between resources used and resources regenerated – not the case in this industry.
2. Resources are as clean (or cleaner) at end use as at beginning – not the case in this industry.
3. The viability, integrity and diversity of natural systems are restored and maintained – not the case in this industry.
4. They lead to enhanced local and regional self-reliance- not the case in this industry.
5. They help create and maintain community and a culture of place – not the case in this industry.

6. Each generation preserves the legacies of future generations – not the case in this industry.

Daniel Chiras of the University of Denver, Colorado has identified four ecological principles of sustainability. The first principle will be discussed here in the context of sustainability of the hog industry in Manitoba.

1. **Biophysical Limits:** The Manitoba economy is dependent on its ecosystems, which provide a wide assortment of resources – renewable and non-renewable. Although it is widely recognized that non-renewable resources such as coal, oil and natural gas are finite, it is rarely noted that renewable resources, except for solar energy, while capable of regeneration, are also limited. Technologies permit humans to stretch the limits of resource supplies – but it becomes more and more expensive. The capital requirements to meet modern standards for wastewater treatment illustrate this most clearly. Evidence has been available since the 1940s that the quality of raw surface waters used for human drinking consumption in Manitoba is significantly below the requirements in most other jurisdictions in North America and Europe.

The Brandon Sun

- August 17, 1941 – "Cases have reached 544 in the polio epidemic in Manitoba."
- August 11, 1952 – "The polio count in the four western provinces stood at 580 cases and 32 deaths... Manitoba with 147."
- October 15, 1952 – "There are a total of 2,604 cases of polio in Western Canada. The epidemic in Manitoba shows no improvement with 40 new cases reported last week."
- November 15, 1970 – The Manitoba Preventative Medicine Service has reported 1,821 cases of infectious hepatitis in the province this year—the highest number of cases of the disease ever reported in the province."

At a May, 1977, Manitoba Environmental Council public forum entitled "Manitoba Water Quality Objectives: How Far Do We Go?" The following was taped:

Mr. Gillespie: "It's my understanding that the City of Brandon receives the Assiniboine River at times with (faecal) coliforms in excess of 2,000 (colonies/100mL). Now it's one thing to treat a portion of a river for a city for domestic consumption, but how do we treat the whole river and get the coliforms down to 200?"

Mr. Ward: "So at least we have defined the problem We've said, "Look, Brandon has got a problem. The river is not meeting the objectives. So we've got two things we can do. One is we can turn to Brandon and say, "Go and get your water somewhere else." That's quite possible. Secondly, we can go out and find out why that is happening."

This same conference raised the issue of eutrophication due to excess phosphate in surface waters, and recommended that this should be addressed forthwith. Our data in the last 10 years indicates that the quality of the raw water source at Brandon and Portage has declined significantly since the 1970s.

In 1988, the Science Council of Canada urged that water be moved to the top of the political agenda, because its quality and

availability are key to both economic and environmental health.

In 1991, the Charest report on the State of the Canadian Environment is an extremely valuable resource. It is one of the few reports in Canada that was subject to independent external review by scientists across the country. Items of significance to this issue include:

"Canadians are the world's second largest per capita users of water. The average daily household use is 360 L per person."

"Water quality in the Red River, Manitoba, like other prairie rivers, is degraded due to agricultural runoff and inadequately treated sewage."

"Despite success in reducing phosphorus loadings in many areas of Canada, nutrient enrichment of rivers and lakes on the Prairies is still a widespread problem."

Assessments of all the rivers in Manitoba are presented, indicating nutrient loading was a serious problem.

"To safeguard drinking water in the future, Canadians should perhaps shift the focus of concern from the quality of what comes out of the country's taps to what is going into its sources of raw drinking water — substances that require increasingly sophisticated techniques to remove and whose long-term effects are unknown."

The report also indicates that between 1970 and 1985, the application of nutrients in the form of fertilizer over the Manitoba sub-basins has increased from 100 to 1000%. The comparable data from Saskatchewan watersheds was increases of 500 to 1000%. If we examine the findings of Hargrave and Shaykewich of the University of Manitoba in 1997 (Canadian Journal of Soil Science, February pp. 59-65) in their article "Rainfall induced nitrogen and phosphorus losses from Manitoba soils:"

"Losses of total sediment phosphorus, total sediment nitrogen and dissolved nitrite, nitrite and ammonium resulting from natural rainfall erosion were studied in southern Manitoba during the summers of 1988-1990. Soils used were a Greta clay, Leary sandy loam, Ryerson sandy clay and a Carroll clay loam. Crop management systems were (1) alfalfa, (2) corn, (3) wheat – minimum tillage, (4) wheat conventional tillage, and (5) fallow. Nutrient losses averaged over the study were greatest from corn and fallow treatments, as high as 160kg/ha/yr for nitrogen and 70kg/ha/yr for phosphorus. Losses from wheat were intermediate and losses from alfalfa were negligible. Most of the nutrient losses occurred with the sediment fraction, a result consistent with previous studies. Thus, nutrient loss can be estimated from a knowledge of soil loss. The amount of nutrient loss per unit soil varied with soil, and was a function of the inherent nutrient status of the soil."

Map 1 identifies the areas in Agri-Manitoba that are susceptible to water erosion – this represents a large area of land and is adjacent to the major rivers, lakes and streams.

The Charest Report (1991) also addresses impacts of animal agriculture:

"Modern intensive methods of animal husbandry can affect environmental quality in a variety of ways, ranging from the degradation of local air quality by offensive odors to more serious problems of pollution in surface water and groundwater as a result of improper manure disposal."

"Livestock manure constitutes one of the principal, non-point sources of nutrient pollution in Canada, and one that has yet to be adequately addressed from an environmental perspective."

"Cattle produce 40kg or more of manure for each kilogram of edible beef that is eventually marketed, and a kilogram of edible pork is associated with 15kg of manure." (N.K. Patni, Agriculture Canada).

The Federal-Provincial Agriculture Committee on Environmental Sustainability (Agriculture Canada 1990) offers this definition:

"Sustainable agri-food systems are those that are economically viable, and meet society's need for safe and nutritious food, while conserving or enhancing Canada's natural resources and the quality of the environment for future generations."

Clearly, although I am not an economist, the economics of food production at the farm level have not been very solid for many years on the Prairies. Indeed, population shifts from rural to urban areas have accelerated as family farms are unable to support full families any more.

When we look at the natural resources, again the Charest Report (1991) is a good place to start:

"The prairie grasslands region, also known as the prairie eco-zone, is one of the most human-altered regions in Canada."

"The shift from grassland to grain cultivation on the prairies tends to increase losses of soil organic matter and plant nutrients."

"The natural water systems have been extensively modified and intensively developed; reservoirs for hydro and thermal power generation, irrigation projects, flood protection, and water management (drainage) have been developed on virtually every major river system in the grasslands region."

"Although (in 1991) only about 2.4% of farmland is irrigated, irrigation accounts for 46% of water withdrawal; irrigation also accounts for 69% of total water consumption in the Prairies."

In Manitoba, since 1991, significantly more irrigation systems have been installed principally for Irish potato production (see transcript and presentations to the CEC on the review of the Simplot Potato processing plant in Portage La Prairie). Dr. Rod McGinn, hydrologist at Brandon University, highlighted the water quantity problems when this development was purported to be dependent in drought years on releases from Shellmouth Dam on the Assiniboine river. McGinn's position is supported by the joint Federal Manitoba Assiniboine/South Hespeler Study of 1988. This report looked at the state of the Assiniboine River and its ability to support major food-processing plants. They concluded that two were possible. The first development was the McCain's potato processing plant at Portage, Campbell's Soup having closed down in the early 80s partly due to water quality issues. The Maple Leaf Meats first shift development in Brandon was number two. The sustainable level of this kind of economic development had been realized.

"Water quality (1991) is not getting significantly worse in most respects but it is close to minimal level at many locations, and current economic, social and climatic trends may cause it to drop to an unacceptable level."

"Economic development is at the limit of available water supplies in some basins in the prairie provinces, and there are growing concerns in southern Alberta and Saskatchewan that increasing consumptive uses will prevent in-stream requirements of aquatic systems from being met. (In CEC hearings since the mid 1980s promises have been given that in-stream flow needs for Manitoba's major rivers will be developed, the most recent being the Maple Leaf Second Shift Hearings in Brandon in the summer of 1993. The calculations are not that difficult and so we can only assume that someone in government doesn't like the implications – Dr. Alex Salki, for example has presented data to the effect that the current flow regimes in the Assiniboine river will not allow the reintroduced sturgeon to complete their life cycle. Alberta has had no difficulty in addressing this issue.)"

"Phosphorus and nitrogen levels are 10 times higher in the Souris and Red rivers than in the Bow and North Saskatchewan"

...rivers in the foothills reaches. Dissolved solids (salts) are more than twice as high in the prairie streams relative to stretches of rivers close to their sources in the mountains." (1991).

The New Scientist, a highly regarded British science magazine in its April issue, 1992 in an article entitled "*Canada, land of dying lakes and forests*" reported:

"The outlook for the world's second largest country is grim. A massive document released by the Canadian government this month outlines – in 27 chapters—the alarming deterioration of Canada's forests, soil, air and water."

"The government scientists, academics, industry and environmental groups who detailed the effects human activities have had on Canada's environment have found little to be optimistic about."

Yet another significant Federal report is: Environment Canada. (1991) "*A Report on Canada's Progress Towards a National Set of Environmental indicators.*" Page 34 Freshwater Quality:

"Drinking water is a potential pathway for contaminants in terms of human health. Provincial and municipal governments are responsible for ensuring that drinking water meets provincial standards, but their data are not readily usable for compiling a national picture."

"The Prairie Provinces Water Board has established a total phosphorus objective of 0.05 milligrams per liter."

"The Prairie Provinces Water Board has established a total nitrogen objective of 0.5 milligrams per liter for Prairie rivers."

Note that we still do not have national water quality standards and events like Walkerton and North Battleford indicate the kinds of problems that can arise if we ignore reports like these. There also have been a number of Prairie province reports that have endorsed the need to deal with this issue. Despite this, politicians of all stripes and at all levels have been unwilling to deal with reality and it should be noted that these were surface water quality reports before the major expansion of the hog industry in the early 1990s.

Premier Filmon in 1988 acknowledged before the Annual Meeting of the Union of Manitoba Municipalities that "*Protecting the environment makes good economic sense. But people have to see it that way before real progress can be made...*" He received a standing ovation!!

In 1989, the Filmon government sought the Manitoba public's ideas and suggestions on Land and Water Strategy. Several thousand people offered their views, some of the highlighted comments included:

"Aquatic systems should be enhanced and restored they are an indicator of the success of sustainable development principles."

"Establish a long term extensive and intensive water quality monitoring program to determine the exact state of our water quality."

"Establish buffer zones approximately 500 feet above high water level on all banks of rivers and streams."

"Cultivation of marginal land not economically or environmentally sound- should be discouraged."

"Give us guidance and direction, but give us the big stick only when we need the big stick."

"The basin/watershed concept of managing the Province's land and water was viewed favorably."

No policies were implemented, politics once again led to continuing failure to address water and land use issues in the province. Note once again, that all of these water and land use issues were identified before the expansion of the hog industry.

For a current view on the state of prairie surface waters and the need for national water quality standards see Paton (2000 and 2002).

The Senate Standing Committee on Agriculture, Fisheries and Forestry received a great deal of publicity across the country when they released a report on soil conservation entitled "*Soil At Risk: Canada's Eroding Future*" in 1984. Some significant issues in this report in the light of major expansion of intensive hog production in the Prairies are:

"The Standing Senate Committee has traveled extensively in Canada examining the issue of soil degradation, a problem which is already costing Canadian farmers more than \$1 billion per year in farm income. It has determined that we are clearly in danger of squandering the very soil resource on which our agricultural industry depends."

"On lands affected by salinization in the Prairies, crop yields have been reduced by 10 to 75%, even though farmers have increased their use of fertilizer."

"The presence of high salt concentrations at or near the soil surface renders the soil infertile. In some areas the telltale white patches on the surface are now increasing at a rate that can only be described as alarming."

"Canada risks permanently losing a large portion of its agricultural capability if a major commitment to conserving soil is not made immediately by all levels of government and by all Canadians."

"It is estimated, at 1982 prices, that it would cost Prairie farmers \$239 million in fertilizer to fully recover the present loss of grain production from wind and water erosion."

Although measures to reduce summer fallow have been successful in reducing wind driven soil erosion, water erosion, particularly at the time of the major snow melt in the spring, has not been reduced significantly and indeed in the Assiniboine river at Brandon over 90% of the nutrients that flow past Brandon to Lakes Manitoba and Winnipeg occurs with the spring flood. The problem of salinization has continued to increase as more and more sloughs and bush have been removed and man-made drainage systems have been constructed. This increased salinity is also seen in surface waters, impacting on crop production that is being irrigated from these sources (Paton, 1988).

Since 1976 I have together with student assistants and other colleagues directed a horticultural extension service called the Brandon University Horticultural Hotline. The program was initiated by the Manitoba Department of Agriculture since they lacked knowledge in horticulture. In the early 1980s it became evident that a significant decline in tree and shrub species, native and ornamental was occurring across the plains of Canada and the United States. Research over the last 30 years implicates a synergistic action of ammonia gas and the phenoxy-acetic acid type herbicides. The phenomenon of nitrogen enrichment is also seriously impacting both commercial forests and natural forest ecosystems as it is in parts of Europe and the United States. An ammonia budget for Manitoba has been developed and major contributions are due to historical livestock production, volatilization from fertilizers, senescence of crops and natural vegetation, sewage lagoons, the fertilizer industry and the incorporation of the catalytic converter in automobiles. The recent addition of eight million pigs in the province adds an additional eight million kilograms of ammonia annually to Manitoba air. Some of this ammonia ends up in surface waters where it is regarded as a priority pollutant damaging to fish, amphibians and other aquatic biota. Both ammonia and 2,4-D are respiratory irritants and the dramatic rise in child asthma in our province correlates chronologically with the impacts of these pollutants on vegetation.

Nitrogen enrichment leads to increased insect herbivory and plant disease in many species of annual and perennial plants. Research indicates that in the presence of ammonia gas plant leaves take up three to four times more 2,4-D or any other organic acid. The same biophysical method can act in the human lung to increase uptake of acidic pollutants in the epithelia of the lung. The loss of trees and shrubs on the prairies has resulted in a dramatic reduction in a number of bird species according to colleagues in the Canadian Wildlife Service. Amphibian population decline has been linked with increased un-ionized ammonia in the aquatic environment in the Netherlands. Dramatic changes in plant species have also been reported in Europe. Unfortunately, we do not have anyone examining this question on the prairies, but down wind of facilities like the Simplot plant in Brandon, trees have been replaced by grass species that tolerate ammonia.

Health and odor issues associated with intensive hog production are discussed in my chapter 5. — *"The Smell of Intensive Pig Production on the Canadian Prairies"* in the book *"Beyond Factory Farming. Corporate Hog Barns and the Threat to Public Health, the Environment and Rural Communities. Proceedings of a Conference held at the University of Saskatchewan in 2002."*

In the Agriculture and Agri-food Canada publication *"The Health of Our Air"* Toward sustainable agriculture in Canada, the following statements are included:

"Agriculture accounts for more than 50% of the ammonia released into the air... Much of this ammonia comes from livestock production."

"Ammonia has many undesirable effects at high concentrations. Near sources where concentrations are high (ILOs), it produces an unpleasant odor and may affect human and animal health."

"In a U.S. study, about 60-80% of N was lost from pig manure in lagoons exposed to air."

"Though many of the effects of NH₃ occur locally; it also has long range effects. Ammonia particles formed upon reaction with other N or S compounds, can be carried long distances by wind before being deposited. Deposition of this ammonium can cause undesirable growth in lakes, alter forest growth, or disrupt sensitive ecosystems."

This report also addresses greenhouse gas emissions from livestock production. The relative global warming potential of the different greenhouse gases over the next 20 years are rated as follows – carbon dioxide 1, methane 56 and nitrous oxide 280. Statements relative to hogs are as follows:

"Hogs produce the second highest amount of manure per 1000kg of live animal per day, which is equivalent to 10kg methane per animal per year. Therefore the CH₄ emissions from hog manure in 2010 in Canada is expected to be about 143Gg (thousand tones) of CH₄."

"10 million pigs = 19Tg mass manure = 102Gg methane"

"The N applied in manure is susceptible to loss as N₂O. In extreme cases, where soils have received excessive rates of manure for many years in succession, N₂O emissions may be as high as 50kgN per hectare per year."

"Liquid manure applied in bands may produce more N₂O than manure applied uniformly on the soil surface. Placing the manure in bands concentrates the N and C creating conditions more favorable for denitrification."

Groundwater is an extremely important resource in rural Manitoba.

"Today there are signs that governments and the public are at last becoming aware of the important role groundwater plays in many of the most urgent environmental problems. No doubt there

are many reasons for this increased awareness but the basic cause appears to be the increasing incidence of situations where human health and well-being are threatened by contaminated groundwater."

John Gilliland, Inland Waters Directorate. 1990. in a guest editorial in Canadian Water Resources Journal.

In the 1995 Report *"Groundwater in Manitoba. Hydrogeology, Quality Concerns, Management"* Robert Betcher et al. contribute the following observations about Manitoba groundwaters before the major pig expansion:

"Groundwater forms an important source of municipal, industrial, agricultural and residential water supply in Manitoba."

"Outside Winnipeg, groundwater provides the primary source of water for municipal, residential, industrial and agricultural use. Of 290 community water supplies in the province, 155 rely solely on groundwater."

"Groundwater quality problems have been experienced in several aquifers in southern Manitoba where overdevelopment has led to saline water invasion of fresh water portions of the aquifers. There is considerable potential for an increasing number of saline water intrusion problems given increasing groundwater development pressures."

"Impacts on groundwater quality in the Assiniboine Delta Aquifer due to seepage from unlined municipal lagoons serving the Village of Glenboro and the Town of Carberry...A number of other lagoons are known to "leak" to a significant degree..."

"There is considerable evidence that agricultural activities have resulted in some degree of impact on groundwater quality in many sensitive groundwater areas of Manitoba."

"Most research has focused on the accumulation of nitrate-nitrogen in the soil zone and in underlying groundwaters resulting from storage and spreading of farm manures, application of commercial fertilizers and feedlot operations [See Racz (1992) for a summary of studies carried out in the past and current research]."

"Bacterial contamination of groundwater supplies is quite common in Manitoba... For example, 68 of 190 water samples taken from individual wells completed into the carbonate rock aquifer in the Village of Fisher Branch in August of 1993 showed the presence of coliform bacteria in standard laboratory analyses."

Bob Betcher is also on the public record in the early 90s in several Technical Reviews for hog slurry lagoons in the Interlake and elsewhere identifying potential impacts of these structures as designed and built on groundwaters.

In 1992, I participated in a CEC Hearing in the R.M. of Portage La Prairie that was examining the case for a sewage lagoon at the Good Hope Hutterite Colony. As part of the documentation presented I extensively reviewed the scientific literature on stabilization ponds in Canada and around the world. Basically my conclusion to the CEC was that these structures as currently designed and operated in Manitoba could not meet license requirements. In response the CEC report stated that:

"This issue might be appropriately addressed by a study on the design, construction and operation guidelines for sewage lagoons. Any such study might best be guided by an advisory steering body made up of appropriate representatives from the scientific community, the public at large, consultants or association representatives, and by representatives of both the provincial and the federal governments."

It was recommended that there was a great deal of urgency in dealing with this matter, but to this date no government body has been set up despite the fact that continuing evidence accumulates that these structures are not complying with their licences and they

are a major source of cyanobacteria and their associated toxins to discharge surface waters.

In September, 1999, as a consequence of Walkerton a rural groundwater quality surveillance program was initiated. In total, 954 wells were sampled randomly, on a basis of about one per 36 square mile township, in the Eastern-Interlake, Winnipeg, South Central and Park-West regions of the province. Samples were analyzed for routine water chemistry, nitrate and bacteria. Sixty-two wells were sampled randomly in the Eastern-Interlake and South Central regions and analyzed for nitrate and bacteria.

In the September 20, 2000 Winnipeg Free Press, the following results were presented for the first year of what was going to be a three year study:

"Almost half of the private wells in Manitoba tested over the last year show traces of contaminants. Of the 997 wells tested across most of the province, 48% contained either coliforms or higher than acceptable levels of nitrates."

"Three percent of those – or about 30 wells- were contaminated with E. coli..."

"Though there were no reports of illness, the results come while students still can't drink water at 11 rural schools."

No data have been forthcoming on the remaining two years of the surveillance study. The project was started under the former Conservative government."

In Manitoba Pork's pamphlet "Earthen Manure Storages," the following statements are communicated to the public:

"An earthen manure structure is much more simply than a hole in the ground. It's a carefully designed structure that incorporates solid engineering principles and meet stringent government regulations."

"Properly designed earthen manure storage structures are reliable and environmentally safe."

"Manure management should be a priority for every hog operation... Earthen storage structures need to ensure the safety of the environment."

Among many members of rural communities on the Prairies, earthen manure storage structures have attracted widespread concern about their potential for groundwater contamination. These concerns have been downplayed by the industry and government regulators. Studies on this issue have been rather limited, however research published and peer-reviewed to date, unlike research sponsored by the industry, I have tended to support the concerns of rural citizens. An interim report published in July 2000 by Alberta Agriculture, Food and Rural Development focused on seepage from five central Alberta earthen manure storage lagoons. The report identified that two of the five lagoons examined had severe to moderate seepage and contaminant movement in the underlying groundwater. In Iowa, researchers at Iowa State in 2002 found that earthen storage structures associated with concentrated animal feeding operations posed serious risk to water resources in Iowa. In this study only 34 of 639 permitted lagoons were evaluated. In August 2000, I reported clear evidence of earthen manure leakage of pollutants into groundwater in the R.M. of Clearwater and impacts on rural citizens' drinking water wells. The monitoring well data consultant report from around the hog slurry lagoon was presented to me for comment by the local R.M. council.

As part of the government's response to public concerns, groundwater monitoring wells were recommended to be placed around lagoons and a number of municipalities required these wells as part of the license requirements for the ILO. In 1999, the provincial government instituted the requirement for some storage structures to report their findings to the province, others could do so volun-

tarily. The data the government has been gathering have not been readily available to the public and therefore the Winnipeg Water Caucus and in particular Mr. Glen Koryluk persisted and **three years later**, after appeals to the Ombudsperson, were successful in getting this raw data, unfortunately with no location data for each lagoon. I was asked to review and comment on the data. My observations are listed below:

"In the data provided by the Manitoba Government to Mr.Koryluk, monitoring well analyses are reported for 565 different hog lagoons. Monitoring started in 1999 and some lagoons have data for five years. Some lagoons have multiple monitoring wells around them, some as high as seven wells."

I applied the following criteria as indicators of groundwater pollution:

Electrical conductivities (measure of salts) above 2000 uS/cm. 207 lagoons or 36.6% indicate problems in this respect. The highest level reported was 32,700 uS/cm.

Nitrate levels greater than 10 mg/L — 124 lagoons or 22% in this category with the highest reading 519 mg/L.

Chloride levels above 200 mg/L — 146 lagoons or 25.8% in this category with the highest at 8,000 mg/L.

Ammonium levels above 2 mg/L — 65 lagoons or 11.5% in this category with the highest level reported at 4,020 mg/L.

Sodium levels above 200 mg/L — 66 lagoons or 11.7% in this category with the highest at 8,880 mg/L.

Not all wells were analyzed for all parameters but over 300 wells indicated problems in one or more pollution parameter.

These results from hog lagoon monitoring wells confirm the fears of many rural residents that many of these slurry storage structures are contaminating groundwater in a serious way. This evidence should be an alarm call to governments at the municipal and provincial levels to identify where these structures are located and alert neighbours as to the potential dangers to their well waters."

The composition of slurries also present problems for the ongoing productivity of soils in the province. Manures obtained from various Elite Swine (Maple Leaf Meats) operations in Manitoba were analyzed for various constituents by Fitzgerald and Racz (2001 ARDI Report). A total of 145 samples from 38 different operations were collected in the fall of 1998 and 1999. The slurries were found to be highly variable. Important analytical findings were:

Electrical Conductivity	8,650 - 27,500 uS/cm
Sodium	188 - 1,270 mg/L
Chloride	97.4 – 2,260 mg/L
Sodium Adsorption Ratio	0.84 – 39.97
Aluminum	1.13 – 825 mg/L
Copper	0.60 – 177 mg/L
Phosphorus	31 – 10,900 mg/L

Many of these parameters are known to be inhibitory to plant growth and over the longer term will put land totally out of production. These analyses are supported by published literature on hog slurries from the United States and Europe.

The evidence presented in this submission (and there is more) indicates that the fundamental resources for life in Agri-Manitoba, the surface and groundwater, the air and the soil, were already under threat before the advent of the eight million hogs. The eight million hogs represent the **"tipping point"** that led to catastrophic outcomes like the sorry state of Lake Winnipeg. It is really unfortunate that Minister of Agriculture Wowchuk did not take the advice I offered to her NDP Agriculture Committee in 1999. We shared many platforms together when the NDP was in opposition and she shared my concerns for the sustainability of this industry.

Saskatchewan Chapter's Concerns - Oil Sands Development

The following brief was submitted to the Alberta Oil Sands Consultations:
Phase II Public Hearing on behalf of the CSEB Saskatchewan Chapter.

Submitted by: Joseph M. Hnatiuk, CSEB Saskatchewan Chapter

Thank you for giving us the opportunity to make a presentation on behalf of the Canadian Society of Environmental Biologists (CSEB), Saskatchewan Chapter. Although the submission reflects mainly Saskatchewan concerns many of them can also be applied Nationally.

We are a National Professional Biologist Society, with several regional chapters across Canada.

The CSEB is a non-profit registered society, whose primary focus is to further the conservation and prudent management of Canada's natural resources based on sound ecological principles. The CSEB was formed in 1958 and has been actively and objectively presenting an informed view on the management of Canada's environment. Members are professionally trained biologists and biology students, from the wide range of environmental biology disciplines. Individuals with other backgrounds are welcome to join as associate members. For more details regarding CSEB please visit our web site at www.cseb-scbe.org.

The CSEB/Saskatchewan Chapter wishes to share some of the following concerns regarding the Alberta Oil Sands development. These are listed below:

1. Our understanding is that Environment Canada has done work indicating that a decrease in sulfur dioxides, combined with constant nitrogen emissions results in an increase in deposition of nitrates further afield, especially under cold temperatures (Environment Canada presentation at CASA Nitrogen Symposium 2006). Being the prevailing winds are from Alberta into Saskatchewan, this raises concerns given the predicted substantial increases in nitrogenous emissions. We would recommend that baseline data collection be initiated immediately so that these data can be used for future management strategies and mitigation if necessary;
2. Critical load mapping commissioned by the Canadian Council Ministers for the Environment has shown that Saskatchewan has highly sensitive soils (http://www.ccme.ca/assets/pdf/critical_loads_mb_sk_1372_web.pdf). The critical loads in some areas of northern Saskatchewan are being exceeded despite a lack of local industry, highlighting the need for Alberta/Saskatchewan/Canada to better understand the boreal forest receiving environment before continuing the breakneck pace of oil sand extraction expansion;
3. Kriging data modeling done by Environment Canada has shown that with present paucity of monitoring in northern Saskatchewan there is a 50% to 100% level of uncertainty in model results for the area at present. Baseline air quality monitoring is necessary to resolve this uncertainty;
4. We believe a scenario in the previous MOSS strategy was that some of the impacted areas could be converted to grazing pastures if reforestation was unlikely. We strongly oppose this as European studies have shown that grasses are extremely aggressive in areas receiving nitrogenous emissions. Introduction of grasses would increase the likelihood that grasses would spread and out-compete native under-story throughout the mid-northern boreal forest. The oil sands need to develop a re-vegetation of native species process and abandon any reclamation strategies that result in a permanent loss of boreal forest and native under-story;
5. The boreal forest may never re-establish itself after this resource extraction, like the coral reefs off Thailand or the Philippines. The Canadian Boreal forest is a unique ecosystem that is delicate and irreplaceable. We strongly recommend that this be recognized, fully discussed, its intrinsic value (present and future) be determined and its potential loss be presented to the public for decision making;
6. There is a need to determine not only the acidification impacts of oil sands activity, but also the potential eutrophication impacts on the nitrophobic boreal ecosystem. Work needs to be done to determine indicators of biodiversity loss and unnatural ecosystem succession from the bacteria and ecto-mycorrhizal fungi (the initiators of the nutrient cycling), through the mosses, shrubs and trees. The symbiotic relationships may become unnecessary if nitrogenous nutrients are raining from the sky; and
7. Water allocation may not be a major concern at present; however, future climate change may result in much less water being made available for the oil sands use. Furthermore, of more major short term concern is the treatment of water that has been used in the extraction of the oil. We are very concerned that water storage over the next 10 plus years will be a major concern, as the great volumes of contaminated water will have no place to be stored and processed before being discharged. Since water treatment (through settlement) may take 30 + years, we are concerned that the untreated water will become a major storage problem as well as a supply problem. We urge the relevant governments and industry to resolve this potential problem before any further developments are permitted to occur.

These are some of our concerns. Please give serious consideration to answering these concerns before any further oil sands approvals are given.

Sustainable Development and the International Stage at CSD 15

Submitted by: Wendy Thomson, CSEB Greater Toronto Area Chapter Chair

What is CSD?

In 1992, the United Nations Commission on Sustainable Development (CSD) was established by the UN General Assembly to ensure effective follow-up of the Rio Earth Summit, the United Nations Conference on Environment and Development. The CSD is responsible for reviewing progress in the implementation of Agenda 21 and the Rio Declaration on Environment and Development; as well as providing policy guidance to followup on the outcomes of the World Summit on Sustainable Development at which the Johannesburg Plan of Implementation (JPOI) was adopted.

The CSD meets annually in New York, in two-year cycles focusing on prescribed clusters of thematic and cross-sectoral issues. The first year of a cycle is a review year and the second a policy year. The review session undertakes an evaluation of progress in implementing the specific areas of the cluster, while focusing on regional experiences, constraints and obstacles, lessons learned and best practices. The outcome for the first year is a Chairman's document which reflects the state of implementation report for the Secretary General. During the second year a policy session is held in which policies on practical measures and options on implementing the thematic cluster are agreed to.

The CSD negotiations open their sessions to broad participation from both governmental and non-governmental actors, and support a number of additional activities, such as the Partnerships Fair, the Learning Centre and a series of panels, roundtables and side events. The High-level segment features dialogue among Ministers, and Ministers also hold a special dialogue session with Major Groups. The nine Major Groups recognized are Women, Youth and Children, Non Government Organizations, Indigenous People, Local Authorities, Workers and Trade Unions, Business and Industry, Scientific and Technological Community, and Farmers.

2007 Thematic Cluster and Review Session

The 15th Session of the UN Commission on Sustainable Development opened April 30th 2007 with speeches from different countries. As a functional commission of the UN Economic and Social Council, CSD has 53 member States and in 2007, 80 government ministers attended, with more than 2,000 governmental and non-governmental delegations.

Building on the outcomes of the CSD 14 review year, CSD 15 focused on policies and options to expedite implementation of commitments in the areas of energy for sustainable development, industrial development, air pollution and the atmosphere, and climate change.

Negotiations and discussions were based on the chairman's draft negotiating document prepared from the intergovernmental preparatory meeting in February.

Given this draft text, NGOs were concerned about a governmental approach encouraging renewables and efficiency while subsidizing and rationalizing further growth of fossil fuel production and consumption. Another concern was that climate change, energy access for the poor, and other such issues are being used to justify and subsidize expansion of nuclear power, agrifuels and other big industry priorities.

Unfortunately key issues in the energy and climate change sections of the text remained unresolved until late the last day, and so the Chair produced a compromise text which he presented to delegates on a "take it or leave it" basis. Delegations were given 45 minutes to consult and cautioned that if they rejected the text, the only outcome from CSD-15 would be a Chair's Summary to be published a week later.



*The Chairman H.E. Abdullah bin Hamad Al-Attiya (Qatar)
"Take it or leave it."*

Not many government nor NGO delegates were pleased with the end results of the past two years of discussion. The EU said the text did not address either the challenges or the expectations. One minister is said to have referred to the session as "a joke." Some say this is a weakness of CSD; yet CSD is also a reflection on the political will and global leadership of the governments making it up. NGOs, on the other hand, have the task of pushing those governments to do the right thing – a task made difficult at the sessions given the rate of change of the document text.

In the end, the EU rejected the text as it neither addressed the identified challenges nor met world expectations. The G-77/China accepted the text, but noted that the procedure followed must not set a precedent for future sessions. Canada commented that the negotiated text is not the only measure of success. As a result the chairman will produce a summary that will be published shortly.



Canadian Stakeholder Engagement

CSD is a framework by which major groups can share a Canadian perspective, solutions and best practices on environmental and sustainable development issues with both developing and developed countries. In addition it is also a venue to learn international solutions to local challenges here in Canada and allows groups an opportunity to express their opinions on the international stage realizing these may ultimately be ratified into Canadian environmental policy.

However unlike in past years at which a representative of youth, indigenous peoples and ENGOS would be on the official Canadian delegation, the federal government decided to exclude civil society. This meant that Canadian civil society including ENGOS had less input on the policy and position adopted by the federal delegation than in prior years.

Even though the federal government did offer additional input opportunity to all Canadian major groups through a federal consultation meeting in April, a very limited number of Canadian ENGOS were present at this meeting or indeed at the CSD in New York. It should be noted there were delegates from agricul-

ture, youth and trade unions but a limited presence from the scientific community and women's groups. The few participants from these major groups who did attend were unaware of each other's presence for the most part.

As CSD is one of the few international vehicles which allow major group participation in such policy, lack of participation from Canadian major groups may mean that we are losing a significant opportunity to effect change internationally and at home!

At CSD 15 a small group of Canadian delegates came together to initiate creation of a "Canadian caucus" for future CSD sessions which will encourage strong participation from civil society stakeholders across Canada. Essentially mirroring the CSD process, the new "Canadian caucus" will be structured into major groups that would organize themselves into caucuses to work on the issues presented at the next CSD thematic cluster: agriculture, rural development, land, drought, desertification and Africa.

If your group is interested in participating please contact Wendy Thomson at wendy@exworld.org.

Conferences & Meetings

Public Science of Canada/Strengthening Science to Protect Canadians

September 6-7, 2007

Hilton Lac Leamy, Gatineau, Québec, Canada

The Public Science in Canada | Strengthening Science to Protect Canadians Symposium will provide a framework for dialogue amongst scientists, policy-makers, decision-makers, and public opinion leaders. This Symposium will allow participants to discuss the state of public science in Canada and share promising practices from across Canada and around the world. Early Bird registration fees are in effect until July 31, 2007.

For an Updated List of Confirmed Speakers and to Register, go to the Symposium website at <http://www.hyper-media.ca/pipsc/>

Water Quality Solutions Conference

September 24-28, 2007

Edmonton, Alberta, Canada

The SAFE DRINKING WATER FOUNDATION conference provides participants an opportunity to network with community leaders and water treatment operators from aboriginal and rural communities, as well as professionals from economic development, health and engineering. For more details and registration information please visit our website www.safewater.org.

Moving?

Any change in address should be sent to CSEB, P.O. Box 962 Station F, Toronto ON M4Y 2N9 or e-mail: Gary Ash at gash@golder.com

Deforestation: The Hidden Cause of Global Warming



In the next 24 hours, deforestation will release as much CO₂ into the atmosphere as eight million people flying from London to New York. Stopping the loggers is the fastest and cheapest solution to climate change. So why are global leaders turning a blind eye to this crisis?

Daniel Howden

Reprinted from The Independent - 14 May 2007

The accelerating destruction of the rainforests that form a precious cooling band around the Earth's equator, is now being recognised as one of the main causes of climate change. Carbon emissions from deforestation far outstrip damage caused by planes and automobiles and factories.

The rampant slashing and burning of tropical forests is second only to the energy sector as a source of greenhouse gases according to report published today by the Oxford-based Global Canopy Programme, an alliance of leading rainforest scientists.

Figures from the GCP, summarising the latest findings from the United Nations, and building on estimates contained in the Stern Report, show deforestation accounts for up to 25 percent of global emissions of heat-trapping gases, while transport and industry account for 14 percent each; and aviation makes up only 3 percent of the total.

"Tropical forests are the elephant in the living room of climate change," said Andrew Mitchell, the head of the GCP.

Scientists say one day's deforestation is equivalent to the carbon footprint of eight million people flying to New York. Reducing those catastrophic emissions can be achieved most quickly and most cheaply by halting the destruction in Brazil, Indonesia, the Congo and elsewhere.

No new technology is needed, says the GCP, just the political will and a system of enforcement and incentives that makes the trees worth more to governments and individuals standing than felled. "The focus on technological fixes for the emissions of rich nations while giving no incentive to poorer nations to stop burning the standing forest means we are putting the cart before the horse," said Mr Mitchell.

Most people think of forests only in terms of the CO₂ they absorb. The rainforests of the Amazon, the Congo basin and Indonesia are thought of as the lungs of the planet. But the destruction of those forests will in the next four years alone, in the words of Sir Nicholas Stern, pump more CO₂ into the atmosphere than every flight in the history of aviation to at least 2025.

Indonesia became the third-largest emitter of greenhouse gases in the world last week. Following close behind is Brazil. Neither nation has heavy industry on a comparable scale with the EU, India or Russia and yet they comfortably outstrip all other countries, except the United States and China.

What both countries do have in common is tropical forest that is being cut and burned with staggering swiftness. Smoke stacks visible from space climb into the sky above both countries, while satellite images capture similar destruction from the Congo basin, across the Democratic Republic of Congo, the Central African Republic and the Republic of Congo.

According to the latest audited figures from 2003, two billion tons of CO₂ enters the atmosphere every year from deforestation. That destruction amounts to 50 million acres-- or an area the size of England, Wales and Scotland felled annually. The remaining standing forest is calculated to contain 1,000 billion tons of carbon, or double what is already in the atmosphere.

As the GCP's report concludes: "If we lose forests, we lose the fight against climate change."

Standing forest was not included in the original Kyoto protocols and stands outside the carbon markets that the report from the International Panel on Climate Change (IPCC) pointed to this month as the best hope for halting catastrophic warming.

The landmark Stern Report last year, and the influential McKinsey Report in January agreed that forests offer the "single largest opportunity for cost-effective and immediate reductions of carbon emissions".

International demand has driven intensive agriculture, logging and ranching that has proved an inexorable force for deforestation; conservation has been no match for commerce. The leading rainforest scientists are now calling for the immediate inclusion of standing forests in internationally regulated carbon markets that could provide cash incentives to halt this disastrous process.

Forestry experts and policy makers have been meeting in Bonn, Germany, this week to try to put deforestation on top of the agenda for the UN climate summit in Bali, Indonesia, this year. Papua New Guinea, among the world's poorest nations, last year declared it would have no choice but to continue deforestation unless it was given financial incentives to do otherwise.

Richer nations already recognise the value of uncultivated land. The EU offers €200 (£135) per hectare subsidies for "environmental services" to its farmers to leave their land unused. And yet there is no agreement on placing a value on the vastly more valuable land in developing countries. More than 50 percent of the life on Earth is in tropical forests, which cover less than 7 percent of the planet's surface.

They generate the bulk of rainfall worldwide and act as a thermostat for the Earth. Forests are also home to 1.6 billion of the world's poorest people who rely on them for subsistence. However, forest experts say governments continue to pursue science fiction solutions to the coming climate catastrophe, preferring bio-fuel subsidies, carbon capture schemes and next-generation power stations.

Putting a price on the carbon these vital forests contain is the only way to slow their destruction. Hylton Philipson, a trustee of Rainforest Concern, explained: "In a world where we are witnessing a mounting clash between food security, energy security and environmental security-- while there's money to be made from food and energy and no income to be derived from the standing forest, it's obvious that the forest will take the hit."

Poor Plankton Plan For Removal of CO₂

*Reprinted from Edmonton Journal Editorial,
June 20, 2007*

Seeding the oceans with iron-rich dust to promote blooms of CO₂-eating plankton has great potential environmental benefits, but the I-dare-you-to-stop-us stance of Planktos Inc., which plans to stimulate a bloom near the precious Galapagos Islands off South America, must be stopped until more is known about the potential benefits and dangers.

The U.S. Environmental Protection Agency warned Planktos that it has serious concerns over the company's plan to spread 45 tonnes of iron in an effort to trigger a massive bloom over 10,000 square kilometres. Planktos, which has offices in San Francisco and Vancouver, says it will simply use a foreign-registered vessel, removing any EPA jurisdiction.

Environment Canada to this point has said nothing publicly about the Planktos plan.

In large numbers, plankton functions as a floating forest, breathing in carbon dioxide and returning oxygen. The organisms float around for months, but ultimately die and sink to the bottom, forming chalk deposits.

According to Planktos, marine photosynthesis consumed about 50 gigatons of carbon dioxide per year in 1980. For a variety of reasons, that capacity has dropped off by nearly 25 percent in the Pacific Ocean in the past 25 years, causing a reduction of about three gigatons in CO₂ consumption each year.

Planktos said it simply wants to restore and then maintain plankton growths in areas that have seen the greatest reductions, especially the west coast of South America.

Of course, Planktos isn't doing this out of the kindness of its heart. It plans to sell the carbon-eating capacity as CO₂ credits, just as tree planters get reforestation credits.

Critics say the increased plankton will raise the acidity of the ocean, potentially harming coral reefs. That, in turn, could further deplete dwindling fish stocks along coasts where people depend on fish to survive.

These concerns are not insurmountable, but Planktos can't be allowed to ignore the concerns of the EPA. If there's any chance the cure could end up being worse than the ailment, the go-slow warnings must be heeded.

The Boreal Forest: Helping The Earth Breathe

*By Art Jones, Saskatchewan Environment
February 22, 2007*

If you were approaching Earth from space, you might wonder about the green band that circles the northern part of the planet. This band of vegetation is called the "boreal forest," named after the Greek god of the north wind, Boreas.

The boreal forest is found in Canada, Alaska, Russia, China, Mongolia, Norway, Sweden and Finland. Collectively, the boreal forest covers 10 percent of the earth's land surface and represents about one-third of the world's forested area.

The boreal forest is one of the largest ecosystems on the planet. It covers approximately one-half of Canada's landmass. Nearly 55 percent of Saskatchewan is covered by forest. Saskatchewan's boreal forest and the boreal forests around the world are important to the health of our planet.

"These forests have been called the lungs of the planet because of the role they play in filtering our air," says Michael McLaughlan, Saskatchewan Environment's Director of Forest Management. "An average tree in the boreal forest will absorb about a tonne of carbon dioxide over its lifetime. Trees in the boreal forest also produce a large amount of oxygen especially during the spring and summer when the trees are vigorously growing. During this time the amount of oxygen in the atmosphere around the world increases and the level of carbon dioxide drops."

In Canada, the boreal forest is home to about two-thirds of Canada's 140,000 species of plants, animals and other organisms, including timber wolves, woodland caribou, gray jays, loons, black spruce, jack pine and trembling aspen.

Many mammals have evolved to make it easier to live in the boreal forest, which has short, cool, moist summers and long, cold, dry winters. For example, caribou have hooves that are adapted for travel and digging in ice and snow in winter. They also have specialized digestion systems, making them the only member of the deer family that can live on lichens. Rabbits and some other animals change colour with the seasons so they can blend in with their surroundings and avoid predators; other species are able to hibernate. The beaver is one of the most important boreal forest animals. Its dams flood parts of the forest, creating ponds and wetlands that are used by fish, waterfowl and amphibians.

The boreal forest is often called North America's bird nursery. It is used by nearly half of the continent's birds, over 300 species, for nesting and raising their young.

In addition to providing habitat for birds and other wildlife, approximately 2.5 million Canadians live in communities that depend on the boreal forest. The boreal forest region supports about 900,000 direct and indirect jobs across Canada in industries such as forestry, mining, tourism, trapping and harvesting natural products.

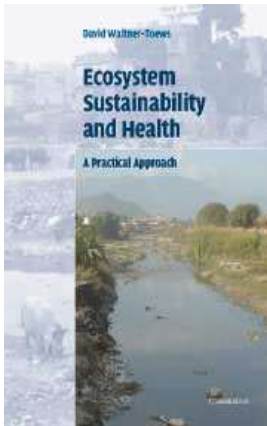
“The boreal forest is a large and relatively resilient ecosystem but it is also under many pressures ranging from development to climate change,” says Environment’s McLaughlan. “It’s hard to imagine, but individual actions as simple as recycling and energy conservation can help by reducing climate change. Governments, industry and other partners are also working together to better understand how the boreal ecosystem works, how humans affect it and how we can make better decisions. Better understanding and using traditional knowledge will help us maintain the boreal forest for generations to come.”

For more information contact:
Michael McLaughlan
Director, Forest Management
Saskatchewan Environment
(306) 953-2436
michael.mclaughlan@gov.sk.ca
or
Art Jones
Communications Consultant
Saskatchewan Environment
(306) 787-5796
(306) 536-8452 (cell)
art.jones@gov.sk.ca



Boreal forests have been called the lungs of the planet. When the trees in the forest are actively growing, the amount of oxygen in the atmosphere around the world increases and the level of carbon dioxide drops.

Book Review



Ecosystem Sustainability and Health: A Practical Approach

Waltner-Toews, David. 2004. *Ecosystem Sustainability and Health: A Practical Approach*. Cambridge University Press, Cambridge. 0-521-82478-8 (hc) \$105; 0-521-53185-3 (pb) \$55

Submitted by: Scott Slocombe, Geography & Environmental Studies, Wilfrid Laurier University

This is a short book with a tall goal: "Searching for solutions to complex problems." It is fundamentally grounded in complex systems, participatory research, and adaptive management, as realized in ecosystem approaches. And it explores applications of these approaches to health, particularly at ecosystem and similar scales. As the author notes, this entails many particular challenges, both conceptual and practical. Waltner-Toews emphasizes solutions to the practical challenges, and the book is aimed at practitioners seeking better understanding and sustainable improvement of human, animal and ecosystem health, which are all often inextricably linked.

Ecosystem Sustainability and Health is organized around the components, application, and evolution of a methodology for understanding and intervening in complex environmental health situations. It begins with "The Basic Figure" – a standard medical assessment and treatment process (p. 3) and critiques and elaborates it into an "Adaptive Methodology for Ecosystem Sustainability and Health" (AMESH) by the end (p. 122). The book's six chapters reflect the components of the Basic Figure: Presenting Complaint, The Clinical Examination, Making a Diagnosis, Setting Goals, Achieving Goals, Responding to Change. Along the way there is substantial discussion of the problems with traditional medical diagnostic practices, and the differences entailed in taking a systemic perspective.

Basic systems and complex systems ideas such as feedbacks, boundaries, hierarchy and holonarchy, self-organization and attractors are described, and their implications discussed. The book does not emphasize theory however, and its strength is in the development of the AMESH methodology, and the presentation and illustration of numerous systems methods throughout, often in the context of human-environment problems such as hydatid disease in Kathmandu, food-borne disease emergence, river management in Chennai, or rural community health in Kenya. Some of the methods and tools discussed include soft systems methodology (SSM), rich pictures, influence diagrams, appreciative inquiry, participatory research methods, triangulation, scale diagrams, Holling's lazy-8, and amoeba diagrams.

Although short, overall Waltner-Toews provides a very useful reflection, and a creative guide to working with complex

systems ideas in complex environmental sustainability and health situations. He draws on his considerable experience in applied projects of this sort, and his veterinary background. The book is also very well written, if not in a particularly linear, academically didactic style. That is likely intentional, and probably appropriate to the subject matter and approach. There is a useful, short, bibliography and index, and the figures, tables and editing are all excellent. AMESH is an excellent overall methodology, and it is well presented. I recommend this book to those with interests in these areas. Waltner-Toews continues to work in these areas, so for more on his approach see Waltner-Toews & Kay (2005), Waltner-Toews, et al. (2005), and Parkes, et al. (2006).

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Recent Publications

Submitted by: Pat Stewart

If you've read a good biologically or environmentally-oriented book recently, please be persuaded to share them with other CSEB members. We'll be glad to include your short (500 word) review of the book in the next newsletter. Contact Pat Stewart at: EnviroSphere Consultants Limited, Box 2906 Windsor, Nova Scotia, B0N 2T0, (902) 798-4022 or e-mail at enviroco@ns.sympatico.ca, attention **Pat Stewart**.

Pat's Picks

Here are some books sent to us by Cambridge University Press over the last few years that wound up on my desk, and hopefully will grace my bookshelf for a long time to come, as they're both informative and useful.

M.G. Barbour and W.D. Billings, eds. 2000. *North American Terrestrial Vegetation. 2nd Ed.* Cambridge University Press.

In this comprehensive volume, the second edition of a popular 1988 textbook, nearly all the terrestrial biomes of North America, including Central America and Hawaii, are presented in a clearly written and authoritative fashion by experts in the field. In particular the chapters on the Canadian arctic biome and the boreal forest are brimming with detail, particularly relevant these days when attention is focused on the former by global warming and the latter by the possible exploitation of the trees over a vast area of boreal forest. The book has an excellent chapter on wetlands, which was particularly relevant to me, and which presents various classification systems, explaining the differences between Canadian and American wetlands terminology. If you're planning to travel anywhere in North and Central America, the photographs (albeit black and white) and explanatory diagrams for succession and processes, make this book a worthwhile investment as a worthy, five-star, biologists' travel guide.

Janet Moore, 2001. *An Introduction to the Invertebrates.* Cambridge University Press.

If you're teaching about, interested in, or just want to get to know invertebrates, this book is pleasant way to plug in to the world of boneless life. Moore adopts an evolutionary approach to look at relationships between various invertebrate groups and their morphology, which is refreshing compared to the encyclopedic treatment of some texts. The book condenses everything into a short 355 pages, with an open layout and lots of full page diagrams. Incidentally, the author updates the taxonomy of major groups (e.g. a new major phylum—"Placozoa"). This book is good general reading but also an excellent accompaniment to other, more conventional, invertebrate texts.

Marie-Josée Fortin and Mark Dale. 2005. *Spatial Analysis. A Guide for Ecologists.*

This book, produced by two Canadian researchers at the U of T and U of Alberta, is a thorough and enlightening presentation on how to analyze and display spatial patterns in numerical data. Sounds appealing? This could be an exceedingly dry topic but the authors don't make it so, explaining even the most difficult concepts so clearly even a novice could understand, and become proficient with it as well. Too often we use software to do sophisticated analysis for us without really understanding the benefits and limitations of each approach. This book is an easy way 'to do your homework' before you plan your sampling and finally display the results—and is an interesting read as well. One particularly useful section deals with the smoothing programs such as 'kriging' used in geographic information systems and graphical plotting software. The book has one of the best simple explanations of 'pseudo replication' I've ever seen, and has an authoritative bibliography as well.



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