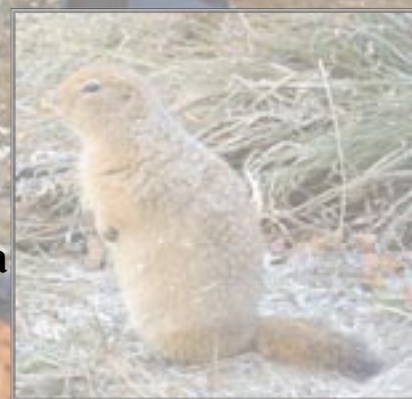




Newsletter / Bulletin

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- President's Report
- Bridging Gaps in Fish Biology
- Saskatchewan's Nuclear Future?
- Keeping the Home Fires Burning
- Wetlands Alteration Policy in Nova Scotia
- Alberta Grizzly Bear Hunt Suspended
- More Fish for Lac La Biche



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Cover Photo: Dr. John Virgil and Chris Madland, of Golder Associates Ltd., undertaking wildlife surveys in the Hope Bay area, near Bathurst Inlet, Nunavut. Insert is an Arctic ground squirrel, which are common in the area. Photo Credit: Corey De La Mare, Golder Associates, Edmonton.

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CSEB NEWSLETTER 2006

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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:** Sean Sharpe, Editor, PO Box 962, Station F, Toronto ON; e-mail: Sean.Sharpe@gems9.gov.bc.ca

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LE BULLETIN de la SCBE 2006

Vol. 63, Numbre 1 Printemps 2006

Le Bulletin de la SCBE est une publication trimestriel de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activités de la Société sur événements courant 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'environnementalistes 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:** Sean Sharpe, Editor, PO Box 962, Station F, Toronto ON; e-mail: Sean.Sharpe@gems9.gov.bc.ca

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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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NATIONAL

President's Report

This is my first message as President of the CSEB. I would first like to thank the members of the outgoing Board of Directors for all of their hard work, particularly our Immediate Past President, Pat Ryan. Under Pat's direction, the CSEB had two successful conferences, and Pat was able to take control of the organization's finances and balance the books – no easy task. Thanks for leaving the society in such great shape, Pat!

To give you a bit of my background, I am a fisheries biologist who spent nearly a decade on the East Coast working in the impact assessment and environmental monitoring fields. I am currently living in Grande Prairie, Alberta, working on a large oil sands project and conducting fish and fish habitat assessments for the oil and gas and forestry industries.

My main focus for 2006 will be to increase membership in the CSEB. Although we have had declining memberships for the last several years, I hope we can reverse the trend with a few relatively simple changes. We have recently started an online sign-up for new members, with PayPal as a payment option. We are hoping to expand the process to include membership renewals in 2007.

Please feel free to call or email me any time if you have thoughts or suggestions for improving the CSEB, I would be more than happy to hear from you!

Shawn Martin, President (2006-2007)
Canadian Society of Environmental Biologists

ENGO Election News

Submitted by: Joseph Hnatiuk, Saskatchewan Director

Since March 2004, Joseph M. Hnatiuk, a member of the National Board of Directors of the Canadian Society of Environmental Biologists (CSEB), as well as a member of its Saskatchewan Chapter, has been serving on a Subcommittee on Quality Assurance within the Environmental Planning and Assessment Caucus (EPAC) of the Canadian Environmental Network (CEN). Joseph was elected to be the Environmental Non-Governmental Organization (ENGO) representative by the Environmental Planning and Assessment Caucus (EPAC) of CEN representing CSEB. The Subcommittee was established by the Regulatory Advisory Committee (RAC), a multi-stakeholder body that

provides advice to the federal Minister of the Environment on matters related to the *Canadian Environmental Assessment Act* (the Act).

The Subcommittee was struck to examine questions related to the design and implementation of the quality assurance program being established for assessments conducted under the Act. That program is required as a result of amendments to the Act proclaimed in October 2003. The amended Act includes a provision instructing the *Canadian Environmental Assessment Agency* (the Agency) to "establish and lead a quality assurance program."

The Subcommittee, which is chaired by the Agency's Director of Legislative and Regulatory Affairs, comprises six members: two from environmental organizations (CSEB; Bow Valley Naturalists); two from industry associations (Mining Association of Canada; Canadian Nuclear Association); and two from federal government departments (Environment Canada; Fisheries and Oceans Canada). It is constituted to capture a range of stakeholder/public perspectives, while providing immediate access to input from federal officials with experience in implementing the Act.

The Subcommittee completed its work in March 2006 and is providing recommendations to the RAC under the following headings, which relate directly to the Subcommittee's terms of reference from the RAC:

1. The Mandate and Structure of the Quality Assurance Program;
2. Key issues and Work Priorities; and
3. Involvement of External Parties.

In addition, the Subcommittee has identified and is recommending approaches that it believes would result in general improvement of the quality assurance program. It has also arrived at certain global conclusions about the program, and is making certain recommendations of a global nature.

The Subcommittee's report will be discussed at the May 2006 meeting of the RAC. ■

Wanted: Regional Newsletter Contributors

CSEB needs to set up a network of regional newsletter contributors to gather newsworthy information and solicit regional based articles for inclusion in the quarterly CSEB Newsletter/Bulletin. If you are interested, please contact Gary Ash at gash@golder.com.

Bridging Gaps in Fish Biology and Fisheries Management: Hard Lessons and Warnings from Two Large Inland Water Systems in British Columbia

Submitted by: T.G. Northcote - Professional Emeritus
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Abstract

Dangers of incomplete understanding in functional processes of fish ecology, physiology and behaviour, as well as fisheries management, are reviewed for two major British Columbia watersheds – the Kootenay Lake system, part of the upper Columbia River, and the Fraser River system, draining a quarter of the province and supporting one of the largest populations of salmonids in the world. The Kootenay system in the last 50 years has been subject to massive cultural eutrophication, then cultural oligotrophication, and most recently an expensive large-scale experimental but controlled “re-eutrophication”, all with substantial effects on its major recreational fisheries. Furthermore mid-twentieth century introduction of “freshwater shrimp” (*Mysis relicta*) to bridge an apparent food web gap for rainbow trout (*Oncorhynchus mykiss*), produced unexpected and only temporary “success” in a non-target kokanee (*Oncorhynchus nerka*) fishery, along with widespread problems throughout many other large lakes of western North America by its inappropriate introductions elsewhere in misguided hopes to repeat the Kootenay “success.” Throughout much of the twentieth century, the Fraser system enjoyed one of the most intensive and pervasive levels of fish ecological, physiological and behavioural research coupled with strong management at the local salmonid stock level, as well as at provincial, federal and even international levels. Nevertheless there were many gaps in understanding and appropriate action ranging from major tributary impoundment in its upper reaches, problems of upstream fish passageway by blockage in its middle reaches, loss of vital estuarine rearing habitat, as well as climate change effects on near-shore and offshore marine waters where intensive commercial and recreational fisheries take place. Indeed in some ways the gaps seem to be widening to gulfs, which if not soon bridged, may result in irrevocable degradation of its world-class salmonid fisheries.

Introduction

The aim of the gap-bridging American Fisheries Society symposium in 1997 – “To create a forum where biologists, fishery professionals and policy makers would come together to discuss ecophysiology” – was good, and I added then only two comments:

- (1) There was just not a gap, but rather, many of them, ranging from narrow and often temporary slits to wide and long-standing gulfs!
- (2) These gaps pervaded not only the two key disciplines forming the subject of that symposium – ecology and physiology – as central as they are to fisheries management, but occurred also in many other disciplines needed for the sustainable management of any fisheries – systematics, genetics, behaviour, limnology / oceanography, and so on.

Perhaps I should add now a third comment on a point clearly identified in the 1997 symposium outline – the “current conflicts between policy-makers and resource users” of fisheries. These conflicts, still present, arise from gaps at several levels of understanding. First, they occur at the level of understanding ecosystem interactions among populations within the resources being used, and the environment from which they are extracted. Secondly, and just as important, are those occurring at the level of understanding the social, political, and economic milieu surrounding the resources – presently, as well as historically. This second level of understanding, and regrettably its shortfalls and lacks, combined with missing elements of the first level, have resulted in two of the most controversial and far-reaching problems in fisheries management experienced in western Canada, if not the Pacific Northwest. They deal mainly with the salmonid resources of two large Pacific river systems, the Columbia with a major part of its upper watershed reaches in British Columbia (hereafter B.C.), and the Fraser River watershed almost entirely within that province.

The origins of the first problem go back at least to the late 1940s in the Kootenay Lake system, a major part of the upper Columbia, and for the purposes of this review, I will call them “*The Kootenay Crises*.” The second problem involves a series of difficulties and attempted solutions on the largest river system in B.C., and probably the largest salmonid producer in the world (Northcote and Larkin 1989), herein to be called “*The Fraser Fiascos*.”

The “Kootenay Crises”

1. Fish introductions

Of the 43 species of fish in the B.C. part of the Columbia River system, 18 or about 42%, are introduced (McPhail and Carveth 1992) – a higher proportion than in any other river system in the province. Some of the introductions were intentional and others occurred by invasion from lower reaches. Together they include seven species of salmonids, four centrarchids, three cyprinids, two catfishes, and two percids. A few started in the late 1800s or early 1900s in attempts to establish special fisheries (commercial and recreational), as for example, that for lake whitefish (*Coregonus clupeaformis*). Others, mainly salmonids, were introduced during the 1930s to 1970s largely in attempts to enhance recreational fisheries. The effects of all of these introductions on the native fauna and in some cases possibly the flora, are virtually unknown but probably involve important competitive, predatory, and habitat interactions. We have been most remiss in not seriously examining these possible effects and their significance to the native fishes and their resource needs.

2. Dams

Many small impoundments were built in parts of the Kootenay system from the late 1800s to the mid 1900s, mainly for local domestic water, irrigation, mining, and electrical purposes. A low head dam built at the outlet of the West Arm of Kootenay Lake in 1931 (Fig. 1) had some negative effects on rainbow trout (*Oncorhynchus mykiss*) spawning and rearing habitat in that portion of the lake. The first major dam was built in 1966 on the Duncan River

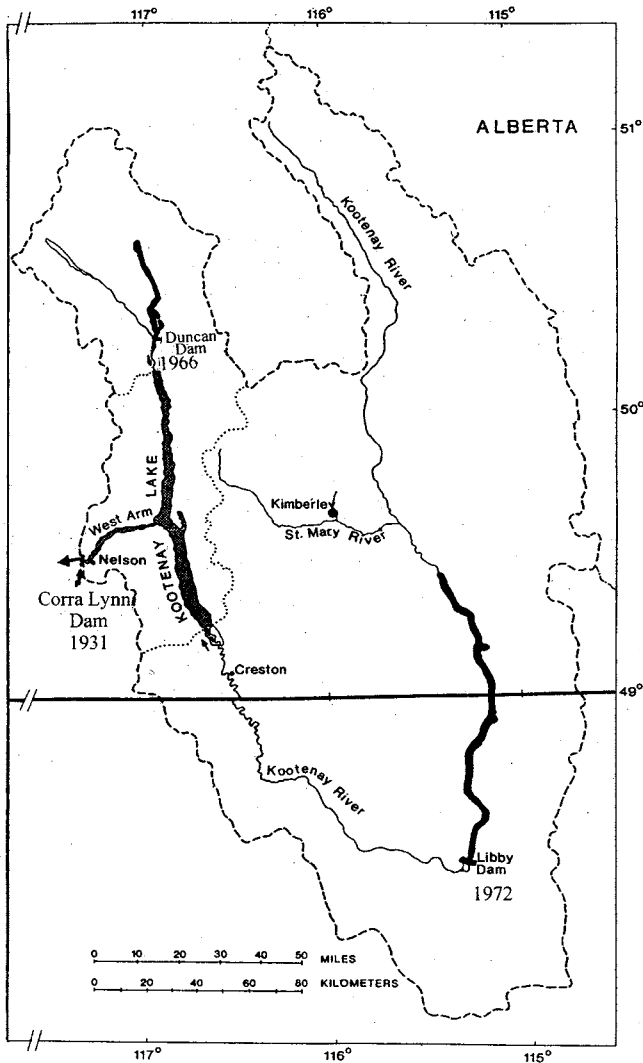


Fig. 1. Location of the Corra Lynn, Duncan, and Libby dams on the Kootenay Lake watershed system.

(Fig. 1), a sizeable inflow to the north end of Kootenay Lake, under the Canada / U.S.A. Columbia River Treaty for storage and electrical generation in the U.S. Columbia River dams. Duncan Dam was located virtually on top of the major spawning grounds for several million kokanee salmon (*Oncorhynchus nerka*) and as well a unique strain of large rainbow trout (supporting part of the lucrative Kootenay Lake sport fishery), with severe losses to both species. The large Libby Dam (Fig. 1) built in 1972 on the Kootenay River in Montana flooded up across the border into B.C., with major effects on turbidity and nutrient loading into Kootenay Lake (Northcote 1972, 1973, Northcote et al. 2005) and had biotic repercussions ranging from algae to fishes.

3. Eutrophication / oligotrophication / fertilization

About 80% of Kootenay Lake's drainage basin arises in the upper Kootenay River (Fig. 1), entering the south end of the lake. Much of it drains off the western slopes of the Rocky Mountains, a moderately nutrient rich area, and along with agricultural additions from the U.S. and

southern B.C. portions, carried a sizeable load of nutrients to the lake even in the early to mid 1900s. But in 1953 a fertilizer plant started operation on a tributary to the St. Mary River flowing into the Kootenay River, with a large increase in phosphorus levels. Annual phosphorus loading in the upper Kootenay, upper St. Mary, and the Duncan rivers throughout the 1960s was low, but high in the St. Mary River below the fertilizer plant (Fig. 2). That the fertilizer plant was largely responsible for this increase was nicely demonstrated in March 1962 when militant Doukhobors bombed the power line to the plant shutting it down for a month, during which phosphorus concentration dropped down to upper St. Mary River levels (Fig. 2), but rose back again when the plant regained operation. By the mid 1960s, heavy algal blooms (phytoplanktonic and periphytic) developed in Kootenay Lake, with detrimental effects on water quality, sport fishing, and aquatic recreation. Over the early 1970s the fertilizer plant phosphorus losses were gradually reduced and its closure in the mid 1970s, along with the continuing phosphorus uptake by the Libby dam reservoir (Fig. 1), reduced phosphorus loading to the south arm of Kootenay Lake to levels below the 1950s. An attempt to correct for this has been carried out by experimental northern end fertilization of the lake (Ashley et al. 1997, 1999), tied in with correctives to another Kootenay Crisis – mysids!

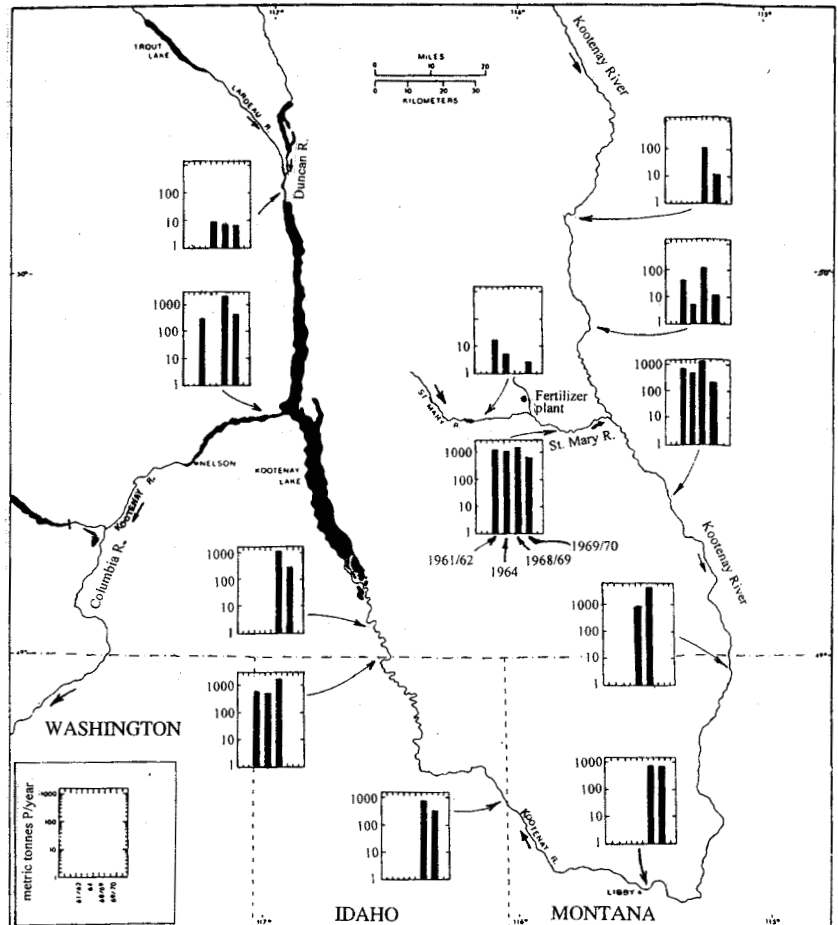


Fig. 2. Loading of dissolved phosphorus ($P_{04}-P$) in metric tonnes P per year within the Kootenay Lake watershed in the 1960s showing the massive increase (over two orders of magnitude) in the St. Mary River below the inflow from a fertilizer plant, and its only slight reduction farther down the Kootenay River before entry into the south end of Kootenay Lake. Adapted from Fig. 8 in Northcote (1973).

4. Mysid introductions

The benthic / epibenthic / pelagic *Mysis relicta* is a common macroinvertebrate well known to fuel growth to large size in lake whitefish and lake char (*Salvelinus namaycush*) in central and eastern Canada, but this did not occur in B.C. It was introduced to Kootenay Lake in 1949 and 1950 in an attempt to speed up the growth rate of juvenile Gerrard stock rainbow trout, which feed largely on macrozooplankton and aquatic insects before their switch to becoming highly piscivorous on kokanee, and reaching their trophy size so critical to support a major sport fishery. But, as it turned out, this introduction suffered from several ecophysiological gaps, incomplete theories and misguided applications! Firstly, mysid introductions produced no increased growth response in rainbow trout, the target species. Secondly, there was a temporary large growth response in kokanee, a nontarget species, but not in the main Kootenay Lake, only in its West Arm population (Northcote 1973, Martin and Northcote 1991). Commercial harvesting of mysids, along with controlled seasonal additions of nutrients, has been carried out in attempts to reduce mysid densities and restore kokanee populations (Ashley et al. 1997, 1999).

SOME "FRASER FIASCOS"

The Fraser River system in B.C. (Fig. 3) covers one quarter of the province, with at least seven major tributaries, starting with its upper

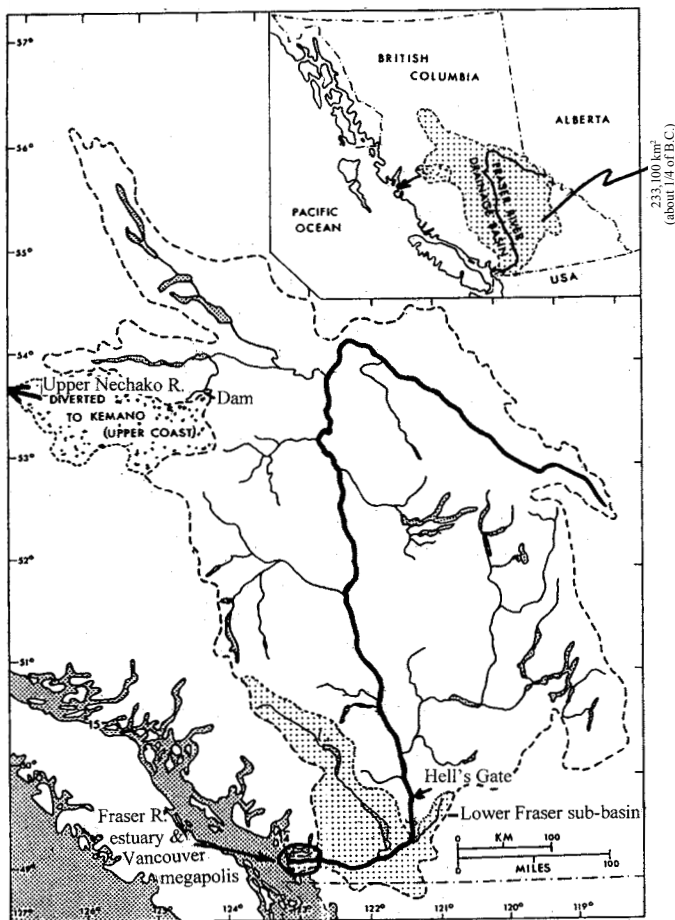


Fig. 3. The Fraser River watershed and location of major tributaries, especially the Nechako River, as well as Hells Gate, a site of difficult upstream passage by returning anadromous salmonid adults, and the Lower Fraser sub-basin.

reaches, then the Stuart-Takla, Nechako, and Quesnel tributaries, followed by those of the Chilcotin, Thompson and Harrison tributaries. All of these systems support sizeable anadromous and resident populations of fishes, especially salmonids, that in many cases were much higher in past decades. Causes for these declines were multiple.

1. Overfishing in near-offshore, estuarine and lower reaches

Some of the most obvious declines in annual catches occurred in four species (Fig. 4), each with one or more sharp rebounds and then declines to the recent decade (1980 to 1990) of extremely low numbers or fishing closures. Especially dramatic are such changes in eulachon and white sturgeon catches, which briefly reached annual levels of over 800 and 500 metric tonnes, respectively, with some of the sturgeon being of enormous size in the early stages of the fishery.

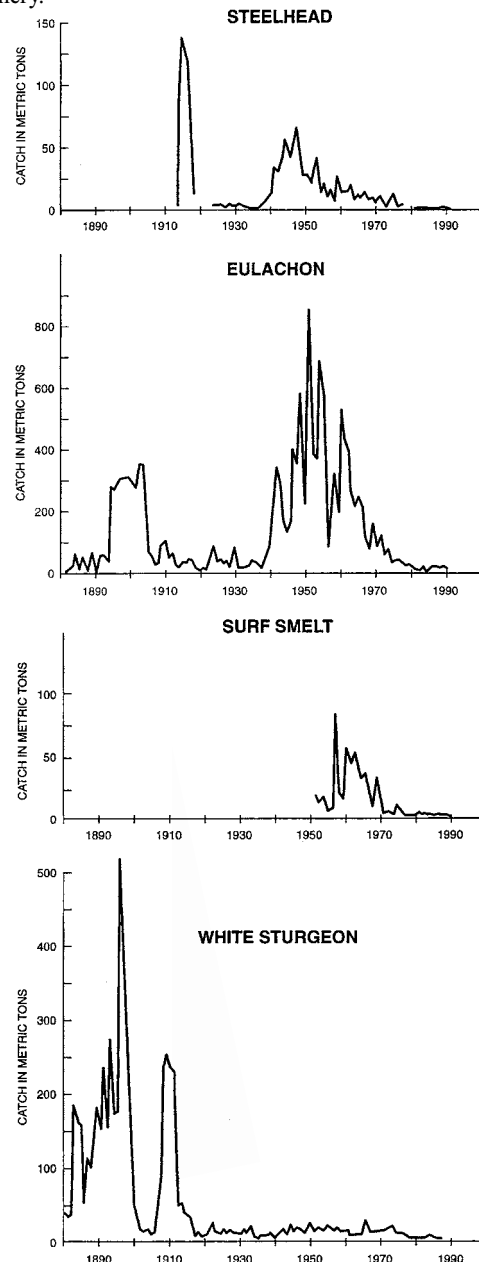


Fig. 4. Long-term commercial catch trends for four anadromous species of Fraser River migratory fishes.

2. Hell's Gate blockage in middle Fraser River

Mean annual catches of sockeye and pink salmon in historical times were over 34 and 23 million, respectively, and in recent decades have shown over five-fold declines (Table 1).

Table 1. Average annual abundance (catch plus escapement in millions) of Pacific salmon in historical (late 1800s to early 1900s) and recent (1951 to 1980s) periods for the Fraser River system. Adapted from Northcote and Burwash (1991).

Species	Historical	Recent	Change
Coho	1.23	0.16	7.69 fold decrease
Pink ^a	23.85	4.32	5.52 fold decrease
Sockeye	34.23	6.75	5.07 fold decrease
Chinook	0.75	6.75	5.00 fold decrease
Chum	0.80	0.39	2.05 fold decrease

^apink salmon adults run into the Fraser River only on odd-numbered years, so on those years numbers are double those shown above

These along with those for the three other species of Pacific salmon were not mainly a result of overfishing, but instead of the Hell's Gate (Fig. 3) blockage. Rock dumping and slides associated with railway line improvements from 1911 to 1914 (Roos 1991) prevented millions of sockeye reaching their spawning grounds, along with most of the upriver multimillion stocks of pink salmon, as well as many of the other three species. Hell's Gate blockage remained a serious obstruction to upriver migration of salmon until the late 1940s, and gradually over the ensuing years, fishway construction permitted salmonid upstream passage over a wide range of water levels. As noted by Roos (1991) "Finally after 45 years of meetings, negotiations and several proposed agreements, a convention between the two countries [Canada and U.S.A.] was concluded and proclaimed on August 4, 1937" [on sockeye salmon; another 20 years later a protocol governing pink salmon was added; fishway construction under the first convention started at Hell's Gate in 1944]. Obviously gaps in corrective action are large and the wheels of action in getting some restoration started are slow in moving, even for a system that probably is the greatest salmonid producer in the world!

3. Upper Nechako River impoundment The Nechako River system (Fig. 3), a large tributary to the upper Fraser River, supported major sockeye and Chinook salmon runs up to the mid 1900s. In the early 1950s, the upper Nechako River was dammed and diverted to a coastal B.C. powerhouse supplying the ALCAN aluminum smelter. As a result of the impoundment, a series of very large and many small lakes in a provincial park were flooded. This Nechako impoundment had and still has serious effects on its salmonid stocks, which, tied in with human population growth and other land use activities there, still need correction to prevent permanent loss of fisheries resources in the system (Hartman 1996).

4. Lower Fraser estuary use by salmonids

Estuarine marsh use by juvenile salmon in the lower Fraser River were intensively studied throughout the 1980s (Levy and Northcote 1981, 1982; Levy et al. 1982, Levy et al. 1989, Northcote et al. in press, Magnhagen et al. in press), with overviews on the multiple effects arising from rapidly increasing human population growth and development in the region (Northcote 1996, Hall and Schreier 1996). By the late 1980s, over 75% of marsh habitat heavily used by at least three species of Pacific salmon young (Chinook, chum, and pink) had been lost as a result of agricultural and flood control dyking, along with industrial and urban development. The large inner marsh area near Ladner (Fig. 5) was one of the few remaining sizable areas where many of the

above three species spent a few days (pink), up to 11 days (chum), and up to 30 days (Chinook), undertaking physiological adjustment to higher salinity, and in the case of chum and especially Chinook, putting on considerable growth providing higher survival in coastal sea waters as they moved offshore (Reimers 1973, Healey 1981).

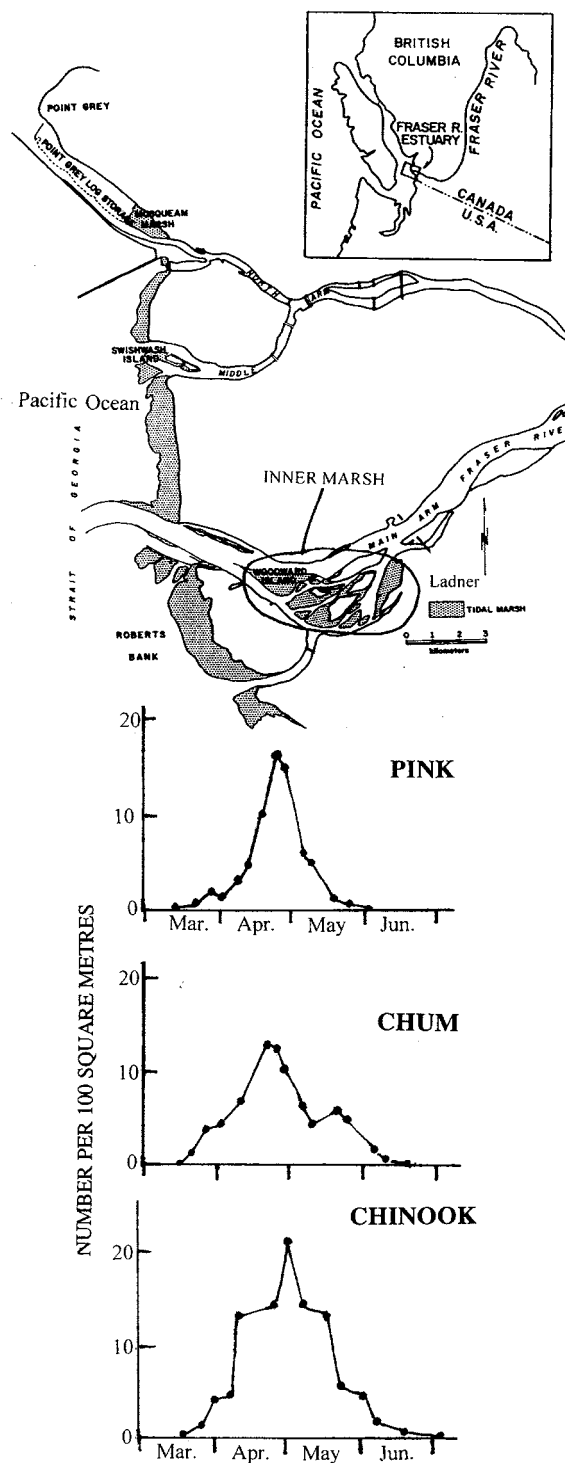


Fig. 5. The estuarine marsh site on the main arm of the lower Fraser River near Ladner (above) and its seasonal use by three species of juvenile salmon (below). Adapted from Levy and Northcote (1982).

Conclusions: Some Hard Lessons and Warning on Gaps

As we have seen for two major watersheds in B.C., there have been no lack of hard lessons, crises and fiascos with both commercial and recreational fisheries management over the last century. And these have occurred despite a remarkably high level of local, provincial, national, and international research on many relevant aspects of fish ecology and physiology, as well as other key scientific disciplines including engineering and the political sciences.

Of course there have been some outstanding and world-recognized successes, for example in Kootenay Lake, by maintenance of the key Gerrard stock of large piscivorous rainbow trout. And also in the Fraser River by the eventual solution of the salmon passage problem at Hell's Gate. Other critical gaps that need to be bridged are those between the sciences and the public / economic / political sectors. For much of the first half of the 20th century, human population pressures in the Pacific Northwest were minimal. Furthermore, the technologies of both commercial and recreational fisheries were unsophisticated, if not almost primitive, in this region over a part of that time. But on both these fronts, this is surely no longer the case now, nor will it be in the future. We desperately need innovative, rapid, and effective ways to bridge the gaps and gulfs that still exist among resource scientists, resource users, and policy makers. On a rather gloomy note and warning, I remind you that despite the loss of hundreds of millions of Fraser River salmon in the early 1900s – shared by Canada and the U.S. – it still took nearly half a century to get a convention on their use and management ratified between these two countries! Therefore, I don't have much hope for a quick fix of other disputes on sharing Pacific salmon that are going on now, unless we bridge some damn big gaps in one hell of a hurry! What is needed to effect a solution to these continuing crises and fiascos in Pacific Northwest fisheries is some hard, realistic rethinking. First by ecologists, physiologists, and other scientists, on the biological and environmental limitations of the situation. And then secondly by economists and politicians, along with the general public on the human limitations of the situation, driven as it is by escalating human population growth coupled with highly unrealistic demands for the "good life."

Jeff Hutchings, Carl Walters and Dick Haedrich published a perspective in the May 1997 issue of the Canadian Journal of Fisheries and Aquatic Sciences that called for a reorganization and even separation of the science and the politics of fisheries management. Their paper (Hutchings et al. 1997) sparked hot responses from several critics in the June issue, but little action. Comments and criticisms flow fast in both science and politics, but effective corrections usually just creep out over decades, I'm afraid!

There still are many difficult problems that require urgent appreciation and solution. In my view just bridging the gaps between relevant scientific understanding of the problems – as important as it is – will surely not be enough! What will be essential by all watershed inhabitants of the Pacific drainages, along with their political appointees, is that human population growth and its associated "development" activities cannot just roll on without major loss of both fishes and fisheries!!

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Saskatchewan's Nuclear Future? - Uncertain, Yet Inevitably Nuclear Power

*Submitted by Dennis W. Lawson
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Editor's Note: The views expressed in the following article are those of the author, and do not necessarily represent the views of the Canadian Society of Environmental Biologists.

Saskatchewan can choose to either (1) seize the moment and decide to start planning for its steady advancement into an inevitable future involving nuclear power, or (2) to amble forward less assuredly towards some alternative nuclear future in response to evolving international events. Oil and natural gas prices are expected to climb upwards at an escalating pace, as punctuated by rapid and unpredictable fluctuations, since world production of oil and gas is now expected to slowly decline and various types of international crises (wars, sanctions and production cutbacks, etc.) will, unfortunately, probably continue to interrupt otherwise dependable supplies.

This article outlines Saskatchewan's current energy situation and foresees a promising future based largely, but not exclusively, on clean coal and safe nuclear. After a short summary on the province's likely nuclear future, there is a brief introduction to fossil fuels. This is followed by a more lengthy and comprehensive analysis of the options for, and the constraints on, meeting Saskatchewan's future energy needs. Conclusions are then drawn as to how the province could move ahead with planning for a prudent and evolving mix of future energy sources.

Major constraints on nuclear power for Saskatchewan are the low capacity of existing transmission lines, the high cost of new lines, a need for assured export markets, the limited range of available CANDU reactor sizes, possible time-consuming licensing of new reactor designs, and financing. Regional planning with Canada, First Nations and Alberta is required to circumvent these obstacles. Furthermore, and within the context of the time required for such planning, public consultation will be paramount, because of the continuing controversy and concern over all things nuclear.

Despite these difficulties, nuclear energy is viewed as a viable option for Saskatchewan over the near term for displacing expensive natural gas and as the only long-term option for eventually replacing depleted coal reserves. Saskatchewan should immediately step forward and enter into discussions with Alberta to supply nuclear electricity to the tar sands; otherwise Alberta is likely to proceed independently with its own energy planning. Saskatchewan nuclear energy could assist Alberta to reduce its dependence on dwindling supplies of natural gas.

A Nuclear Prognosis for Saskatchewan

Saskatchewan is the largest producer (mining and milling) of uranium in the world but does not add value to the yellowcake produced nor generate nuclear energy. There are opportunities to refine and convert yellowcake before it leaves the province, but extensive nuclear power generation is questionable over the next 25

to 200 years, as we deplete the province's coal reserves. However, nuclear power could soon start to replace increasingly scarce and expensive natural gas in both Saskatchewan and Alberta.

Yellowcake will likely come to be refined at Saskatchewan uranium mines (it is currently shipped to Ontario for refinement), and the province's next large energy development will likely be based on so-called "clean coal." Conversion (for overseas enrichment) and fuel fabrication (reactor rods) will likely continue to be done in Ontario. The reprocessing of used reactor fuel is probably several centuries away.

Hence the crucial, immediate and linked questions for Saskatchewan are **"can we assuredly develop clean coal technologies"**, or **"should we now begin the inevitable transition to nuclear power?"** The answer to the first question is probably **"Yes"**, so that the answer to the second question might at first appear to be **"No"**; but hang on and don't expect to hold your breath over the next 10 to 50 years, as the dialogue between the public, industry and government is bound to continue. The big question, **"when do we switch from the clean burning of coal to safe nuclear power?"**, is down the road, but probably looming closer than we think. Meanwhile, back at the ranch, opportunities to supply nuclear electricity to the Alberta tar sands and to replace the gas-fired power plants in Saskatoon are on our doorstep.

Alberta uses natural gas to provide the steam that liberates the bitumen in its tar sands. Small nuclear reactors in Alberta at individual tar sands projects could be designed specifically to produce steam. Saskatchewan, for its part, could build a medium-sized nuclear power plant near La Loche to supply electricity to the Fort McMurray area, but not steam, which cannot be transported long distances. Even without nuclear steam plants in Alberta, Saskatchewan nuclear electricity would help to reduce Alberta's dependence on dwindling and increasingly costly natural gas. The large volumes of renewable cooling waters in the upper Churchill River are a natural nuclear asset.

The nuclear plant at La Loche would need a backup plant for regular and unscheduled servicing. This second reactor could be located on the North Saskatchewan River near North Battleford, so as to also routinely supply electricity to the Saskatoon area. Some such tandem siting of reactors in the northwest would suspend, curtail or eliminate the province's need for gas-fired electricity. New, costly, modern, high-capacity transmission lines would be required, so long-term regional planning with Alberta is essential.

Should nuclear reactors near La Loche and North Battleford not be feasible, then a small-sized reactor might be viable somewhere near Saskatoon.

Thinking Globally and Planning Regionally

North American oil production peaked in 1970 and global oil production may have peaked a few years ago; we just can't

tell yet. In any case, oil and natural gas prices are expected to increase steadily and to fluctuate widely in response to international incidents. It would not be economically prudent for Saskatchewan to embark on an energy future that depends on a dwindling supply of cheap oil and gas.

Oil and natural gas will at some time become too precious to burn for heat and electricity. They will need to be conserved for lubricants, plastics, aircraft fuels, pharmaceuticals etc. It will not be easy to end our dependence on oil and gas. Replacing gasoline and aviation fuels for automobiles and airplanes will be a real challenge. This opens up yet another subject, for some future discussion.

Climate warming is real and upon us, as driven by greenhouse gases from the combustion of fossil fuels. It will take centuries to reverse the trend, but we should get started in response to growing and increasingly valid concerns, both public and scientific. Polar bears will likely be exterminated before it is possible to correct the situation.

Clean coal technologies and safer nuclear energy are currently the only viable large-scale options for replacing power production from oil and natural gas. Clean coal will only be viable in Saskatchewan for another 200 years. Should we burn all of our coal or does it have more valuable uses? This too is, for now, yet another unanswered question for future consideration.

Clean coal technologies have yet to be developed and enter routine operational service. Saskatchewan could export its soon-to-be-developed clean coal expertise to the rest of the world, as our contribution to the global reduction of greenhouse gases. This noble ambition should be pursued, as immense coal reserves in China, India and the rest of the world are posed to be burnt.

Saskatchewan should advance into a new world-wide energy future with the confidence that comes from long-range planning. This will require new provincial, national and international partners to achieve some optimal and evolving balanced mix of environmentally-friendly energy sources. Nuclear energy is seen as a viable short to long-term option for first replacing western Canada's natural gas and then, eventually, our low-grade coals.

Current Saskatchewan Energy Sources

- 84% of Saskatchewan's energy comes from fossil fuels (coal and natural gas) and this contributes to greenhouse gases (CO₂ etc.) Coal-fired plants occur along the boundary with the United States and gas-fired plants are located in Saskatoon.
- 16% of the province's energy is hydroelectric, and some potential remains, but there would be environmental disruption from new dams and reservoirs (in particular on the Churchill River).
- Wind provides a mere 0.2% of the province's energy, but will soon contribute some 5% (Rushlake Creek Wind Power), and should continue to increase. Wind is the least environmentally damaging source of energy, but it is unreliable and needs backup from coal, natural gas, hydro or nuclear.
- Large scale solar power is uneconomic and not environmentally benign.

- All forms of electricity plants have a half life of about 25 year and a full life of about 50 years, so new investment decisions arise about every 35 years.
- 15% of the province's energy facilities (coal-fired electric, 450 megawatts) need to be rebuilt within five years, and will probably be replaced by clean coal. The largest Saskatchewan power plant is currently 300 MW (megawatts).

Nuclear Primer

- Nuclear power is clean in terms of modern mining and greenhouse gas emissions.
- Uranium is a non-renewable resource, but large cheap supplies exist (larger than coal, oil and gas combined). Australia has more uranium reserves than Canada.
- There are "relatively safe" large nuclear reactors that need to be located near cooling water (e.g., some 20 safely operated CANDUs in Ontario, Quebec and New Brunswick).
- Small "fail-safe" nuclear reactors are being designed and tested internationally. Some are air cooled and shut down automatically if they overheat.
- Canadian nuclear reactors use natural uranium. All other world reactors use uranium that is enriched in fissile (splittable) U235 relative to unfissile U238. Some of the U238 in reactor fuel is changed to fissile "U239" (plutonium) as a small amount of U235 is split (used up, burnt).
- Nuclear power becomes potentially dirty, dangerous and expensive if used reactor fuel is reprocessed to recover unspent U235 and plutonium. Less than 1% of the U235 in used Canadian fuel is burnt. If perfected, reprocessing promises a virtually unlimited source of energy.
- In 2005, Canada decided to store used nuclear fuel at reactor sites in dry canisters, for now. This is to be followed by centralized (one site), shallow geological, interim, accessible (retrievable) storage. Deep geological disposal or reprocessing would be an even later, future, decision. Deep geological disposal can be safe.
- Canada's used nuclear fuel comes largely from Ontario, Quebec and New Brunswick reactors. Used nuclear fuel is unlikely to leave eastern Canada because of transportation, economic and political considerations.
- According to polls, the Saskatchewan public supports uranium mining, yellowcake refining and nuclear power generation; but not the storage of used nuclear fuel in the province. The storage of used nuclear fuel in Saskatchewan is probably not worth pursuing. Used nuclear fuel should not be placed in the fractured and drilled rock at our northern uranium mines.
- Fragile international safeguards are used to prevent the spread of nuclear weapons.

Nuclear Power for Saskatchewan

- Large nuclear power plants (1,200 to 1,600 MW) are too big for Saskatchewan. One plant would provide from about 1/3 to 1/2 of Saskatchewan's peak power needs (3,500 MW) and approximately all of the province's minimum power needs (1,500 MW):
- A large nuclear power plant would regularly and occasionally not be working and the existing shared power grid with Manitoba and the eastern United States could not provide the replacement power;

- The existing power grid could also not support the routine transmission of the concentrated large amount of electricity, nor the needed export of surplus electricity; and thus
- New and upgraded transmission lines would be required, as would an increased power generation reserve, up from the current 300 MW to a possible 1,600 MW (i.e., a second large nuclear power plant), and new agreements to share/export power to Manitoba and the eastern United States. Manitoba might not be interested because of its abundant hydro power, and more willing partners could possibly be found in Alberta and perhaps the western United States.
- Small nuclear power plants (150 to 300 MW) are still in the advanced design stage and could be considered by Saskatchewan within 10 to 25 years. Saskatchewan transmission ties are designed for 300 MW, so as to be able to move power from the current largest provincial power plant. That is, we could presently accommodate one or more small reactors; or we would need costly new transmission lines, two large reactors and export sales.
- Saskatchewan should encourage Canada (Atomic Energy of Canada Limited) to accelerate the design of small safer reactors, or the province should consider looking elsewhere (internationally to the United States or Japan) for suitable small sizes.
- The design and construction of medium-sized nuclear reactors (450 to 700 MW) has at this time also been abandoned by Canada. AECL has had a CANDU 6 (600 MW) reactor on the drawing boards for some time now. The CANDU 6 could fit into Saskatchewan's nuclear future, but new and upgraded transmission lines would still be required, along with new export agreements. Saskatchewan should seriously consider this option for its entry into the use of nuclear power. Long-term national, interprovincial and international cooperation and planning is required.
- At this time, the CANDU is the only reactor design that is approved for use in Canada. It could take a decade to license a new reactor design, in particular an international (non-CANDU) design.
- Saskatchewan would need two CANDU 6 reactors. Canada would finance the construction of the first such reactor. The reactors could be sited in tandem somewhere in the northwest, so as to backup one another, and to supply electricity to the Alberta tar sands, as well as to replace gas-fired electricity from Saskatoon.

Tar Sands

There is a limited window of opportunity for Saskatchewan to export nuclear energy to the Alberta tar sands, but this window could soon be closed by Alberta energy decisions:

- The Alberta tar sands presently have lots of electricity; however, it is supplied by natural gas, a costly and diminishing resource, and the demand is rising rapidly;
- The tar sands need heat in the form of steam to recover and process the bitumen;
- Steam cannot be transported long distances, and it is not economic to convert electricity into steam; and thus
- The tar sands could possibly use several small nuclear reactors as extremely local Alberta heat sources; however, at the same

time, Saskatchewan could supply the region with nuclear electricity from a medium-sized CANDU nuclear reactor on the upper Churchill River.

Exploration for Saskatchewan tar sands should continue; however, the potential for discovery and size does not rival that of Alberta.

Clean Coal Technology

- Nuclear electricity could soon be viable for northwestern Saskatchewan, but clean coal is a better bet for southern Saskatchewan.
- Clean coal will likely be southern Saskatchewan's energy choice for the next 25 to 35 years (at which time the replacement of another 500 to 2,500 MW of generating facilities will have begun or need to be decided upon, and clean coal will again step forward).
- Saskatchewan has at least 200 years of coal reserves.
- Scrubbers only remove SO_2 (sulphuric acid, acid rain).
- New technology will be required to (1) remove CO_2 and (2) use the CO_2 .
- CO_2 can be used for secondary recovery of oil (injected into old oil reservoirs), stored or disposed of underground, or used as a carbon feedstock in manufacturing (e.g., the proposed plant at Belle Plaine).

Nuclear Safeguards

- The last Canadian uranium for nuclear weapons was sold in 1967.
- Canadian uranium is now sold only for peaceful purposes.
- However, while a volume/mass of uranium equal to Canada's exports does not enter nuclear weapons, Canadian uranium physically continues to enter nuclear weapons because of mixing at international processing (enrichment) plants.
- Safeguards on the making of nuclear weapons by non-nuclear states are undertaken by the United Nations Security Council via its International Atomic Energy Agency.
- Closing Saskatchewan uranium mines would only shift production to other countries. Uranium is present in small quantities in all rock, soil and water. Japan extracts uranium from seawater. Iran has uranium deposits.

Conclusions

1. Saskatchewan needs to determine if it can assuredly develop viable clean coal technologies within the next five years for use over the following 25 years and beyond.
2. The province could postpone the use of nuclear power for as long as possible, so as to eventually employ the safer nuclear reactors that are expected to evolve.
3. Small nuclear reactors could become viable for Saskatchewan over the next 10 to 25 years, without any upgrade to the province's power transmission lines (power grid). This would prolong our use of clean coal and could replace gas-fired electricity.
4. Saskatchewan needs to carefully forecast the needed future capacity of its electric power grid and decide on the optimal timing of an upgrade over the next 200 years, an upgrade that could be required to accommodate medium-sized nuclear

reactors and ties to Alberta and the western United States.

5. Small to medium-sized nuclear reactors will likely have to gradually replace all of the province's coal and gas-fired electric plants over the next 200 years. The public needs to become fully aware of such a likelihood as soon as possible. The first such decisions could be only a decade away.
6. First Nations will have an important role to play in the siting, financing, construction and operation of future nuclear reactors and new transmission lines.
7. Saskatchewan could seize the day and immediately commence a 10-year plan to:
 - fully explore the possibility of exporting nuclear electricity to the Alberta tar sands,
 - negotiate the near to long-term supply of nuclear electricity to Alberta,
 - construct a short, modern, high-capacity (600 MW or more) transmission line from near La Loche to Fort McMurray,
 - construct a medium-sized nuclear reactor (600 MW or more CANDU) near La Loche on the Churchill River, with a similar backup CANDU reactor farther south on the North Saskatchewan River, perhaps above North Battleford,
 - construct two more high-capacity transmission lines from near North Battleford to La Loche and Saskatoon, to replace the province's generation of gas-fired electricity in Saskatoon, and
 - select, site and license a small international reactor design for a location near Saskatoon, should the above two suggested CANDU reactors not be feasible.
8. Saskatchewan should declare any intention to consider small or medium-sized international reactor designs to the Government of Canada, Atomic Energy of Canada Limited, the Canadian Nuclear Safety Commission, and the international reactor community as soon as possible, so that the designs would be approved for construction within 10 years. Air-cooled reactors would not need to be sited on major lakes and rivers, such that the tentatively-suggested medium-sized La Loche reactor could be relocated closer to the Alberta border, while the suggested North Battleford site could be shifted north towards Meadow Lake. Alternatively, should the above two reactors not be feasible, then a small air-cooled nuclear reactor could be sited almost anywhere near Saskatoon, as it would not need cooling water from Lake Diefenbaker, the South Saskatchewan River or Last Mountain Lake.
9. Nuclear power for Saskatchewan is uncertain over the near term (the next 10 to 100 years), but inevitable over the long term (say beyond 100 years). The questions are, **"how and when do we make the transition from costly natural gas and clean coal to safe nuclear"**, and **"how can we best consult the public"**. Decisions could be required repeatedly every 25 years.
10. Canada needs to:
 - design and test safer small to medium-sized nuclear reactors on a priority basis,
 - determine if used nuclear fuel can be safely reprocessed in an environmentally sound manner, and
 - pursue continuous and never-ending improvements to international safeguards for nuclear weapons.
11. Innovations in solar and wind power should continue to be pursued by all levels of government, industry and inclined members of the general public.

About the Author and Further Information

The author has had over 30 years of involvement with Environment Canada in the environmental aspects of Saskatchewan uranium mining and the deep geological disposal of nuclear wastes. He is now retired and lecturing in land management at the First Nations University of Canada, delivering a shoreline awareness program (Living by Water) for Nature Saskatchewan, and engaged as a volunteer in watershed planning for the Saskatchewan Watershed Authority (Wascana Creek). The views expressed are his own and discussion is welcomed. An ongoing public dialogue is viewed as essential to moving ahead with energy developments within our Saskatchewan way of life.

These notes are based on, and motivated by, the author's attendance at a recent Sierra Club meeting on Saskatchewan's Energy Future and a larger and more formal conference on the province's Nuclear Future by the Saskatchewan Association of Rural Municipalities, the Saskatchewan Urban Municipalities Association, and the University of Regina. A series of articles in the Regina Leader Post from January 12 to January 20, 2006 provide a consulted perspective on the above two meetings and Iran's nuclear ambitions. The genie is out of the atomic bottle and needs to be both safely used and effectively controlled.

A 2005 report by Canada's Nuclear Waste Management Organization "Choosing a Way Forward" outlines the prudent future management of our used nuclear fuel.

A public examination of the social and environmental concerns over expanding Saskatchewan uranium mining took place during the eight year period from 1991 to 1998. This was done under the Joint Federal/Provincial Environmental Impact Assessment Panel for proposed new uranium developments at Cigar Lake, McArthur River, McClean Lake, Midwest and Cluff Lake. A separate Federal Panel reviewed Eagle Point at Rabbit Lake. All projects were eventually deemed suitable for proceeding under government regulatory scrutiny. ■

Atlantic News

Submitted by: Pat Stewart, Atlantic Director

Wetlands Alteration Policy in Nova Scotia

The Nova Scotia government has formalized its approach to activities which will impinge on or modify wetlands. Under its *Policy Respecting Alteration of Wetlands*, which came into effect on March 1st, the Province requires that a wetlands authorization be obtained for any activities which will alter marshes, swamps, bogs and fens as well as salt marshes. An application must be made to the Nova Scotia Department of Environment and Labour, primarily to alert the Province to the intended activity to allow an appropriate response such as an environmental assessment. The regulation complements the

Provincial watercourse alteration regulations presently in place, which require similar notification in the case of watercourses, and federal legislation such as the Fisheries Act concerning activities that may interfere with fish habitat. ■

Eastern Scotian Shelf Integrated Management

Under the *Oceans Act*, proclaimed in 1997, Canada is responsible for the implementation of integrated management of offshore areas. Integrated management is a process of management which ensures that activities and stakeholders in the ocean resource are considered and involved in the management process. Eastern Scotian Shelf Integrated Management (ESSIM) is a demonstration of this process, undertaken within Fisheries and Oceans Canada to apply integrated management to a large area of the ocean off Nova Scotia. Underway for approximately three years, and involving public and scientific meetings, the ESSIM project is nearing completion. A public overview of the project will be available later this year. For information, consult http://www.mar.dfo-mpo.gc.ca/oceans/e/essim/essim-intro_e.html. ■

Quebec News

The Superior Court of Quebec Declares the Canadian Environmental Assessment Act Violates Cree Rights Under the JBNQA

NEMASKA, EYYOU ISTCHEE, April 3 /CNW Telbec/ - In a lengthy decision rendered upon a motion submitted by the Grand Council of the Crees (Eeyou Istchee) and the Cree Regional Authority, the Honorable Nicole Bédard of the Quebec Superior Court has declared the *Canadian Environmental Assessment Act* inapplicable to Northern Quebec.

In this decision, the Superior Court reaffirms the prevalence of the treaty with the Crees, the 1975 James Bay and Northern Quebec Agreement (JBNQA), over any incompatible federal or provincial laws, and the Court confirms the constitutionally protected right of the Crees to “fully participate ... in the management, control and regulation of the development of the territory.”

Since the *CEA Act* does not recognize the special status of the Crees and does not use the impact on Cree rights as the basis for the assessment of development projects, the Court has declared it inapplicable in Northern Quebec and in violation of the constitutionally affirmed JBNQA.

“We are extremely satisfied that the Court has agreed with us that the *CEA Act* violated our treaty right” declared Grand Chief Matthew Mukash. The Grand Chief added “This decision strongly reaffirms the principle of the prevalence of our treaty rights in the James Bay territory, as well as our guaranteed

participation in the management, control and regulation of all development throughout the territory.”

The GCCEI/CRA had asked not only that *CEA Act* be declared inapplicable, but also that the federal assessment and review process provided for under the 1975 JBNQA be substituted therefore. The federal review process under the JBNQA had been set aside by the Federal Court of Appeal in 1993 with regard to hydroelectric development in the territory, and the GCCEI/CRA was seeking that this be examined again by the Court. The Quebec Superior Court has however decided not to overturn the previous 1993 decision of the Federal Court of Appeal on this matter. The GCCEI/CRA intends to maintain its position that both federal and provincial assessment processes provided for under the JBNQA apply to development projects in James Bay and will be seeking a decision to this effect before the Quebec Court of appeal.

Nevertheless, the decision vindicates the Crees’ long standing position that the *CEA Act* did not take into account their treaty rights and was therefore in contradiction with the JBNQA. Though requested to correct this situation many times through negotiations, the federal authorities had rather decided to impose CEA on the Crees in disregard of the terms of the treaty. The Court has now ordered Canada to respect the terms of the treaty.

This decision does not affect the on-going review of the Eastmain 1A - Rupert Diversion Project, as this is being carried out under a special agreement among the Crees, Canada and Quebec. This agreement calls for a review to be carried out under the CEA that also takes into account the provisions related to the protection of the Crees, their way of life and economy, under Section 22 of the James Bay and Northern Quebec Agreement.

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Please Renew your Membership

For more information please contact
Gary Ash at gash@golder.com

Ontario News

*Submitted by: Natalie Helferty and Grant LaFontaine,
Ontario Directors*

Ontario Chapter welcomes back Wendy Thomson to head up the Greater Toronto Area Chapter. After a two year absence to help her family settle into Canada as emigres from Britain, Wendy has brought her enthusiasm and energy back to CSEB. We are grateful to have Wendy return to help us. She provides an outline of an upcoming event that may be of interest to members in Ontario. ■

GTA Chapter News

*Submitted by: Wendy Thomson
GTA Chapter Chair*

CSEB Ontario, in conjunction with the Society for Conservation Biology and Conservation Council of Ontario, is working to build a one day symposium scheduled for summer 2006 entitled: 'At Home with Nature – Biodiversity Conservation In Your Backyards.'

The purpose of the symposium is to determine key elements of developing a province-wide 'biodiversity at home' campaign by gathering and exchanging knowledge of biodiversity conservation in the urban context of gardens.

The symposium will provide examples of various forms of successful biodiversity gardens in the city (via a tour on streetcar!), share knowledge on social marketing, financing and implementing conservation campaigns, as well as provide students with an opportunity to share their research.

The target audience is primarily key players in NGOs, government agencies, and other interested professionals.

More information on this event will be posted in the next edition of the newsletter plus on the CSEB Ontario website www.exworld.org/cseb. ■

Manitoba News

CSEB 2006 AGM and Conference

Doug Ramsey, one of the Manitoba CSEB Directors, is diligently working on the organization of the CSEB annual meeting and conference, which likely will be held in the Winnipeg area in fall, 2006. Stay tuned for further details. ■



Calvin and Hobbes - Bill Watterson



Saskatchewan News

Submitted by: Curt Schroeder

March 1, 2006 Regina - As white snow blanketed Regina on Wednesday, SIAST's Wascana Campus turned green.

SIAST held its first-ever Eco-Fair on the campus's "Main Street." Fifteen environmentally friendly local businesses and agencies were on hand to raise environmental awareness among staff and students. Drew Martin, a 23-year-old SIAST student, was one of many students taking in the Eco-Fair. He hoped students would learn something from the exhibits.

"Everyone knows the environmental problems are pretty big. This lets people know ways they can get involved and do different things for the environment," Martin said. "Hopefully it will be an eye-opener."

Martin said he was surprised at the number of local groups that are environmentally conscious. Martin thinks people are unaware that being environmentally friendly can save them money or how easy it can be to recycle.

"We are promoting (SIAST) as an environmentally friendly place to work and for students as an environmentally friendly place to learn," said Curt Schroeder, a SIAST faculty member and co-founder of the Wascana Green Group - the group leading the initiative to create the Eco-Fair.

Schroeder said the goal of the fair is to raise awareness but also to give Regina an understanding of what they can do to preserve their environment and limit their consumption of natural resources.

"The City of Regina has taken on the concept of sustainability and SIAST wants to be a part of it," said Schroeder.

Schroeder approached SIAST President Bob McCulloch a year ago with the idea to create a group to promote SIAST as a green workplace. Schroeder joined with fellow faculty member Elaine McNeil to establish the Wascana Green Group. He added students have been involved in the event planning and promotion. Schroeder said the response to earlier initiatives by the group was "overwhelmingly positive."

"We are optimistic that this will become a model for other campuses," he said. Students received an "eco-passport" and used it to learn more about each exhibit. Organizers were also encouraging visitors to sign up for the One-Tonne Challenge by pledging to reduce their energy consumption.

Exhibitors included the City of Regina Waste Diversion, Sask Power, Regina Eco-Living, and the Saskatchewan Watershed Authority.

Editor's Note: Curt Schroeder is a CSEB Saskatchewan member, and Past-Chair of the Saskatchewan Chapter of CSEB. ■



Keeping The Home Fires Burning

Prepared by: Art Jones, Saskatchewan Environment

January 25, 2006 - In days gone by, the fireplace was the heart of many Saskatchewan homes. Even today, in the days of central heating, few things seem to warm a cold evening like a fire blazing in the hearth. With the high price of fuel, more and more people are looking to wood as a way to help heat their homes. Whether you buy your firewood or harvest it yourself, there are a few things you should know to make sure you get what they pay for and that our environment is respected.

"Commercial firewood sellers should be able to tell you where their wood came from, whether private or Crown land," says Tim Loran, a forestry officer with Saskatchewan Environment. "Sellers should be able to give you a private land location where the wood was harvested or provide you with a copy of the permit authorizing that the wood be harvested from Crown land. Commercial harvesters always require a permit, whatever the type of wood."

People harvesting fuel wood from the Provincial Forest for their own use don't need a permit for dead or down wood, but do need a permit to take green wood. Harvesters should make sure that they know the status of the land where they want to harvest fuel wood. Different jurisdictions such as provincial parks and recreation sites, *Wildlife Protection Act* or Crown agricultural land, have different permit requirements so, if harvesters are uncertain, they should check at their local Saskatchewan Environment office.

Harvesters should also stick to existing roads and trails, not make their own, and be careful not to damage adjacent trees or new seedlings that may be growing at the site.

"We want to make sure that resource users respect the forest," says Environment's Loran. "The rules are in place to make sure that human activities are sustainable and don't damage the forest."

People buying firewood should make sure they get what they pay for. Wood is often sold by the cord. A cord is four feet wide by four feet high by eight feet long. A typical half-ton truck box holds about half a cord.

Also of concern is the movement of insects and diseases into our natural and urban forests. Insects and diseases can live in or under the bark and in the harvested wood.

Moving firewood with the bark attached increases the ability for these intruders to travel long distances, so there are legal restrictions on the transport and use of some types of wood. For example, because of the risk of spreading mountain pine beetle, pine fuel wood may not be transported into Saskatchewan or out of the Cypress Hills. Dutch elm disease regulations make it illegal to use, store, transport or buy elm wood for any purpose.

"Because insects can live in firewood, they could emerge from firewood piles and may kill neighbouring trees in your yard, neighbourhood or move into an adjacent wild forest," Environment's Loran says. "When insects or diseases are introduced into a new area, they can cause a great deal of harm."

Environment's Loran says if you have questions about the types of fuel wood and the rules about their harvest and transport, you should contact your local Saskatchewan Environment office. For more information, contact:

Tim Loran
Forestry Officer
Saskatchewan Environment
Phone (306) 953-2334
tloran@serm.gov.sk.ca

Or

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Communications Consultant
Saskatchewan Environment
(306) 787-5796
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ajones@serm.gov.sk.ca

(Permission is given to reprint or broadcast all or parts of this article. Previous "Environment Newsline" articles are available at www.se.gov.sk.ca/media/) ■

Enhancing Uranium Refining in Saskatchewan

The following resolution was passed at the SUMA (Saskatchewan Urban Municipalities Association) Convention, February 5 to 8, 2006 in Regina, Saskatchewan.

RESOLUTION:

22. Enhancing Uranium Refining in Saskatchewan

Sponsored by: SUMA Board of Directors

Whereas world demand for electricity is growing and nuclear power produces virtually no emissions of carbon dioxide, the major greenhouse gas that contributes to global warming, nor does it produce any sulphur dioxide or nitrous oxides – the emissions that pollute the air and cause smog and acid rain; and

Whereas there are 440 nuclear power plants in over 30 countries supplying about 16% of the world's electric power and in 2004 world nuclear power generation grew almost 4% from the year before; and

Whereas Canada's energy demand is projected to increase by 34% by the year 2025; and

Whereas in the coming years, Saskatchewan's production of U308 will significantly increase, providing sustainable and predictable uranium production well into the future; and

Whereas the development of the uranium industry in Saskatchewan has the potential to significantly impact the economy, creating more wealth, and to provide employment opportunities for our youth; and

Whereas more than 80% of Saskatchewan residents are in favor of considering activities that add value to the uranium produced in the province by further preparing it for use in nuclear reactors to generate electricity; and

Whereas there is need for open dialogue and communication with the people of Saskatchewan regarding enhanced uranium refining;

Therefore be it resolved that SUMA ask the Provincial Government to create a venue to explore the possibility of enhanced uranium refining in Saskatchewan to inform residents

about future opportunities, debate the issues associated with the nuclear industry, and identify the economic, environmental and social impacts as they relate to enhanced uranium refining.

Background Information (provided by SUMA): Over 200 registrants attended the Exploring Saskatchewan's Nuclear Future Conference jointly organized by SUMA, SARM and the University of Regina January 16th – 18th in Regina. Attendees indicated a willingness to continue the frank and open dialogue seen at the conference and presentations suggested that uranium refining is the most logical, viable, and economically beneficial step to expand Saskatchewan's role in the nuclear industry. Two resolutions calling on the Province to explore an expanded nuclear industry were passed at the 1992 SUMA convention. ■

Editor's Note: CSEB MEMBERS - DO YOU AGREE WITH THIS RESOLUTION?

Alberta News

Submitted by: Brian Free, Alberta Director



Spring Grizzly Bear Hunt Suspended

Rancid cow blood and fish liquid.... That's what a team of wildlife biologists used to lure grizzly bears to bait stations. This was part of the ongoing research on grizzly bear populations in

west-central Alberta. This research and other information have lead to a decision to suspend the controversial spring grizzly bear hunt. It has been suspended while more DNA census data are collected throughout the province over the next few years.

The Department of Sustainable Resource Development has released the census and mortality data, the Draft Grizzly Bear Recovery Plan and peer reviews of this Plan by two bear experts, Dr. Chuck Schwartz and Dr. Christopher Servheen. Both scientists were involved in bear population programs for Yellowstone Park in the USA.

For more information about these studies and grizzly bear management in Alberta, check out www3.gov.ab.ca/srd/fw/bear_management/index.html ■

More Fish for Lac La Biche?

Lac La Biche is a large lake, by Alberta standards. With a surface area of 234 km² and average depth of 8.4 m, Lac La Biche is located in the Athabasca drainage about 220 km northeast of Edmonton. It is popular for all kinds of recreational activities including sportfishing. For many years, a commercial fishery has operated on the lake, focused mainly on lake whitefish, with some walleye and northern pike also harvested.

Over the past several years, the fishery has been declining, likely due to intense fishing pressure. A growing cormorant population in the area is also cited as a reason for the fisheries troubles. It has been estimated that in 2005, there were about 8000 nesting pairs within a 45 km radius of Lac La Biche.

The Department of Sustainable Resource Development has announced a number of actions are planned to help restore the fishery. These include the following:

- Reducing the sportfishing bag limit to one fish over 75 cm for northern pike and three for whitefish. Other sport fish limits remain unchanged, including no walleye;
- Closing the Owl River, other tributaries and the lake outlet to fishing;
- Reducing commercial gill net fishing to one early summer fishery, with a quota of 30,000 kg for whitefish, and tolerance limits of 500 kg for northern pike and 150 kg for walleye;
- Continuing to reduce the cormorant population in the area. This has been done by oiling their eggs.
- Continuing to consult with First Nations and Métis groups about the subsistence fishery; and,
- Re-activating the provincial walleye stocking program in spring 2006, including upgrading facilities at the Cold Lake Fish Hatchery. One of the first goals is to restore the walleye population in Lac La Biche. ■

Alberta's Environment Conference

Alberta CSEB members should check out the May 2-5, 2006 Environment Conference being held in Edmonton. Up to two thousand delegates are expected to attend this major event. The program includes field trips and workshops on May 2 and 5, and conference sessions on May 3 and 4. Topics range from protected areas management to grappling with oil sands development, lake management, coal bed methane, forestry, waste management, wildlife, hazardous chemicals, and environmental regulation and on and on. There will be as many as six concurrent sessions going at the same time!

This conference is being organized by Alberta Environment and the Environmental Services Association of Alberta. For more information, check out the program at:

www.environment2006.com/ ■

Alberta Water Quality Awareness Day

Alberta members are invited to register on-line for Alberta's Water Quality Awareness Day in June. You will receive a very simple water quality testing kit. Invite your friends and family to your favourite watering hole – and I mean favourite river or lake – and involve them in some field work biologists often perform. Teach them a bit about aquatic ecology and contribute to this annual snapshot of Alberta's water quality.

For more information, check out: www.awqa.ca/AWOA/home/awqaIndex.asp ■

British Columbia News

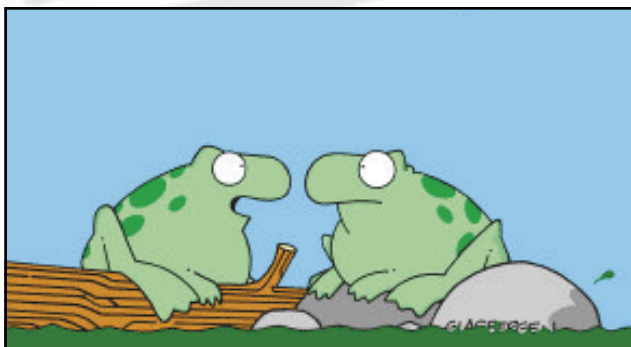
* WANTED *

The BC Chapter has been inactive for the past while, but we would like to see it reactivated. We are looking for new executive positions for the chapter, including the following:

Chapter Chair
Vice Chair
Secretary
Treasurer

We are also looking for a second Regional Director for BC.

If you are interested in any of these positions, please contact Tim Slaney, CSEB Regional Director (tim.slaney@amec.com) or Shawn Martin, CSEB President (smartin@gartnerlee.com).



"Looks aren't everything. It's what's inside you that really matters. A biology teacher told me that."

Territories News

Submitted by Anne Wilson

Spring greetings! Here are a few notes from north of 60:

Activity in the NWT and NU continues at a high pace, with a wide variety of proposed projects on the table. These range from mining projects (open pit mines for diamonds and gold, and underground base metal extraction) to hydroelectric and municipal activities. The Mackenzie Gas Pipeline review is underway, and whole villages are deserted as people leave to attend the various hearings (okay, I'm exaggerating a little!).

Most developments in the NWT and Nunavut are regulated by boards, with input from stakeholders. As a result, we have a rigorous review of all proposed projects, followed by permits, which emphasize responsible operation using best management practices, backed up with environmental monitoring, which will both detect changes and inform adaptive management. Biologists of all persuasions are gearing up for the upcoming field season, having just about finished all the data reports from last year's work. We are continually learning from this work, and are adapting practices and recommendations as a result.

Recently, more attention has been paid to the issue of incineration. Those of us who have traveled around remote camps will be familiar with the use of burn barrels to deal with garbage. Incineration of waste will release persistent organic pollutants and metals to the environment. In fact, waste incinerators account for a quarter of total dioxin and furans emissions in Canada. As the number of remote developments and work camps increase, so will the number of incinerators and the amount of toxins. Incinerators are expected to meet the Canada-wide Standards for dioxins and furans, and mercury emissions. Camps are encouraged to minimize emissions through waste segregation, properly training operators and using incinerators that are best available technologies (BAT). While this issue originated with the air quality folks, it is cross-cutting to wildlife, vegetation, soils, and surface waters with the spread of contaminants from incomplete combustion. The CCME website contains further information, at <http://www.ccme.ca/ourwork/air.html>

Are you thinking of doing research in the north? The Aurora Research Institute is responsible for licensing and coordinating research in accordance with the NWT Scientists Act. Their website is <http://www.nwtresearch.com/>

As we enjoy the brief spell between Snow Goose parkas and Deep Woods Off, I wish all the renewal and enjoyment of spring! ■

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

BOOK ARRIVALS

WANTED * BOOK REVIEWERS * WANTED

We're currently interested in finding colleagues who are willing to provide short (500 word) reviews of new books of biological and environmental interest. If you're interested in reviewing any of these titles, please 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.

If you like books, you'll love to get your hands on one of these titles, and display it on your bookshelf.

Allsopp, D., K. Seal and C. Gaylarde. 2004. *Introduction to Biodeterioration*. 2nd Ed. Cambridge University Press. Hard Cover \$75 US, Paper \$34.99. 237 p. (This book provides an introduction to biodeterioration—the attack on man-made materials by living organisms. The authors outline the principles involved, as well as the ways in which such damage can be controlled and prevented.)

Bell, P.R., and A.R. Helmsley. 2000. *Green Plants. Their Origins and Diversity*. 2nd Ed. Green Plants covers the gamut of topics, from the beating of flagella on unicells to the evolution of complex life forms. A must for any plant ecologist. Cambridge University Press.

Frankham, R., J.D. Ballou and D.A. Briscoe. 2004. *A Primer of Conservation Genetics*. Cambridge University Press. Hard Cover \$85 (US), Paper \$35. 220 p. (This concise, entry-level text provides an introduction to genetic studies in conservation and essentials of the discipline.)

Norris, K., and D.J. Pain. 2002. *Conserving Bird Biodiversity. General Principles and their Application*. Birds the world over are facing a crisis as their habitats are encroached and polluted. *Conserving Bird Biodiversity* presents the science of conservation biology as a tool in their conservation, and provides us with hope and some solutions.

Young, A.G., and G.M. Clarke, eds. 2001. eds. *Genetics, Demography, and Viability of Fragmented Populations*. Cambridge University Press, Conservation Biology Series, #4. (Habitat fragmentation is one of the most ubiquitous and serious environmental threats confronting the long-term survival of plant and animal species. This book highlights the value of conducting integrated and inclusive studies for effective conservation management.)

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