



# **THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Newsletter / Bulletin**

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- **GROWTH : TIME TO REMOVE ITS HALO**
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- **CSEB AGM AND CONFERENCE ANNOUNCEMENT**
- **COMPREHENSIVE MONITORING PROGRAM LAUNCHED IN NORTHERN SASKATCHEWAN**



# CSEB Newsletter Bulletin SCBE

VOLUME 68, ISSUE 3, 2011

CSEB Website <http://www.cseb-scbe.org>

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### Date of Issue- September 2011

#### Cover Photos:

Front Cover: Biologist Nick Bartok, M.Sc., EBA, A Tetra Tech Company, Calgary, enjoying the scenery at 6000 ft while conducting breeding bird surveys for a proposed mine in the Yukon

Back Cover: Biologist Nick Bartok, M.Sc., EBA, A Tetra Tech Company, Calgary, conducts breeding bird surveys for a proposed mine in the Yukon

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**CSEB NEWSLETTER 2011**

Vol. 68, Number 3 Fall 2011

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](mailto:gash@golder.com)

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**LE BULLETIN de la SCBE 2011**

Vol. 68, Numéro 3 Automne 2011

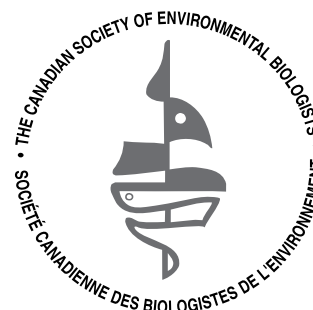
Le Bulletin de la SCBE est une publication trimestriel de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activités de la Société sur événements courant ainsi que les progrès qui font en sciences de l'environnement. Par un échange d'idées au niveau national, 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:** Gary Ash, Editor, courriel: [gash@golder.com](mailto: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.

**Advertising Rates:****CSEB National Newsletter/Bulletin**

<b>DISPLAY ADS• ( 4 issues)</b>	<b>Rate Per Issue</b>	<b>Annual Rate</b>
Business Card Size (3.5" x 2")	\$ 25.00	\$ 85.00
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# Canadian Society of Environmental Biologists

## Recognizing the Value of our Canadian Parks – Ecozones: Conservation, Biodiversity and Research

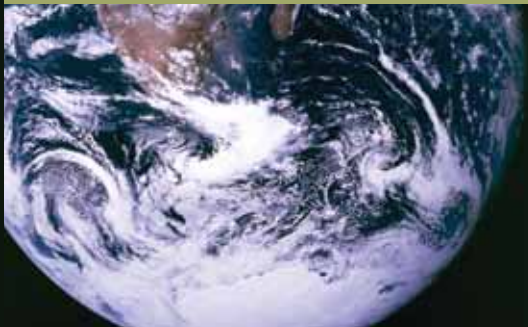
Workshop and Annual Meeting

October 27th-28th, 2011 | Royal Oak Inn & Suites, Brandon, Manitoba



### CONFIRMED SPEAKERS:

**Cheryl Penny** - Superintendent - Riding Mountain National Park  
**Rod McGinn** - Researcher - Riding Mountain National Park  
**Shelley Penziwol** - Formerly Manitoba Conservation Department



**FULL:** Members: \$120  
 Non-Members: \$160\*  
 1 ½ Day Conference

**STUDENTS:** Members \$40\*  
 1 ½ Day Conference

\* Includes 2012 CSEB Membership Fee

Field Trip: \$25

**REGISTRATION**

### CALL FOR ORAL AND POSTER PRESENTATIONS

**Workshop Sessions:** Thursday, October 27 & Friday, October 28, 2011

**Local Field Trip:** Saturday, October 29, 2011 - Riding Mountain National Park

## SESSIONS

### Conservation:

- Conservation of ecosystems
- Conservation of communities
- Conservation of species
- Conservation education
- Managing invading species
- Restoration of species, communities, ecosystems

### Biodiversity:

- Biodiversity assessment
- Biodiversity protection
- Biodiversity change through human influence and time
- Biodiversity and climate change
- Biodiversity and ecosystem services

### Parks and Protected Spaces Research:

- Value to research
- Air quality impacts research
- Water quantity and quality research
- Water and wastewater research
- Unique environmental research

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**Program & Registration: Go to [www.cseb-scbe.org](http://www.cseb-scbe.org)**

## NATIONAL News

### PRESIDENT'S Report

Where has the summer gone? With Labour Day behind us, and the days growing shorter in terms of daylight, I know that natural systems are preparing for our Canadian winter.

However, as I write this in Oklahoma, I listen to reports of severe blue-green algae blooms on the radio advising people to stay clear of the waters in southern Oklahoma and Texas, and concerns for a period of extended drought. Further, reports of tropical storm Lee and projected hurricane Katia's potential to impact the eastern half of North America following hurricane Irene raise concerns that the impact of this coming winter's La Nina event will be significant. After a prolonged heat wave which has lasted here for the better part of three months, with temperatures exceeding 40C on a regular basis, and severe drought, these storms may bring welcome relief, contrary to public opinion in eastern North America.

The earth's climate is changing, in my view, and we have an opportunity in late October at Riding Mountain National Park (RMNP) in Manitoba during our AGM and workshop to sit and listen, exchange viewpoints, and formulate positions on how best to interact with others, and more importantly, with our provincial and federal governments. This is especially important during this time of financial belt tightening, when environmental protection and research always seem to be the priority target areas for governments looking to trim budgets. How this makes any sense is beyond me. The failure of governments to see the long-term connection between the economy and a healthy environment has been the downfall of many governments, in my opinion.

We, as in the Canadian Society of Environmental Biologists, need to see one of our roles, beyond that of biological research and monitoring, as one of advising governments of its leadership responsibility of providing adequate funding and tools to ensure the long-term viability of not only the Canadian economy, but that of the planet's environment.

Parks Canada will be playing an active role in this year's meeting at RMNP, not only in sharing their work in national park planning and research, but in sharing their views on how the Canadian Park system operates within Canada and the role it plays in conservation, research and biodiversity. Please plan on attending, if you can, the Society's AGM and the great technical program in Brandon, Manitoba, followed by a field trip to RMNP on October 27-29.

Robert Stedwill  
President  
[rjstedwill@live.ca](mailto:rjstedwill@live.ca)

### THE PASSING OF DR. JOSEPH NELSON

#### Joseph Nelson taught the world about fish

By Lana Cuthbertson, Edmonton Journal August 15, 2011  
Reprint from the Edmonton Journal

Joseph Nelson, one of the world's top fish experts and former head of the University of Alberta's zoology department, died last week at age 74.



Dr. Nelson's interest in fish began in high school, when he kept a fish tank in his bedroom

and watched the fish lay eggs. He worked for the federal Fisheries Department during his undergraduate studies at the University of British Columbia, then travelled to Edmonton to do a master's degree at the U of A and study the fish of the Kananaskis River.

"His real life interest was astronomy, but that's hard to make money at. Working at the fisheries really peaked his interest, so that's what he studied", said his wife, Claudine Nelson.

The two met in Vancouver when Joe offered to give Claudine a ride to work from the university, where they met through Claudine's cousin. Six months later, on Aug. 31, 1963, they were married. Dr. Nelson returned to Edmonton in 1968 after completing his PhD in B.C. in 1965 and became an assistant professor in zoology at the U of A.

Mrinal Das, a former student of Dr. Nelson's and a close family friend, came from India to Edmonton 28 years ago specifically to study with Dr. Nelson. "Coming from Kolkata, a hot tropical climate, to Edmonton, was a big step for me, and it was because of him", Das said.

By that time, Dr. Nelson had published the first edition of *Fishes of the World*, which describes all known fish species on earth and how they evolved.

"Joe is world-renowned for his book, it's been translated into different languages", said U of A professor Mike Belosevic, who worked in the biological sciences department with Dr. Nelson.

The book, now in its fourth edition, is one of more than 100 publications Dr. Nelson authored, including *The Fishes of Alberta*, published in 1992. Dr. Nelson received several top level and international awards for his work in ichthyology, the study of fish. Four fish species are named after him.

"In terms of fish systematics and evolution, Joe is the one person almost everyone should know", Das said. Dr. Nelson served as chair and associate chair of zoology at the U of A, and served as an associate dean for the faculty of science for six years. He was involved with the American Society of Ichthyologists and Herpetologists and served many roles with the organization. He and his wife had four children and four grandchildren.

In 2001, Das's daughter was born and that is when he and his family became close with Joe and Claudine. They often visited Das's daughter Sharanya, and Claudine would take care of her so the parents could have some rest.

"My parents and in-laws are in India, so she never got a chance to have grandparents here, so Joe and Claudine were like that for her, they would take her everywhere and introduce her as their granddaughter", Das said.

Dr. Nelson took her to watch fish spawning in Blackmud Creek four years ago, when Sharanya was five.

"Last Thursday, he said to her, 'next spring, make sure you ask your dad to take you and look at sucker spawning, and when you go do that, remember me'. That's the kind of person he was, someone who already knew his days were numbered, but there was a smile on his face. I've never seen someone like that", Das said.

Dr. Nelson taught karate at the Jewish Community Centre as a hobby. "The first time he ever went to Europe to a meeting by himself, he almost got mugged in Paris, so when he returned here to Edmonton, they were offering a karate course at the centre, and the head karate person didn't think he'd ever continue", said his wife, Claudine.

"But he became a seventh degree karate instructor and he taught for years".

Sharanya Das, 10, remembers Dr. Nelson as a kind, mild-mannered person.

"He was a black belt in karate, but if you saw him, you wouldn't really understand that", she said.

"Most people I see who learn karate, they're really hyper, like people in my class, and he was really calm, and he never looked like he needed to use it".

In September, Dr. Nelson will receive one last, posthumous award for conservation from the American Fisheries Society.

"They came to the house in July and videotaped him and he was able to give a good talk and they will play that at the award presentation at the meeting in September in Seattle", Claudine Nelson said.

## REGIONAL News

### ALBERTA News

#### Environmental panel report needs immediate response, says co-chair

Submitted by Joseph Hnatiuk, CSEB Regional Director  
Reprinted from Lethbridge Herald, by Dave Mabell  
[dmabell@lethbridgeherald.com](mailto:dmabell@lethbridgeherald.com)

Faced with mounting opposition from the U.S., our province's oilsands have become part of a global debate. If Albertans want clean water, land and air - while developing their massive northern resource - they should stand up and say so.

That's the suggestion from retired university president Howard Tennant, co-chair of an experts' panel which laid out an Alberta environmental monitoring roadmap this summer.

Tennant, president of the University of Lethbridge during a decade of expansion and growth, was one of 11 Albertans selected early this year by Energy Minister Rob Renner. The science-based panel completed its work at the end of June, he told Thursday's session of the Southern Alberta Council on Public Affairs.

"Protecting our environment and quality of life is not some distant or hypothetical challenge", the report concluded. "It is a very real imperative that requires a response now".

With Premier Ed Stelmach stepping down, however, and his ruling Conservatives selecting a new leader, nothing has been done.

Until the new premier appoints a new environment minister, Tennant said, not much can be expected.

But if Albertans take the report half as seriously as its authors do, he said they'd better make it clear they expect the panel's 20 recommendations to be implemented.

They should "write letters to the new premier, and tell him this is important".

Individual letters to the premier and the new minister have far more clout than petitions or statements from interest groups, he added.

Otherwise, audience members suggested, the report could be ignored like many other Alberta government reports on the environment, conservation and other related issues.

The report's key recommendation is a creating an independent "Alberta Environmental Monitoring Commission" as a science-driven, arm's length and operationally excellent public agency.



"The commission would be responsible for baseline monitoring, effects monitoring and state of the environment monitoring in all regions of Alberta".

The lower Athabasca River region, home of the oilsands, must be the first covered by full monitoring programs, Tennant said. The South Saskatchewan River watershed, including the Oldman River, should be next.

Tennant said the panel - including U of L aquatic research scientist Joseph Rasmussen and scientists from other universities, along with an economist and representatives of the petroleum producers and pipeline operators - found the province's environment department was not capable of handling a comprehensive monitoring role.

"We decided the Alberta government was not up to the task", and with the energy revenues the provincial administration relies on, any of its departments would be seen in a conflict-of-interest situation.

The new monitoring commission, he added, should have aboriginal and industry participation, as well as a science advisory council and a governance board.

Responding to questions, Tennant said the commission might also take on studies of new "fracking" techniques being used in oil exploration near Lethbridge.

It could also determine how much estrogen, antibiotics, nitrates and other unwanted substances are being ingested by people getting water from the Oldman River as it run from the foothills, through Lethbridge and on to communities further east.

### How You Can Help the CSEB

- **Contribute to the quarterly newsletter and/or website.** Give us an article on something you are interested in
- **Write a short paragraph about what you have been doing, articles or reports you have written**
- **Provide us with points of views on issues.** Your Executive is always interested in learning what issues concern you
- **Write a book review for the newsletter**
- **Become a Chapter Chair, or offer to join the Board of Directors**
- **Promote CSEB - put up a poster, distribute membership forms** - download from our website
- **Set up a Chapter** - contact any Director for help
- **Organize a CSEB event** - contact any Director for help
- **Attend the annual conference and maybe present a paper on your work.**

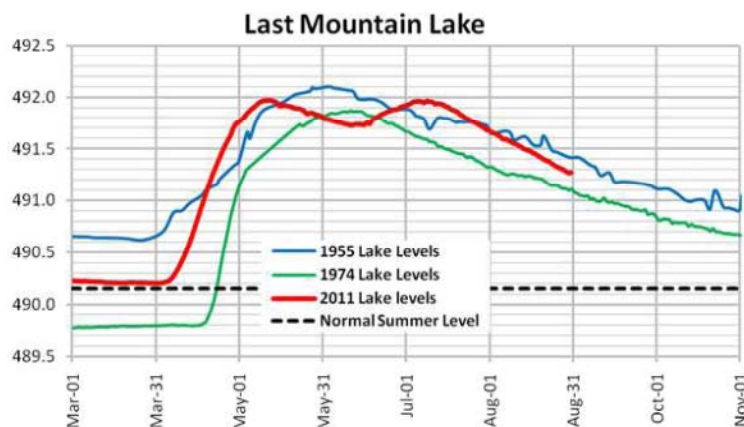
## SASKATCHEWAN News

### Flooding at Last Mountain Lake, Saskatchewan (Summer 2011)

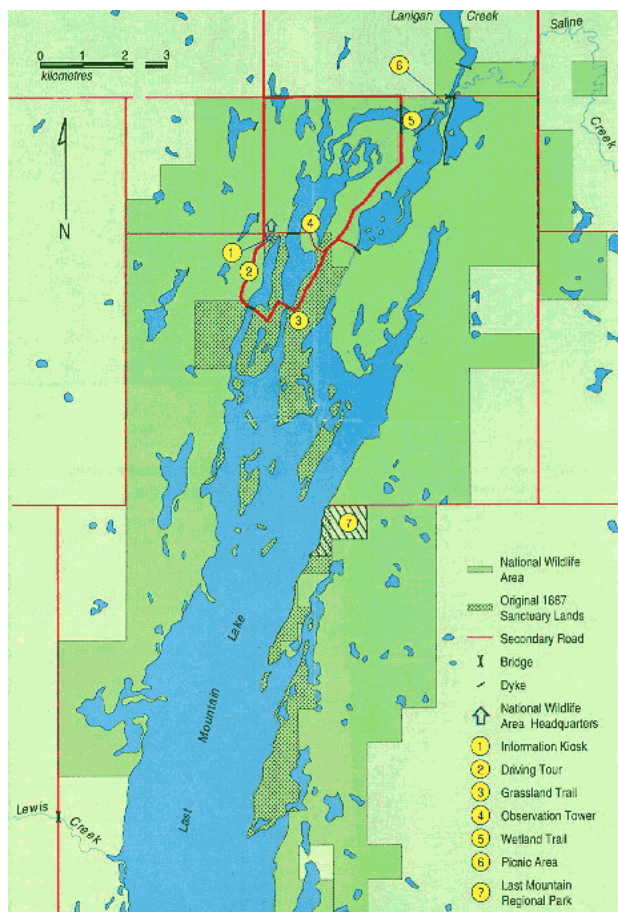
Submitted by David Rezanoff, M.Sc., P.Geo., MBA, PMP  
General Manager Cameco Corporation Saskatoon, and a long-standing member of the CSEB.

Summer in Saskatchewan is marked by both its beauty and its shortness! The lead up to summer 2011 was also marked by record high snowfalls in southern Saskatchewan, resulting in significant spring runoff and unusually high water levels in many watersheds. Of the many affected areas, record high water levels were experienced on Last Mountain Lake, and the remainder of the lakes along the Qu'Appelle Valley. Boat lifts and docks that were left high and dry on beaches and shorelines in the fall of 2010 were curiously sitting in water following the 2011 spring melt. As the situation became clearer, word quickly spread throughout the beach communities that water levels were going to continue to rise throughout the summer.

The following hydrograph indicates current and historical water levels for Last Mountain Lake. The summer of 2011 was marked by two peaks in high water levels, although neither reaching the 1955 maximum.



Last Mountain Lake is located approximately 45 minutes Northwest of Regina. It is a relatively narrow, L-shaped Lake with a total length of approximately 100 kilometres, averaging approximately 2 kilometres in width, and ranging in depth to a maximum of about 30 metres. It is also the home of the Last Mountain Lake National Wildlife Area, located at the North end of the lake.



*Last Mountain Lake National Wildlife Area*

## 2011 High Water Impacts

At its peak, Last Mountain Lake was almost two metres higher than the historic average, resulting in significant impact to buildings, shoreline and recreational activities, causing:

- Erosion and sloughing of the shoreline around the entire lake that was unprotected from soil saturation and wave action at the high water mark.



*High water level and waves resulting in erosion, May 2011*



*Shoreline erosion due to high water and wave action, September 2011*



*Typical hillside collapse (sloughing) due to erosion undercutting the toe of the slope, September 2011*

- Damage to dozens of boathouses, with the typical scene being boathouses standing in 2 -3 feet of water, with doors open to allow water to enter to try to minimize damage from wave action.
- High water bringing trees, propane tanks, fridges (yes fridges) and other debris into the lake, resulting in hazards to boaters.
- Loss of use of natural beaches around the entire lakeshore (they were under water for most of the summer!), including the popular Regina Beach.
- Shutdown of camping at the annual Craven Country Jamboree (located at the southeast end of the lake, that draws over 20,000 people annually) as the site became inundated with rising lake water and heavy rains in early summer, despite the completion of a \$1.8 million project funded through the provincial government's Emergency Flood Reduction Program to build two dikes on the site, and pump the resulting trapped water out of the dyked area. The project was monitored by the Department of Fisheries and Oceans, and the work was halted in consideration of the large number of fish that were trapped by the dyke, and the expected fish kill that would have resulted if the site recovery plan went through to completion. The Jamboree still went ahead, with campers having to ride buses from / to a temporary campsite approximately 10 kilometres away.





*Regina Beach Yacht Club – breakwater and gas pump house inundated by rising water, May 2011*

*Dyke construction at the Craven Country Jamboree site, June 2011*



*Workers from Clifton Associates use nets to catch fish in standing water that is being pumped out of the campgrounds at the Craven Country Jamboree site near Regina on June 27, 2011  
Photograph by: Bryan Schlosser, Leader-Post*

## Looking ahead

As lake levels continue to recede the full extent of the changes to Last Mountain Lake and other lakes in the Qu'Appelle Valley chain will emerge. Unfortunately based on the latest lake level projections by the Saskatchewan Watershed Authority, Last Mountain Lake will remain high well into spring and possibly the summer of 2012, and flows of the Qu'Appelle River through Craven and downstream are expected to remain well above normal for the summer and into the fall. Wind generated waves will continue to present a threat to properties around Last Mountain Lake and many of the lakes in the Qu'Appelle Valley chain.

Despite these predictions, what is already clear is that, like many regions that experience flooding, the high water level in Last Mountain Lake is resulting in significant impacts to biological, civil and social / recreational aspects of the region.

## References

<https://www.saskflood.ca/pdfs/dailyrunoff.pdf>  
<http://www.sasktourism.com/Last-Mountain-Lake-National-Wildlife-Area>  
[http://econet.ca/sk\\_enviro\\_champions/last\\_mountain\\_lake.html](http://econet.ca/sk_enviro_champions/last_mountain_lake.html)

## Comprehensive Monitoring Program Launched in Northern Saskatchewan

By Barb Barootes, Reprint of News Release  
- September 14<sup>th</sup> 2011

Saskatchewan's Boreal Forest region contains some of the highest quality fresh water in the world. The Ministry of Environment is working with partners on a comprehensive monitoring program for northern Saskatchewan to address environmental concerns. "There are approximately 100,000 lakes, interconnected by rivers and streams in Saskatchewan's northern region, and we need to protect this priceless resource", Environment Minister Dustin Duncan said. "The Government of Saskatchewan is committed to ensuring that commercial and industrial developments are conducted in a manner that minimizes potential adverse impacts on the environment".

The projected cost of this initiative for 2011-12, is \$1.6 million with the government's contribution equalling \$1 million. The additional funding will be provided through financial contributions from Areva and Cameco, and with in-kind contributions from Environment Canada, the Saskatchewan Watershed Authority, Queen's University, University of Alberta as well as the Universities of Regina and Saskatchewan.

This represents a substantial step in assessing and maintaining the ecological integrity of Saskatchewan's northern watersheds, enabling the ministry to better understand the sensitivity of the northern boreal forest and to identify sustainable management practices.

Studies will address First Nations and Métis Traditional Knowledge, clean water, air and land management and biodiversity. Relevant data being collected and reviewed will also assess historical trends dating from the 1970s to the present. Current working partnerships will be maintained with neighbouring jurisdictions that include data and information sharing with Alberta through the recent Memorandum of Understanding on monitoring trans-boundary air quality. As well, consultation and information-sharing will be undertaken with northern and First Nation and Métis communities, all levels of government, academia and industry.

For more information, contact:

Barb Barootes  
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# ATLANTIC News

## Environmental Assessment Woes and Public Opposition Slow Down Old Harry

Submitted by Patrick Stewart, CSEB Atlantic Regional Director

A proposal to drill an exploratory well off southwest Newfoundland in the Gulf of St. Lawrence is proceeding although it has been going through a convoluted environmental assessment process, and has met public opposition over potential threats to the valuable fishery.

Corridor Resources of Halifax proposes to drill an exploratory well in 400-500 m of water in the Laurentian Channel, a deep seabed feature which runs through the Gulf of St. Lawrence and exits between Nova Scotia and Newfoundland. The project on the 'Old Harry' lease has evoked concern because of the fears of accidental spills fostered by the recent BP blowout of a deepwater well in the Gulf of Mexico. 'Old Harry' is on the eastern fringe of a broad reserve of potential oil resources, which extends throughout the Gulf of St. Lawrence. Provincial jurisdictions throughout the region (the four Atlantic provinces and Quebec) have dibs on the action. But the Gulf of St. Lawrence is an important and productive ecosystem, supporting significant fisheries and ecological resources—one that could be seriously impacted by an accidental oil spill.

The environmental assessment for 'Old Harry' has been tortuous with a screening level federal/provincial process underway, but in June the offshore regulator in Newfoundland—the Canada Newfoundland Offshore Petroleum Board, C-NLOPB—requested that the federal government conduct a higher level review, suggesting that it be bumped up to a Panel or Mediator

Review. The Board indicated that although all its expert opinion indicated that the project was unlikely to have significant environmental effects, "the public commentary received to date [was] of a level and nature greater than any the C-NLOPB has received respecting environmental aspects of a proposed exploration or production project in its 26-year history. The Board believes that this level of concern warrants such a recommendation".

The federal government refused to upgrade the EA status, however, citing the existence of a previous strategic environmental assessment for drilling in the Gulf, soon to be updated. In response, late last month (August) the C-NLOPB took the unusual step of setting up its own independent review of the project, appointing Mr. Bernard Richard, a lawyer and a former social worker who served as a Cabinet Minister in the New Brunswick legislature, New Brunswick Ombudsman and that province's first Child and Youth Advocate. The independent review will focus on the potential environmental effects of the proposed drilling of a single exploration well on the 'Old Harry' lease. Public consultations will be held in the five jurisdictions bounded by the Gulf of St. Lawrence.

Drilling on 'Old Harry' could be just the 'tip' of the proverbial 'iceberg' of hydrocarbon exploration in the productive Gulf of St. Lawrence, forcing Eastern Canada to deal with the issue of potential conflicts between biological resources. Another jurisdiction—Nova Scotia—dealt with the same problem on the resource rich Georges Bank by instituting a moratorium on exploratory drilling. The idea of a moratorium hasn't even come up here, but what seems likely is that it will be a challenge to get the provinces to see eye-to-eye and work together to manage hydrocarbon exploration and their shared resources.

## Environmental Review Pokes Holes in Lower Churchill Hydro Development

The project to develop hydroelectric resources on the Lower Churchill River in southeastern Labrador received a setback in August when the federal-provincial Environmental Assessment Review Panel asked for further analysis before the federal and provincial governments considers granting approvals for the project.

Nalcor Energy is proposing to develop two hydroelectric generation facilities on the lower Churchill River in central Labrador with a combined capacity of 3,074 megawatts (MW) and at a cost of approximately \$6.4 billion. The Project would consist of two dams located at Muskrat Falls (824 MW) and Gull Island (2,250 MW), two reservoirs, and transmission lines connecting Muskrat Falls, Gull Island and the existing Churchill Falls hydroelectric facility. Additional facilities would include access roads, temporary bridges, construction camps, borrow pits and quarry sites, diversion facilities and spoil areas.



The review panel determined that the Project would have several significant adverse environmental effects on the aquatic and terrestrial environments, culture and heritage, land and resource use, as well as downstream effects such as accumulation of mercury in ecosystems in Lake Melville.

Among the issues it dealt with, the Panel did not accept that developing the hydroelectric potential of the lower Churchill River was a “need,” and that therefore the Project should be first compared to reasonable alternatives that addressed the future demand for electricity, and delivered a renewable energy future and long-term revenues for the Province.

In terms of operations, the Panel recommended applying the ‘full clearing’ option to the Muskrat Falls reservoir because it would be technically and economically feasible and would not negatively affect the construction schedule; the partial clearing proposed for the Gull Island reservoir is different because the reservoir area is much larger, the terrain more difficult and the stands of timber less dense, and therefore less economic to harvest. The Panel also recommended that Nalcor be responsible for ensuring that all timber harvested from the reservoirs, together with all merchantable timber salvaged by the trash and debris removal program, be utilized because of the socio-economic and environmental benefits.

Air pollution and noise, with appropriate mitigation and use of best available technology, were not considered to be a problem and would likely be localized and temporary in nature. While the exact markets for much of the power are not yet known, the power produced by the Project would very likely displace more greenhouse gas emissions than it would cause. Moreover, the Panel recommended that Nalcor make all reasonable efforts to ensure that power from the Project would be used to back-up wind power and other intermittent renewable sources of energy; to displace energy from high greenhouse gas emission sources; and not to displace conservation and demand management or power from renewable sources.

Damage to fish and fish habitat in creation of the reservoirs and operation of the turbines and water level management were reviewed extensively. Issues of concern included how and when filling of the reservoirs would occur, changes in water and habitat quality during the long period of time it would take for the new shorelines to stabilize, damaging effects on fish that might go through the turbines, how methylmercury – a by-product of new reservoirs – would accumulate in fish, loss of fish habitat through flooding and to what extent it could be replaced successfully, and the effects of all these on the fish community that would inhabit the new reservoirs and the river below them.

The Panel concluded that Nalcor’s fish habitat compensation strategy, if successful, would likely address most of the habitat needs of the resident fish species; however, many uncertainties remain, particularly with respect to how the different species would interact and whether the new habitats would stabilize—consequently, the Panel concluded that the project would result in significant adverse environmental effects to fish habitat and the final fish assemblage in both reservoirs.

The habitat issue included the fact that repairing or reconstructing the habitats lost would be difficult or impossible after the reservoirs were filled; the make-up of the final fish community could not be predicted with certainty; and that there would be a risk that one or more species, particularly valued from community and Aboriginal perspectives, could be lost or considerably reduced in numbers, because of the wide scale water quality and habitat changes and inherent uncertainties. Nalcor has committed to re-create lost riparian habitat through a compensation strategy and cited successful habitat compensation in other projects in North America. However, there were concerns that Nalcor had underestimated the challenges involved in engineering ecosystems and that there would be a net loss of riparian habitat. The Panel noted that wetland and riparian habitat play important roles in ecosystem health and agreed that compensation plans are vital.

The possibility of mercury moving downstream in sufficient quantities to contaminate fish and seals [Lake Melville downstream of the project is an estuarine system], and eventually require consumption advisories, was a particular concern expressed by the public during the assessment process, and was highlighted by the Panel. Participants also questioned whether subtle changes in suspended solids, nutrients or water temperature might, over the long-term, change the productivity of the river’s estuary.

The Panel concluded that in light of the scale of terrestrial habitat that would be inundated and the permanence of the effect, the overall loss of terrestrial habitat would be a significant adverse effect. The Panel also observed that the effects to the terrestrial ecosystem might be further compounded by future resource extraction projects and shifting climate change patterns. Wildlife in the areas covered by the project would be particularly affected, especially endangered species. While rare plants of concern did not become an issue, there were several animal species which may be affected, although there would not likely be significant effects on listed species other than the Red Wine Mountain caribou herd. However, the Panel indicated that the lack of recovery strategies and identification of critical habitat for some of these species makes a final significance determination premature. The Panel recommended that governments make all reasonable efforts to put recovery strategies in place before making final decisions about the effects of the Project on listed species.

The Panel decision also included a broad scope of socioeconomic recommendations to mitigate impacts on First Nations and other residents and industries. The Panel findings are available for review at the CEAA website [www.ceaa.gc.ca/](http://www.ceaa.gc.ca/).

*Abridged from Review Report for Lower Churchill Environmental Assessment Panel, P. Stewart.*



# TERRITORIES News

## Greetings from Iqaluit and points south!

### Nunavut Regional Update

Submitted by Paula C. Smith, NU Regional Director

On a very sad note, the First Air plane crash in Resolute on August 20<sup>th</sup> claimed the life of an important supporter of Arctic Research, Marty Bergmann, who was the director of Natural Resources Canada's Polar Continental Shelf Project. PCSP's facility in Resolute provides critical support to over a thousand researchers working in isolation throughout the Canadian Arctic. Mr. Bergmann will be deeply missed by the Arctic research community.

Changing gears, big news in Iqaluit is the harvesting of a bowhead whale in Frobisher Bay in mid-August. The 14-metre, approximately 74 ton whale was harpooned in mid-August after local hunters obtaining a federal fisheries license. Kugaaruk and Coral Harbour are the only other two communities in Nunavut who have been granted harvest licenses.

In development news, mining continues to stake a claim in the territory with the Mary River Project (iron ore) continuing through the environment assessment process, the Kiggavik Project (uranium) still expecting to issue a draft Environmental Impact Statement in November and the Jericho Mine looking to come back online soon through ownership by Shear Diamonds.

It's been a beautiful summer in the territory and I'm just back from the field so I'm sure there's lots of news that I've missed while away!

### NWT Regional Update

Submitted by Anne Wilson, CSEB 1st Vice President and NWT Regional Director

Autumn is a favorite time of year for being outdoors – the relentless insects have abated, there is a palette of fall colors to enjoy, and that indescribable smell in the brisk evening air. This year I will be enjoying a somewhat longer fall season, having recently relocated from the North to the "Gateway to the North" aka the Edmonton area. I've moved to a similar job working with environmental monitoring and water quality issues around mining developments, and will keep connected to some of the files North of 60. New challenges with the job will include learning about the oil sands sector and all the environmental issues that are associated with that type of development. The biggest adjustments so far are having a commute, not having a big lake on the doorstep, and seeing all the dirt and vegetation after living on the Canadian Shield rock for 3 decades!

Over the summer I had the opportunity to do some field work audits in connection with environmental effects monitoring of metal mines. Great to get out in the field, but by no means easy. Kudos to the field biologists who continually carry out a high quality of work in what can only be described as routinely adverse conditions!

#### Mining news:

The start to summer was marked by the arrival of three Developer's Assessment Reports (DAR), for the Fortune Minerals Ltd. NICO project, the Avalon Rare Metals Inc. Thor Lake Rare Earth Elements Project, and Tyhee's Yellowknife Gold Project. The Mackenzie Environmental Impact Review Board does a conformity check on each submission to see if it meets the guidelines issued by the Board. Fortune's project was found to be in conformity, and is proceeding with the next steps of the environmental assessment; Avalon's submission had some deficiencies identified, and the proponent is preparing its deficiency statement response. For Tyhee, the Board did not make a conformity determination, but has issued a number of information requests. Full details are available on the Board's web site at <http://www.reviewboard.ca/register/>.

Reviewers have a great deal of reading ahead on these files, as well as the other active environmental assessments:

- Public hearings were held in late June for the Prairie Creek Mine Project environmental assessment. Work continues on the development of appropriate water quality objectives and water management options, given the proximity of the Nahanni National Park. The Board will have to weigh a lot of evidence and make some difficult decisions in arriving at the conclusion for this EA, and setting any terms and conditions which are deemed necessary.
- The Giant Mine Remediation Project environmental assessment is moving on to technical meetings in mid-October. The project includes the containment of 237,000 tonnes of arsenic trioxide dust currently stored underground, generated over 6 decades of mine production.
- The Board has now received and reviewed all the additional information on the Environmental Impact Statement for the Gahcho Kue Diamond Project and has determined it is in conformity with the EIS guidelines and issued a work plan with timelines.
- The three active diamond mines (Ekati, Diavik, and Snap Lake) in the NWT continue operations, and continue with environmental monitoring over the summer. Each mine has a comprehensive environmental monitoring program, and reports are available on the land and water boards' public registries at <http://www.mvlwb.ca/default.aspx> with Diavik and Ekati under the Wek'eeshii Land and Water Board tab.

- DeBeers is working on their Snap Lake Water Licence renewal, with technical sessions scheduled for the second week in Sept. One of the issues will be the upwards trend in TDS in the whole lake, and how that should be regulated.
- North American Tungsten continues production at the CanTung Mine. The mine has been continuing its environmental monitoring under the Metal Mining Effluent Regulations, as have several closed mines (Lupin Gold Mine, Giant Mine, and the Con Mine).

**Hydroelectric:**

- Taltson Hydro Expansion: The Mackenzie Valley Environmental Impact Review Board has adjourned this assessment at the request of the developer.

**Municipal:**

Municipal field work continued in several communities across the North, with sampling done for comprehensive characterization of representative Northern systems.

Regarding "Type A" municipal water licence renewals, Iqaluit's licence expired May 15, 2011 and has not been renewed yet; Fort Smith's licence expires Oct. 31st and has gone through public hearings, with the Board decision awaited.

**Closing:**

Are you doing work in the North that you'd like to let others know about? Got an idea for a training course the CSEB could help organize? Please feel free to contact us, or to draft an article for the newsletter. The CSEB provides a valuable networking and communication forum! There is also the option of instigating other CSEB activities – both of the fun and/or of the educational variety - with colleagues in the north. Please email your thoughts to [anne.wilson@ec.gc.ca](mailto:anne.wilson@ec.gc.ca) or [paula.c.smith@ec.gc.ca](mailto:paula.c.smith@ec.gc.ca).

I am looking forward to the CSEB AGM and workshop this fall, coming up Oct. 27-29th in Brandon, MB with a field trip to Riding Mountain National Park. Hope to see many of you there!

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## CSEB Workshop and Annual Meeting

Recognizing the Value of our Canadian Parks -  
Ecozones: Conservation, Biodiversity and Research

October 27-28, Brandon, Manitoba.

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[www.cseb-scbe.org](http://www.cseb-scbe.org)

## Greenland, Nunavut want Arctic protection

Some of Greenland's politicians say they want to team up with Nunavut to demand better protection for Arctic waters, as areas like the Northwest Passage open up to more marine traffic.

Several members of Greenland's home-rule government's foreign affairs and security policy committee are meeting with Nunavut Premier Eva Aariak and other leaders in Iqaluit this week to talk about issues concerning the regions, both of which have large Inuit populations.

Aleqa Hammond, one of the Greenland MPs, said people in her country are worried about the shrinking and thinning polar ice cap, and how it could affect Arctic waterways.

"The Northwest Passage and also the North Pole will put us in a very, very fragile and delicate situation", Hammond told CBC News.

"The North Pole will be ice-free during summer in years to come, and that itself will put the Arctic Sea basin on a very high risk of ... environmental disasters that might be there", she added. "Many of the ships that are coming in our waters ... are not built for icy waters".

If an accident ever happens in Arctic waters, Hammond said that could jeopardize the fragile Arctic environment — especially in areas where narwhal and other marine mammals migrate — in both Greenland and Nunavut.

Hammond and other members of the committee said Greenland wants to join forces with Inuit in Nunavut to call for tough marine regulations and controls, especially rules calling for all ships travelling in the Arctic to be double-hulled.

The call for tougher Arctic marine rules was applauded by Michael Byers, the Canada Research Chair in Global Politics and International Law at the University of British Columbia.

Byers said Canadian marine legislation that governs areas such as the Northwest Passage dates back to the 1970s, and must be updated to address new realities in the Arctic.

He also noted that as the sea ice melts, the waters of the central Arctic could become a very busy shipping route in the next 10 to 20 years.

"It's also quite significant that they're talking about the central Arctic Ocean, talking about areas that are beyond the jurisdiction of any coastal state", Byers said.

"Perhaps we will see here an effort by the Arctic Council to draft a new multilateral treaty on shipping standards for the Arctic Ocean for those areas in international jurisdiction".

The issue of Arctic marine protection is expected to be discussed at the Arctic Council's next meeting this spring in Greenland.

# GROWTH : TIME TO REMOVE ITS HALO

Submitted by Gordon Hartman, Reprinted, with permission, from the Common Sense Canadian (TheCanadian.org)

*No belief in industrial society is so pervasive and so essential to it as "progress" defined in terms of economic growth. It sustains faith in the industrial system and reinforces the hope among the poor that they may also "strike it rich". From Ark II by Dennis Pirages and Paul Ehrlich 1974.*

## INTRODUCTION

Many years ago, the ecologist Paul Anderson wrote *"The ecological childhood of man is over, and it has ended without the gift of ecological wisdom"*. For the primary socio-political interests that control our society this, sadly, is still true. Ecological wisdom is more than understanding ecology. It implies understanding both what we are doing in 'nature', and what the consequences of our 'doing' may be.

I have reached my own 'ecological wisdom', as it stands now, from decades of work in research, university teaching, and resource management. Such information is for the purpose of self introduction to help readers understand the basis of my perspective.

After 60 years of such experience I am inclined to look back a long way – clear back to my early life. By the same token, I find myself looking far ahead - at the future of my grandchildren, at the future of other grandchildren. This thinking, and the uneasiness it brings, is more than reminiscence about the past or casual thoughts regarding the future. It is a deep concern driven by the massive changes that I have seen, and see, coming in the world around us. It is driven, in one of its dimensions, by the problems that I see in fisheries, my professional discipline.

Around the planet, across North America, and more particularly for this discussion, in B.C., we can witness an endless parade of growth-driven building and 'development' projects. On the surface, the process is driven onward by the need for more jobs - jobs for more and more people, but less spoken of, profit and growth for business. The insatiable growth process is circular, there is no 'end game'. More people, need for more jobs, use of more resources and space, then more people yet, need for still more jobs, urgency to find more resources – around and around it goes. In many respects this circular syndrome has come to define our culture. In one form or another it has come to define most human cultures. In its present scale, it has come to stress ecosystems at all levels.

We still have some chance to do far better in some parts of the world. The time has come to change direction. Bigger, faster, and more are no longer better.

## GLOBALLY - AN EARTH UNDER STRESS

Global ecosystems are under stress from our activities, demands, and impacts. Wherever we look, be it forests, soils, fish populations, water supply, or biodiversity, damage

and overuse goes on and expands. The scale of stresses and risks as well is understood and has been spelled out by many authors.

In 2005, the *Millennium Ecosystem Assessment Synthesis Report* was released. It involved the work of an enormous number of people and organizations. It was designed to assess the consequences of ecosystem change, and to establish a scientific basis for actions to enhance the conservation and sustainable use of ecosystems and their contributions to human well-being. The following are examples from among major findings:

- Approximately 60%, 15 out of 24, ecosystem services evaluated in the assessment are degraded or are being used unsustainably. Most of this had developed in the past 50 years.
- 20 % of the world's major coral reefs have been lost, 20% more have been degraded.
- 60% of the increase of atmospheric carbon dioxide (at 376 ppm in 2003) has taken place since 1959.
- Humans have changed, to a significant extent irreversibly, the diversity of life on earth.
- Many of the great fisheries of the world are already lost or are in danger of loss in the next few decades.

Much of the following part of my discussion is based on fisheries issues because of my education and experience. However, the challenging elements of human behavior involved transcend fisheries issues.

## GLOBALLY - FISHERIES IN TROUBLE

In many regards the situation with fisheries is emblematic of a wider human dilemma. Many, if not most, of the fisheries of the world are in trouble. Among many of them sustainability hangs in the balance or is already lost. This damage to most fisheries has been done by people and fishing, driven in the end by our ever increasing numbers and collective appetites for food and profit. Damage to some fishery resources is not exclusively from overuse.

In some instances the use of one resource has compromised the existence of another. In doing research for the book *"Fishes and Forestry – Worldwide Watershed Interactions and Management"*, edited by Northcote and Hartman, it was found that expanding forestry activities had damaged fish habitat and populations at a time before people cared or thought about it. Such damage carried on years after people



did know about it. Although our book dealt with forestry effects, it is likely that similar books could be written about impacts on fish populations from mining, agriculture, urban expansion, or other human activities.

Beyond the effects of environmental impacts, growth in fishing, particularly for marine species, has put such resources in jeopardy. In an article in *Nature*, Aug. 8, Vol. 418, Daniel Pauly and co-authors showed that total catch of invertebrates, groundfish, and pelagic fish rose from about 20 million tons in 1950 to about 80 million tons in 1988. It fell to about 70 million tons by 1999. However, catch data do not tell the whole story. The composition of the total catch has changed through “fishing down”. In “fishing down”, the fishery over time takes a progressively higher fraction of the catch from species that are lower in the food chain.

### **B.C. - LIKE THE REST OF THE WORLD**

In the B.C. salmon fisheries the pressures on the fish are double-barreled. We catch too many of them, and concurrently, we degrade their environment through growth in industry, housing, waste disposal, and resource extraction. Viewed in such a context, salmon in the Fraser River, and indeed in other major rivers face a very uncertain future.

The issues go beyond those of run forecast and allocation, which are regularly in the news. The Fraser River system is under the stress of a configuration of impacts and ongoing growth-driven change. In a chapter in the book “*Sustainable Fisheries Management – Pacific Salmon*”, Drs. Northcote and Groot and I, listed twelve environmental impacts, including Alcan’s diversion, that endanger salmon runs in the river. Many of these impacts may well occur at low levels of effect, however, collectively they pose a threat.

Effective response to such threats, especially those which may have subtle effects, is difficult without well developed monitoring and assessment. The combinations of impacts that cause the threats may be different for different salmon populations depending on where and when they migrate. The research on cumulative effects, as they may be manifested for different populations in the Fraser River system, has not been done.

Concerned citizens and thoughtful managers do understand some of the ‘high point’ impairments to salmon populations in the system. They recognize some of the most problematic impact sources. The issues and the conflicts involved in ‘high profile’ problems may, however, divert attention from the complexes of current environmental issues and from the heavy duty impacts of long-term macro changes in the environment. The risks exist at two levels.

### **RISKS AT TWO LEVELS**

Fisheries resources, at levels from local to global, are put in jeopardy by competitive fishing and overuse in the short term, and by macro changes in an array of environmental conditions in the long term. Human population size is a pervasive element among the latter. In this regard, it is an

interesting and indeed almost a hallmark of my profession, that most biologists struggle hard with issues of ‘allocation’ and ‘management’, but stand aloof from discussing growth in human numbers as it contributes to fisheries failures. The book “*Salmon 2100 – the Future of Wild Pacific Salmon*” by Lackey et al is a notable exception.

Some fisheries can change quickly under the pressure to feed a rapidly increasing human population. I worked in Malawi, Africa, for 2 years on fisheries and environmental projects. In the short course of 3 decades (1960s to 1990s), during which the Malawi population came close to doubling, the fish stocks of the southern end of the lake were over-used and the size range of species captured decreased dramatically. Fish populations along the narrow fishing zones in the mid- and upper lake became over exploited and changed somewhat more slowly. It was acceptable for Malawian managers to search for ways to catch more fish, however, it was not acceptable for them to discuss the impacts of a population that doubled in 30 years or less.

In B.C. and the Pacific Northwest states, population growth will, potentially, play an enormous role in determining the long-term future of salmon. If the current average annual human population growth of the last half of the 20<sup>th</sup> century (1.9%) continues, Lackey et al predict that numbers in the Pacific Northwest will reach about 85 million by 2100. I present these numbers not so much as something of certainty, but rather to indicate that if we look into the long-term future, salmon in systems such as the Fraser River face a very problematic future.

Much of BC’s share of future growth will occur in the lower Fraser River basin from Hope to Vancouver with more water pollution, more gravel removal, more roads, more water removal, more subdivisions, etc. Ongoing climate change, expansion of human population, and ‘development’ will be the primary determinants that will shape the freshwater environmental future for the diverse Pacific salmon stocks in the Fraser River system.

A long-term strategy, involving research and related management responses which are scaled to the magnitude of the issues, must be developed for salmon populations of the southern half of B.C. Such research must deal with the implications of expanding human populations and related development and infrastructure.

The rapid growth of human numbers, beyond ‘sustainability’, is the pervasive element in fisheries management whether in the Fraser River system or other parts of the world. It is the pervasive element in most ecological issues that face society(ies). Whether it is in fishery matters in the Fraser River, fisheries issues around the globe or other some other resource-related concern, biologists must put problems of human population growth, and its unending imbalance, into the ‘equation’.

## TO THE ENVIRONMENTALISTS – CHALLENGE THE GROWTH ETHIC

It is the reality of our times that we must question not only the specifics of each resource use issue and each 'development' issue of our time, but also the societal context in which it occurs. Over the past 30 years or more, I have witnessed cases in which people, who were concerned about the environment, questioned or opposed activities that ranged from small to large, and from moderate to heavy in impact.

We have not, however, questioned well the direction or the 'end game' along which each step in the growth/development process takes us further. The numbers should wake us up. The UN medium growth projection has human numbers peaking at about 9.3 billion – 3 billion more than now. The US growth projection is for about 420 million by 2050. The Canadian projection is for about 42 million. Based on growth rate from 1950 to 2000, B.C. will have a population of 8 million or more.

The question that we 'environmentalists' must ask in regard to these kinds of trends is, 'where does the process take us'? Do we wait, passively, until the growth process takes the planet to the 9 billion plus mark? Do we grow until nature says 'stop', as it surely will, or do we begin an active discussion of the processes that envelope us? These are the issues. These are the questions that should be asked in every political campaign in which our "leaders", perhaps in ignorance, take us one increment further along the road to greater environmental risks.

Such questions and issues must begin to be part of every discussion and every hearing as additional 'development' projects come before society. The fact that project review formats and terms of reference may not openly permit such discussion, in this day and age, can only serve to emphasize their ultimate limitations.

## REACHING FOR A HIGHER RUNG ON THE LADDER

To a large degree it is the political process that reflects the direction of a society. In a deeper sense this process reflects our relationship to our environment and to nature. The political discussion that we have heard is one in which the core of the debate is about the 'individual' as opposed to the 'collective'. As such, these two perspectives are both about how we use the planet and about how nature may serve our species. It is in this context that we presently try to 'write the rules'. A look at the conditions around us tell us that now such 'rules' of societal operation are short-sighted. Too many people in our society live with their eyes on the stock market and their hands on their wallets. The environment is an abstraction 'somewhere outside'.

My sense of the situation is that we are at a 'break-point' at which the 'political' context must also reflect rules of nature that are common to all species. Such a transition would reflect intellectual process as much as political doctrine. It would reflect, in the fullest sense, that we cannot 'grow forever'.

It would also reflect that '*all things are interconnected in nature*'. The Nuu-Chah-Nulth people on the west coast of Vancouver Island embraced this concept long ago in their expression "*hishuk ish ts'awalk*".

Historically, people have made positive transitional leaps in regard to some things in society, in particular, how they should operate and govern themselves. I think that we are due for another step. I believe that it is time that we recognized nature as a partner and a regulator rather than as a servant and a collection of resources. This idea is an abstraction on one hand, but a powerful reality on the other. In its fullest sense, the concept has no home in any present political organization. It is a concept based on perceived relationships rather than how we gain and own material wealth. As such it may be elusive, and making it work would require new dimensions to our thinking and social depth. However, the consequences of failure to reach for and attain it, because we opt for 'business as usual', may be disruptive and dangerous.

My last hope is that it is not already too late.



G. F. Hartman, Ph.D., longtime CSEB Member

THE DEPTH DISTRIBUTIONS OF BROWN TROUT IN CITY STREAM OF ST. JOHN'S, NEWFOUNDLAND

By R. John Gibson (rjgibson@nf.sympatico.ca), CSEB Atlantic Region Member.

Sections of the city rivers of St. John's, Newfoundland, have exceptionally high biomass of brown trout, *Salmo trutta*, (Gibson and Haedrich 1988), probably related to suitable habitats, providing habitats for all life stages, and suitable water chemistry, with enrichment contributing to abundant instream and riparian terrestrial prey items (Gibson and Colbo 2000; Steele 1991). Also due to the island's glacial history, few competing or predatory fish species are present. The brown trout was introduced to some waters of the St. John's area about 100 years ago, and has since spread to other waters around the Avalon Peninsula (Hustins 2007), and where successful, has been blamed for the consequent decline of the indigenous brook trout (*Salvelinus fontinalis*). Other cohabiting fish species in the city rivers are eel (*Anguilla rostrata*) and threespine stickleback (*Gasterosteus aculeatus*). Atlantic salmon (*Salmo salar*) were extirpated from the city rivers about 80 years ago. Experimental stockings of salmon have shown good growth and success of the species at those sites, but insufficient numbers were stocked to start a permanent run, although a few adults did return.

A number of electrofishing surveys in the city rivers have been made. We sampled in late summer, after the major growth period. Sites and methods are reported in Gibson and Haedrich (1988) and Gibson and Colbo (2000). Table 1 shows some physical variables of the sites mentioned in this article.

Table 1. Physical variables of the habitats at the electrofished sites, all in third order streams

Habitat Variables	S. Book Riffle	S. Brook Pool	Virginia R. Flat	Virginia R. Pool	Channelised, Virginia R. (Riffle)
Wet width (m)	4.5	4.3	3.1	3.5	4.7
Length (m)	17.0	11.9	12.7	9.0	15.8
Area (m <sup>2</sup> )	76.5	64.7	39.4	31.8	74.0
Mean Depth (cm)	18.2	34.8	26.9	31.25	12.5
Maximum Depth (cm)	50.0	76.0	48.0	63.0	15.5
Substrate Rating (silt, sand 1 – boulders 6)	3.8	2.5	3.6	2.3	3.7
Instream cover (%)	5	15	25	35	0
Overhanging Cover (%)	1	5	10	25	0
Canopy cover (%)	30	15	0	40	0

During daylight hours, water depth itself is a cover variable for brown trout and young salmon (Gibson and Erkinaro 2009). This present article gives further evidence of the relationship of selected depths to trout size in the field. As can be seen in Figure 1, larger trout (>1+) were in the deeper sites than at the channelized site. Underyearlings (0+) were abundant at the riffle sites, but were fewer in deeper water.

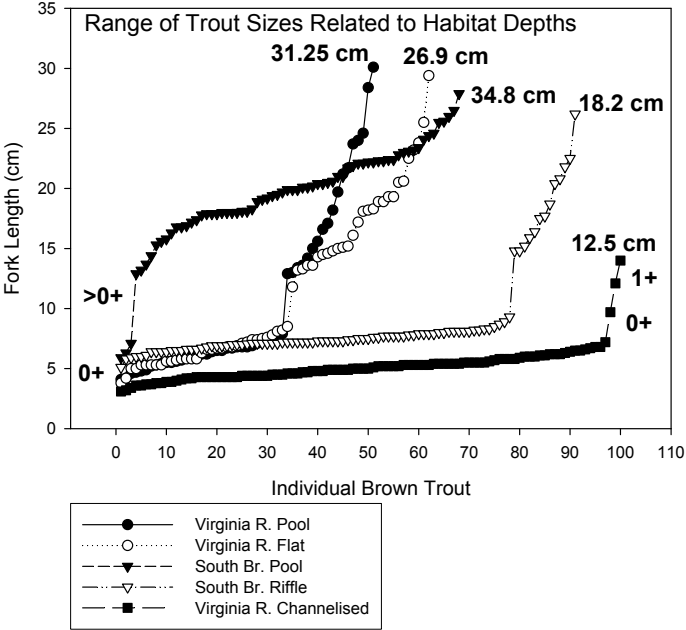
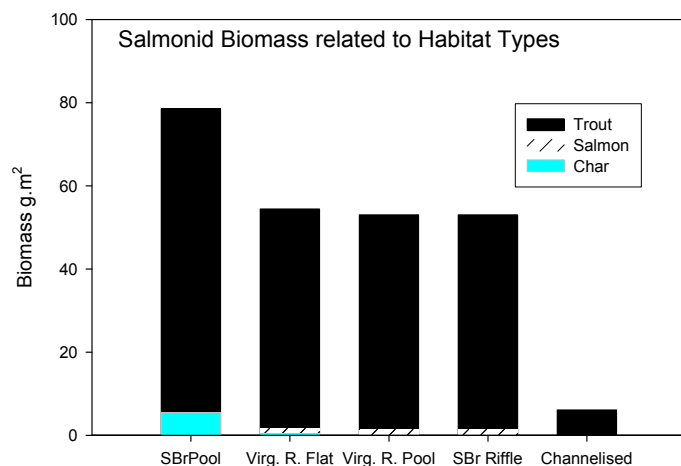


Figure 1. The relative sizes of brown trout at the various sites sampled. Mean depths of each station are shown on their respective plots, i.e., the pools had mean depths of 31.25 cm and 34.8 cm, the flat 26.9 cm, the natural riffle 18.2 cm, and the channelized station 12.5 cm. Areas of the stations are shown in Table 1.

Greatest salmonid biomass was at the deeper water stations (Figure 2). 'Trout' refers to brown trout. The brook trout are here termed 'char', to avoid confusion. The salmon present were from experimental stocking. The salmon 0+ were abundant in the South Brook Riffle station (density 1.03 per m<sup>2</sup>; biomass 4.14 g·m<sup>-2</sup>), but were absent in the adjacent South Brook Pool. Yearling salmon had densities of 0.01 per m<sup>2</sup> both in the South Brook Riffle and Pool, and 0.03 per m<sup>2</sup> in each of the Virginia R. Flat and Pool). Brook trout (char) are less aggressive than salmon parr and brown trout, and where they are the indigenous trout, underyearling salmon, although generally more common in riffle habitat, in Newfoundland can be found commonly in all habitat types (Gibson 2002). Five brook trout (0.06 per m<sup>2</sup>; 5.50 g·m<sup>-2</sup>) were in the South Br. Pool, and one in the Virginia R. Flat (0.03 per m<sup>2</sup>; 0.44 g·m<sup>-2</sup>). They are still abundant in some of the headwater tributaries, but are sparse farther downstream. South Brook stations were still in their natural state. The Virginia River Flat and Pool had been channelized about 30 years ago, but had been restored successfully by the Virginia River Conservation Society. The channelized station had been channelized the previous year (photo below). As is well known, channelization of streams reduces habitat and biological diversity, destabilizes substrates and riparian zones, etc., and, in general, is damaging to stream ecosystems.





**Figure 2.** The total salmonid biomass ( $\text{g.m}^{-2}$ ) at each station. 'Trout' refers to brown trout, and 'char' to brook trout.

Although sections of the city rivers are exceptionally productive, and provide scenic areas and interesting attributes of natural history, these are generally areas in valleys and gullies where heavy machinery would have difficulty getting in. Elsewhere, where possible, streams are channelized or put underground. Storm sewers are incorrectly installed, so that water quality is decreasing. There are regulations against such degradations, but the rules are frequently ignored, without penalty. Possibly because trout streams are not revenue generating, as they would be for example in the UK, where they are better appreciated, authorities of the City of St. John's use only engineering expertise, and regard the city rivers merely as useful drainage systems, rather than living ecosystems. We are still trying to get the local authorities here up to date!



*A channelized section of Virginia River (including the station described in this article).*



*The Virginia River Pool station (in the middle distance). The lower barrier net for blocking the site has been removed and is on the bank to the right of the photo.*



*A riffle habitat in South Brook (partly including the station mentioned in this article).*

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## BOOK REVIEW

### **Sustainable Energy – Without the Hot Air.**

By David, J.C. MacKay. 2009. UIT Cambridge Ltd., Cambridge, England. [www.withouthotair.com](http://www.withouthotair.com)

If you're like I am and have basic mathematical and physical science skills and a little bit of confidence to use them, you may at times attempt to figure out numbers that matter in day-to-day life. Your gas mileage. Calories from common foods. Your momentum and the energy required to get you accelerated to a point where you actually have momentum [maybe even if you took Physics 100 you wouldn't try that one].

Or maybe you wouldn't try at all. Many biologists don't have the inclination or in many cases the skills to rough these values out. But we're faced more and more with an important environmental problem which may force us to. I'm thinking global warming, and the many alternative ways of generating and using energy. How do they compare and can I even have a whiff of an understanding them? What is my carbon footprint? Is wind power better than solar? On second thought, you may think the experience of trying to calculate these things will be so unrewarding and unlikely to reach a reasonable answer, so why try?

*Sustainable Energy – Without the Hot Air* by Cambridge physics professor David MacKay may just be the best thing that's come along to make you take that leap. And at the same time, the book uses the understanding it generates to help evaluate the feasibility of all (yes all) energy options with a goal of reducing global warming. The book is designed to simply allow you to make all these calculations, look at all forms of alternate energy, and relate them to one another so you develop a personal appreciation of the scale of your energy actions in simple terms.

But it's a bit of a manifesto too, knowledgeably showing why we should accept that the changes in climate are man-made, and then showing us the way to understand which of our actions and technologies will work, and which are doomed to fail.

MacKay's book is a bit of a Bible in terms of its size and technical content, and highly authoritative. Some of the tidbits it presents include a convincing argument for scrapping incandescent light bulbs—sure their replacements have a mercury problem but it won't be long before incredibly efficient LED lights enter the marketplace. The fact that they use electricity for the most part generated by thermal sources, which are among the most inefficient means of generation, makes replacing them a no-brainer. And don't obsess about unplugging cell phone chargers. In the grand scheme of things there are other things you can do that save far larger amounts of electricity.

The book even convinced me that electric cars could actually save fossil fuel emissions—if the energy they use is generated by an alternate energy means. There is actually less loss of energy in the electrical transfer from a hydroelectric plant to a car battery and to the wheels of your car to produce motive force, than to burn fuel in the car to generate the same motion.

I was recharged [no pun intended] after reading *Without the Hot Air*, promptly dragging out my chemistry knowledge and some of MacKay's conversions to turn litres of my gas consumption into pounds of CO<sub>2</sub> and then into bags of fertilizer (something I can readily envision). So my 200 km trip to Nova Scotia's Atlantic coast produced the equivalent weight to one bag of fertilizer. I can grasp that concept.

*Without the Hot Air* is a great book and an easy read. And it's also free—its 368 pages of charts, text and conversion tables are available as a pdf download from the publisher's website [www.withouthotair.com](http://www.withouthotair.com) and it's also available for a price in a paper version which many may prefer. I recommend it wholeheartedly.

Patrick Stewart, CSEB Atlantic Region Director.

## BOOKS OF Interest

### **Advances in Insect Chemical Ecology.**

By Cardé R.T. and J.G. Millar. 2011. Eds. Cambridge University Press Ebook (Adobe eBook Reader) \$56.00 US.

*Advances in Insect Chemical Ecology* presents the latest research and thought in the study of how insects use chemical signals to communicate with each other or to interact with other species. The internationally recognized experts in this volume focus on topics such as plant defenses against insects, floral odors that attract pollinators, host-finding by parasitic insects, and pheromone-mediated interactions in cockroaches, moths, spiders, and mites. The book is essential reading for researchers and graduate students of chemically mediated communication in insects.

### **Agronomy of Grassland Systems. 2nd Edition.**

By Pearson, C.J. and R.L. Ison. 2011. Cambridge University Press Ebook (Adobe eBook Reader) \$63.00 US.

The challenges facing grassland agronomists are becoming increasingly complex, with environmental and ethical issues assuming a greater significance alongside more conventional technical aspects. This new expanded edition, with an increased emphasis on systems thinking, has been revised to reflect current concerns, knowledge and practice. As such it addresses the need for a different approach to grassland agronomy, providing novel and provocative material to instruct, stimulate and enthuse the reader.

### **Insect Ecology. Behavior, Populations and Communities.**

By Price, P.W., R.F. Denno, M.D. Eubanks, D.L. Finke and I. Kaplan. 2011. Cambridge University Press. Paperback (\$86.95 CAD).

Combining breadth of coverage with detail, this logical and cohesive introduction to insect ecology couples concepts with a broad range of examples and practical applications. It explores cutting-edge topics in the field, drawing on and highlighting the links between theory and the latest empirical studies. The sections are structured around a series of key topics, including behavioral ecology; species interactions; population ecology; food webs, communities and ecosystems; and broad patterns in nature. Chapters progress logically

from the small scale to the large; from individual species through to species interactions, populations and communities. Application sections at the end of each chapter outline the practicality of ecological concepts and show how ecological information and concepts can be useful in agriculture, horticulture and forestry. Each chapter ends with a summary, providing a brief recap, followed by a set of questions and discussion topics designed to encourage independent and creative thinking.

**Social Networks and Natural Resource Management. Uncovering the Social Fabric of Environmental Governance.**

By Bodin, Ö. and C. Prell. 2011, Eds. Cambridge University Press, Paperback.

*Social Network Analysis (SNA)*, a quantitative approach to the study of social relations, has recently emerged as a key tool for understanding the governance of natural resources. Bringing together contributions from a range of researchers in the field, this is the first book to fully explore the potential applications of *SNA* in the context of natural resource management. Topics covered include the role of *SNA* in stakeholder selection; improving fisheries management and conservation; the effect of social network ties on public satisfaction and agrarian communication networks. Numerous case studies link *SNA* concepts to the theories underlying natural resource governance, such as social learning, adaptive co-management and social movements theory. Reflecting on the challenges and opportunities associated with this evolving field, this book is an important resource for students and researchers involved in many areas of natural resource management, environmental biology, sustainability science and sociology.

**Animal Camouflage. Mechanisms and Function.**

By Stevens, M., S. Merilaita, and Å. Akademi. 2011. Cambridge University Press, Paperback (\$65.95 CAD).

In the last decade, research on the previously dormant field of camouflage has advanced rapidly, with numerous studies challenging traditional concepts, investigating previously untested theories and incorporating a greater appreciation of the visual and cognitive systems of the observer. Using studies of both real animals and artificial systems, this book synthesizes the current state of camouflage research and understanding. It introduces the concepts of different types of camouflage and how they work, including background matching, disruptive coloration and obliterative shading. It also demonstrates the methodologies used to study them and discusses how camouflage relates to other subjects, particularly with regard to what it can tell us about visual perception. The mixture of primary research and reviews shows students and researchers where the field currently stands and where exciting and important problems remain to be solved, illustrating how the study of camouflage is likely to progress in the future.

**The Aquaculture Controversy in Canada. Activism, Policy, and Contested Science.**

By Young, N. and R. Matthews. 2010. UBC Press, Hardcover (\$85 CAD).

Aquaculture -- the farming of aquatic organisms -- is one of the most promising but controversial new industries in Canada. Advocates

believe aquaculture has the potential to solve serious environmental and food supply problems resulting from global overfishing. Critics argue that industrial-scale aquaculture poses unacceptable threats to human health, local communities, and the environment.

*The Aquaculture Controversy in Canada* is not about the techniques and methods of aquaculture, but it is an examination of the controversy itself. Rather than picking sides, Nathan Young and Ralph Matthews draw on extensive research to determine why the issue has been the centre of intense debate in Canada. They argue that the conflict is both unique, reflecting the specific history of coastal and resource development in Canada, and rooted in major unresolved questions confronting democratic societies around the world: the environment, rights, knowledge, development, and governance. The inability of the industry and its advocates to address the complexities of the controversy, they argue, has given a powerful advantage to aquaculture's opponents and fuelled the debate.

Comprehensive and balanced, this book explores the issues at the heart of the aquaculture controversy -- the relationship between humanity and the environment, notions of rights and justice, and the rise of intense local-global interactions and conflicts. It will appeal to anyone interested in environmental controversies, public policy, natural resources, or coastal issues.

## BOOKS FOR Review

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Hatcher, M.J. and A.M. Dunn. 2011. *Parasites in Ecological Communities. From Interactions to Ecosystems*. Cambridge University Press, Hardcover, \$125 US, Soft Cover, \$60.

Viswanathan, G. M., M.G.E. da Luz, E.P. Raposo and H.E. Stanley. 2011. *The Physics of Foraging. An Introduction to Random Searches and Biological Encounters*. Cambridge University Press, Hardcover, \$60.

Walker, L.R. and P. Bellingham. 2011. *Island Environments in a Changing World*. Cambridge University Press, Hardcover, \$115 US, Soft Cover, \$49.

Castello, J.A. and Stephen A. Teale. 2011. *Forest Health. An Integrated Perspective*. Cambridge University Press, Hardcover, \$105 US, Soft Cover, \$49.

Hodkinson, T., M. Jones, S. Waldren and J. Parnell. 2011. *Climate Change, Ecology, and Systematics*. Cambridge University Press, Hardcover, \$125 US.

Dutilleul, P.R.L. 2011. *Spatio-Temporal Heterogeneity. Concepts and Analysis*. Cambridge University Press, Hardcover, \$125 US, Soft Cover, \$57.



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