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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Newsletter / Bulletin

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Front Cover: Bull Moose in Muskwa-Kechika Management Area, northern British Columbia - Photo taken by Barry Huber, retired DFO Resource Manager.

Back Cover: Scenic view near Tuchodi River in Muskwa-Kechika Management Area, Northern British Columbia - Photo taken by Jared Huber.

Inserts: Lower left - Pika in Cathedral Provincial Park, British Columbia - Photo taken by Don Lawrence, retired DFO habitat biologist.

Lower right - Two ptarmigan photographed in northern BC. Photo taken by Don Lawrence.

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CSEB NEWSLETTER 2016

Vol. 73, Number 3 Fall 2016

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 nonprofit 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: garyash@shaw.ca

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LE BULLETIN de la SCBE 2016

Vol. 73, Numéro 3 Automne 2016

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: garyash@shaw.ca

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

The Canadian Society of Environmental Biologists (CSEB) is a national nonprofit 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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DISPLAY ADS• (4 issues)	Rate Per Issue	Annual Rate
Business Card Size (3.5" x 2")	\$ 25.00	\$ 85.00
1/4 Page (4"x 5")	\$ 55.00	\$ 190.00
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NATIONAL News

PRESIDENT'S Report

Our current acting President, Anne Wilson, has been busy organizing the Canadian Ecotoxicity Workshop to be held in Edmonton in late September. As a consequence, she was not able to prepare a report for this newsletter. We look forward to her report for the winter newsletter.

WEBINAR Series

By Loys Maingon, CSEB BC Director

CSEB Launches a Webinar Series

Over the past two years, CSEB's executive has had many discussions about the need to reach out more effectively to both our existing and our potential membership. Dr. Bill Paton often pointed out to us the difficulty of reaching out to younger biologists who have grown up in the digital age. The new generation of Canadian biologists communicate mostly through hand-held devices and social media.

Over the past decade most of our information has been digitalized. Setting aside our concern with the destruction of both government and university research library collections over the last five years, most research information is now only digitally accessible to most scientists. This has a number of important implications. As we all know, digital communication has accelerated our pace of life, for better or for worse.

On the plus side, digital technology has evolved tremendously, and allows users with direct live access to current research, even before it is officially published. In an age when we are increasingly concerned with our carbon footprint and with time management, it is becoming increasing hard to manage or justify both the time and expenses to travel to conferences. Increasingly, the traditional exchange of information, which is an inherent part of professional activity, is being replaced by digital or desktop conferencing, in the comfort of one's home.

Expressions Of Interest In Membership Of COSEWIC's Species Specialist Subcommittees

**Will Be Posted On The COSEWIC
Website From September 21 To
October 19, 2016 (Until 3:00Pm
Eastern Time)**

**(For More Information,
see <http://www.cosewic.gc.ca>)**

CSEB is joining this trend and will host a series of monthly one hour web seminars, or "webinars," as well as December's AGM, by using Citrix "GoTo Webinar" platform. This platform provides a virtual seminar room for 100 participants at a time. These events are live. Participants are invited to join the seminar by clicking an event-specific link for the day and time of the seminar. All that participants need for webinars is a computer, or hand-held device with speakers. Live discussion just needs a microphone and camera (which are built in to most computers built over the past five years.)

CSEB and Citrix will provide registration information and publicity. All members will receive electronic notices in their email and events will be posted on the CSEB website and on our Facebook page. Here is the protocol you should follow:

- Participants should register in advance and make their connection 15 minutes early so that any connection and registration problems can be addressed.
- When you connect you will be held in waiting in the virtual lobby. There is a "chatbox" into which you can type questions
- The sessions start on time, usually on the hour
- Sessions move into "the virtual seminar room" where the host will greet you, and then introduce the speaker.
- During the session and at the end of the session you can type in questions that will be answered at the end of the session.
- There is no actual time limit to most sessions, so if you want to have a face-to-face discussion, the host will be able to activate your camera and microphone.

This comes at no cost to participants and is supported only by our memberships.

For those of you who use hand-held devices (tablets and phones) there are apps available online to adapt to Citrix; see <http://support.citrixonline.com/Webinar/videos>.

Our first presenter will be Dr. Sarah Dudas, who is a Canada Research Chair teaching biology at Vancouver Island University (Nanaimo) and the Shellfish Aquaculture Research Centre. Dr. Dudas' research on the impact of microplastic contamination in marine foodchains recently came to national attention in a variety of CBC programmes. CSEB will be hosting a seminar on her research Monday October 17 at 11 am (Pacific Standard Time).

Don't miss the kick-off of a whole new era for CSEB! However, if you miss this—unlike traditional conferences—this is recorded, and will eventually be made accessible.

Please be sure to join us on October 17th for this exciting webinar, and stay tuned for additional upcoming speakers. If you would like to present a webinar or know of a good contact for a future webinar, please contact Anne Wilson at Anne.wilson2@canada.ca.

REGIONAL News

BRITISH COLUMBIA News

By Loys Maingon, CSEB BC Director

BC's Environmental Record: Out at Sea in an Ocean Planet

As September rolls in with a sudden flip to cool autumnal days across the province that should herald the return of salmon runs, salmon returns appear to be at an all-time low. Where pink and chinook salmon should normally rise in the morning glass of coastal rivers there is an uncanny stillness this year. It is a statement from an ocean planet to terrestrial river watchers, a prelude of everything that is amiss in the province's failed environmental policies and inaction. The latest fisheries reports in BC indicate that even in this low year, returns of the normally prolific runs of the Nass, Skeena, and Fraser River, are below modelling expectations and characterized as "below expectations," "poor return", and "significant conservation concern."¹ Coincidentally, the significant exceptions are the Douglas Channel/Great Bear Rainforest fisheries, where ground-breaking environmental conservation efforts made headlines in the spring, bucking general forestry practices in BC.² Where wilderness is protected, so is the integrity of environmental processes and services.

We know what should be there, even when this government dodges acknowledging its absence, pretends that the problem does not exist, and then pretends that it is a "world leader" in "environmental responsibility and climate change." The province is, in fact, following a general global trend towards ideological polarization where climate change debates and conservation decline are concerned. The release this month of two international reports, the IUCN report *Explaining Ocean Warming: Causes, scale, effects and consequences*³ and the Wildlife Conservation Society's *Catastrophic Declines in Wilderness Areas Undermine Global Environment Targets*⁴ makes provincial policy and conservation claims vacuous.

These reports are simply indicative of both the failure of current environmental policies which are clearly at odds with public representations made by provincial and federal governments. Government policies appear to ignore environmental realities explicitly presented by the scientific community. The findings of the Conservation Society confirm that over the last two decades the world has lost 10% of our remaining wilderness. In spite of much-touted conservation targets set by governments, and efforts to meet them:

We demonstrate alarming losses comprising one-tenth (3.3 million km²) of global wilderness areas over the last two decades, particularly in the Amazon (30%) and central Africa (14%). We assess increases in the protection of wilderness over the same time frame and show that these efforts are

*failing to keep pace with the rate of wilderness loss, which is nearly double the rate of protection. Our findings underscore an immediate need for international policies to recognize the vital values of wilderness and the unprecedented threats they face and to underscore urgent large-scale, multifaceted actions needed to maintain them.*⁵

There is a huge disconnect between representations made in the name of "environmental sustainability" and the delivery of actual environmental conservation practices that do not result in the further global decline in both biodiversity and ecological services. This is an indictment of sustainability policies, which should provide for or enhance biodiversity and the planet's ecological services.

In point of fact, a recent study of "city-centric" urban planning "sustainability policies," as promoted by BC municipalities and practiced in much of the Western world, or G7 countries, shows that these practices largely shift the costs of sustainability to rural and third-world communities, and multiply impacts globally. Sustainability can only be validated if it is subjected to full-ecological accounting. Otherwise, "sustainability policies" only amount to shifting the location of our garbage output. **Figure 1** below illustrates the actual environmental cost-shifting that current urban sustainability practices represent.

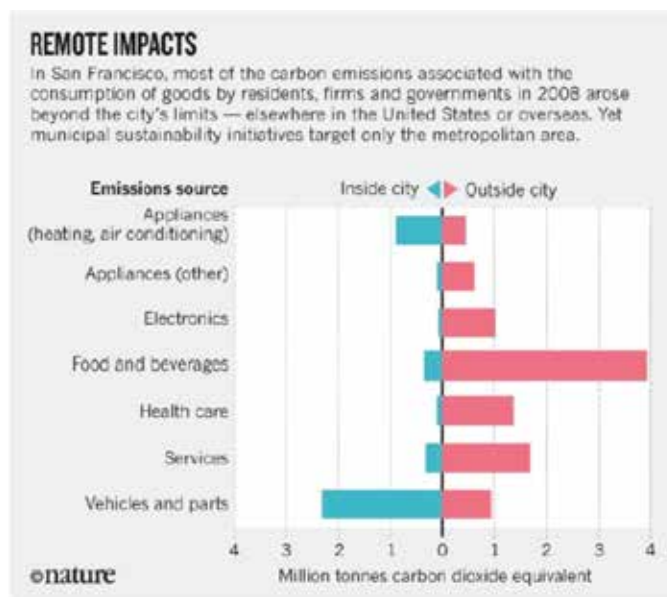


Figure 1 Data analysis of San Francisco's greenhouse gas emissions showing that 80% are produced outside the city and unaccounted for. (Stanton, E.A. et al. *Consumption-Based Emissions Inventory For San Francisco* (Stockholm Environment Institute in Nature (2016), 536, 393.)

The point that this analysis makes is that no matter how much one tries to manage the current economic system for sustainability, the prevailing consumer economy is inherently unsustainable. The inevitable disconnect between ecological realities and economic

aspirations is well reflected in what environmental economists such as Dr. Mark Jaccard have qualified as the government's "deceptive cynicism."⁶

This summer BC residents were promised three things concerning the general management of BC's environment by both the provincial and federal governments. The general consensus is that BC voters were betrayed on all three counts. First, in the wake of much posturing in Paris at COP21, Premier Christy Clark promised a plan to address climate change. After an almost silent release of a not very progressive plan put forward by the hand-picked "Climate Leadership Team" on a Friday afternoon in November 2015, the premier with her deputy minister Fazlil Milhar, past director of The Fraser Institute, reviewed the plan and have now gutted it sufficiently to make it a completely meaningless document.^{5,6}

Second, after *Tsilquot'in Nation vs British Columbia*, both BC's government and the federal government have been legally compelled to recognize that aboriginal title gives First Nations "the right to decide how the land will be used, to enjoy, occupy and possess the land, and to proactively use and manage the land, including its natural resources."⁷ In spite of the formal recognition of their explicit legal obligations, provincial and federal practice seems unchanged. Notwithstanding their many promises to respect aboriginal title, both Premier Christy Clark and Prime Minister Trudeau have elected to disregard the opposition and concerns of First Nations leadership in BC to the Site C development, and have failed to consult meaningfully.⁸ As Grand Chief Stewart has put it on behalf of the BC chiefs "The honeymoon is over ...the Trudeau Government, like cowardly, thuggish thieves in the dark, quietly issued federal permits before a long weekend to allow for the acceleration of construction."⁹

Form a practical point of view, we have recently seen what the alienation of First Nations' goodwill has meant for the state of relations with First Nations in BC. After years of tolerance, hereditary chiefs recently issued eviction notices to coastal aquacultural lease holders.¹⁰

Third, in spite of the constant flow of glossy reports on the state of mines and mining oversight by the ministry of Forest Lands and Natural Resource Operations claiming to uphold "An ongoing commitment to our land and water resources,"¹¹ July was a time for more reality checks. The public also found out, at the same time that the province re-opened the Mount Polley mine site, that it is looking at a \$508 million bill for the clean-up of 83 abandoned contaminated mine sites.¹² In keeping with this trend, Fort Nelson First Nations recently had a water license issued to Nexen Inc. for gas fracking revoked, because it had been issued without a full scientific review.¹³ This is just part of an ongoing general decline in the scientific management of water resources and conservation in BC.

There has been a growing drift away from conservation in BC's provincial and national parks, in keeping with the implications of the 2015 Bill 4. Not only is park oversight now down to seven full-time rangers (from 27 in 2001), in a steady erosion of full-time staff continuing the 1984 cuts from 411 to 288 full-time staff,^{14,15} but in concert with provincial policy, the federal government has also shifted focus away from conservation to tourism and recreation in national parks.¹⁶

Similar economic priorities, as opposed to conservation priorities, have also seen park boundaries altered, as at Finn Creek Provincial Park to make way for controversial pipeline projects, such as the Kinder Morgan pipeline.¹⁷ Ironically, Finn Creek Park was until recently touted as prime spawning habitat for now "at risk" chinook and coho salmon. This is a particularly sensitive question in BC, as many voters, and the mayors who represent them, are opposed to the development of any more pipelines and are increasingly committed to shifting the economy away from fossil fuels to alternatives. Notwithstanding that Prime Minister Justin Trudeau is expected to once again buck public opinion and support Kinder Morgan¹⁸, the provincial government's ambiguous opposition to this project reflects a long standing public concern with the movement of oil by tankers or by pipelines and the risks it poses for the state of the oceans and BC's fisheries. The recent IUCN report (*Explaining Ocean Warming: Causes, scale, effects and consequences*³) can only reinforce public concern over the development of any fossil fuel economy and the direction taken by the provincial government to develop LNG.

At a time when climate change discussions appear to be gaining prominence around the world, it is difficult to understand how the practice of BC's government, and its federal counterparts', can be so incredibly at odds with stated objectives. At least that is how things look until we come to weigh how the debate over climate change has been progressing over the last 20 years. Although Canadians like to distinguish themselves from their American neighbours, there are many similarities when it comes to economic perspectives and priorities, and how the media shape our responses. In many ways, particularly in the West where oil and gas development have been important drivers of the economy, economic discourse shapes perspectives on such issues as climate change.

Recent surveys by the League of Conservation Voters show that there is a growing polarization in climate change debates and in attitudes towards conservation and environmental issues, largely driven by conservative media.¹⁸ As the graph of voting records in Figure 2 below shows, contrary to what one might expect after three decades of discussion about the developing problem of climate change, conservative-minded politicians are now less likely to accept scientific concerns as legitimate. The findings of University of Oklahoma social scientists are worth quoting: "*Today's Republicans are less likely than they were a decade ago to accept that the effects of global warming have begun, that humans are responsible, and that there is a scientific consensus on these questions.*"¹⁹ In other words, after three decades, we have reached a crossroads at which no amount of dispassionate rational facts, or scientific discussion, will bring right-leaning politicians to recognize the value of the environment and our responsibility to it.

For non-BC residents, it may come as a surprise that BC has always been a politically polarized province with a long labour history. In BC, there are really only two viable political parties: the BC Liberals and the NDP. The BC Liberals are an amalgamation of former Socreds, Conservatives, and Liberals, united to keep the NDP out of power. While there is no doubt that the BC Liberals are not an exact mirror of the US Republicans, there are many affinities, particularly through the right-wing think-tank, The Fraser Institute, which cultivates links with its

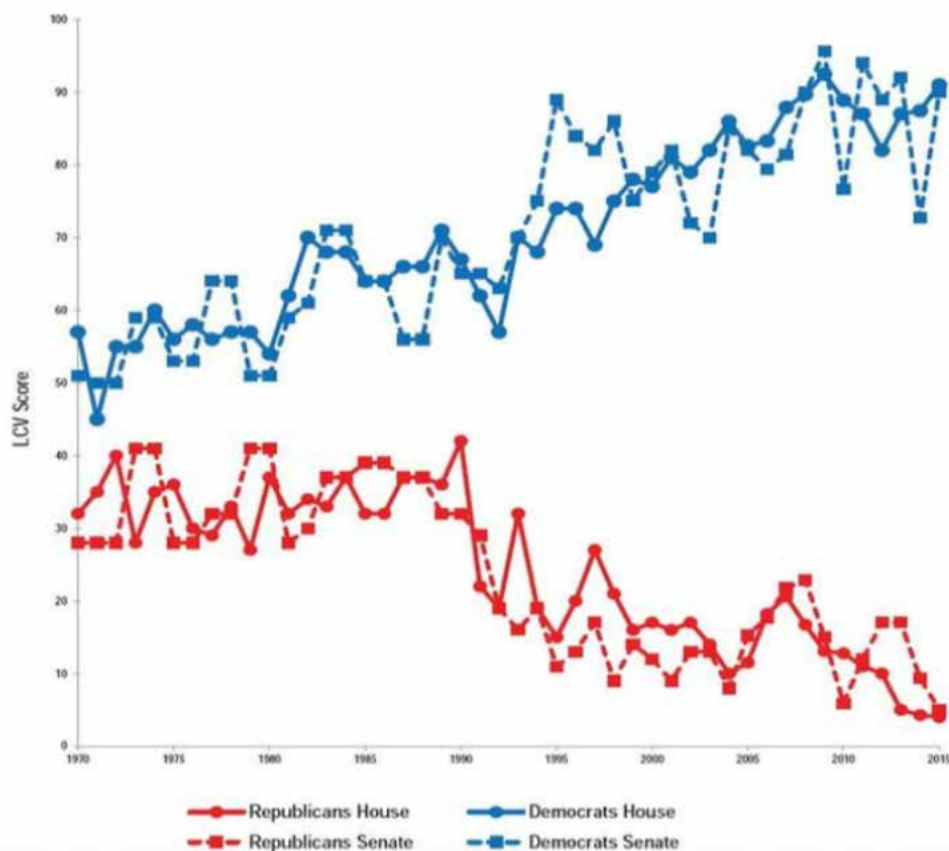


Figure 2

Source: League of Conservation Voters

League of Conservation Voters' environmental voting scores U.S. Congress – by chamber and party. Photograph: Dunlan et al. (2016).

American counterparts. The appointment of the Fraser Institute's past director to the review and ultimate formulation of BC's climate change policies made the outcome a foregone conclusion. Fazhil Milhar, who has a long record of climate denial, reflects the Republican inclinations of the current government and its divergence from the more progressive liberal ideology of the Gordon Campbell government.

The comments of Gordon Campbell's chief advisor on climate change policy, Dr. Mark Jaccard of Simon Fraser University, best capture the current direction of BC's government. To quote: "*Last week, Ms. Clark finally released her climate policy. Predictably, it perfectly fits the 'cynically ineffective' category. First, there is no immediate tightening of the stringency of any effective policies to achieve emissions targets in say 2020 and 2025. Second, consistent with the cynical category, the plan includes a list of innocuous policies that are known to be ineffective – subsidies to industry to electrify some processes, information programs for consumers, and statements about the government's good intentions. And taking cynicism to a new level, the plan's so-called emissions reductions are dominated by tree planting on lands that are already allocated to forestry, an action that does not decrease emissions in the long run.*"²⁰

Here, as he has done before, Jaccard can only point out the obvious – unlike its predecessors, this government has a consummate practical disregard for science. It engages in

extensive consultation with the public – seeking its opinion on climate change science- when it should be consulting with the people who understand the problem – the scientific community. It does not consult with the public out of democratic interest, but as a way of obfuscating real action and maintaining a status quo favourable to environmentally unsustainable economic interests. Unlike its predecessors this government does not really give credence to the realities that climate change is increasingly and inevitably imposing on us.²¹

Now the immediate concern for British Columbians, and for all Canadians, should be that Justin Trudeau as a mis-guided Liberal, appears to give credence to the "climate leadership" of Premier Christy Clark, as he seems to have regarding Site C, LNG developments, and Kinder Morgan. And that is where the latest IUCN report, *Explaining Ocean Warming: Causes, scale, effects and consequences* is really worth taking note of. This report's central theme is that the data are now in and that the ocean is warming – with serious implications. It is a stark warning about: "*....the knife edge that humanity is on if the ocean reduces the huge buffering it provides as a heat and carbon reservoir for the world.*"²²

Until about 12 years ago, climate change research had focused on the effects of terrestrial temperature increases. In this framework, the ocean was largely viewed as a huge passive sink. This report draws on more recent research, 25% of which is from after 2014 and considers the dynamic implications of ocean warming,

largely based on data gathered since 2000 by the international Argo programme to measure in real time and at different depths data on conductivity, temperature, and pressure. The informed preliminary picture drawn from Argo is challenging. As eloquently put by its authors, the ocean is 75% of the earth's surface, its processes have direct implications for our terrestrial processes, and biodiversity. It has absorbed 93% of anthropogenic CO₂ since the industrial revolution. Between 1955 and 2010, the top 2000 m of the oceans absorbed 240 ZJ of energy, which is equivalent of 36 °C in the lower 10 km of the atmosphere.²³

The conclusion of the 80 scientists who contributed to this report is that oceans role in buffering terrestrial systems from anthropogenic CO₂ over the past 200 years has come at a cost. Ocean temperatures and chemistry have been altered, and the ecosystems that they support are undergoing large shifts. The implications of these impacts are now either unfolding or about to unfold, and present “the greatest hidden challenge to our generation.”

We are truly “an ocean planet.” Every student of biology has learned that life came out of the ocean. Having learned that somewhere around 1865 when Darwin and Wallace released the theory of evolution, and that after the 1925 Scopes trial that all life is interdependent, we now seem to be guided by fundamentalist leaders oblivious to the implications of climate change and our dependence on the state of our environment. Over that past 50 years, the world seems to have forgotten the implications of these important axioms, and particularly so that we are dependent on our ocean origins.

The state of the oceans and the stability of the processes it sustains affect every ecosystem on this planet. Anybody who has waded in a salmon river knows the link and the rhythms it sets into motion all around us. The production and consumption of fossil fuels is literally “dumping at sea,” with consequences that have been foreseeable long since at least 1956 when meteorologist Carl Gustav Rossby made an early case for the implications of “ocean warming” and pointed out that “*Tampering can be dangerous. Nature can be vengeful. We should have a great deal of respect for the planet we live in.*”

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Chris Pielou (1923-2016)

Comment from Comox Valley Nature Past President

A few days ago, the scientific world in Canada, the Comox Valley as a whole, and Comox Valley Nature, in particular, lost a 5 foot 2 inch giant. Nobody is ever likely to replace Dr. Chris Pielou. I knew her long before I came to the Comox Valley. I joined largely because she was a member—what self-respecting scientist wouldn't have—I was shocked and amazed that she was given so little recognition locally. If I had to rate Canadian biologists or Canadian environmental scientists, I would have to say that she was perhaps Canada's greatest contribution to our global understanding of the environment.

I knew Chris Pielou intimately (I choose that word carefully—and she laughed when I slyly told her that), because I, as many postgraduate biology students, had learnt multi-variate statistics from her classic book *The Interpretation of Ecological Data*, which is the a key work for any mathematical ecologist. In this, she towers above a David Suzuki, whom I also respect, but while he gives mere information, Chris Pielou gave us the tools to get the information, destroy corporate lies, and tell the truth, which we are always obligated to communicate.

Every serious biologist in Canada is a student of Dr. Pielou, and she deserved every bit of respect she claimed. Regrettably, few people in the Comox Valley understood how important, how brilliant she was, and how much she deserved to be heard. And man, thank god she could roar!!!

She was an extremely important member of CVN, who worked tirelessly at the head of the Conversation Committee, which for decades was CVN's advocacy voice—taking on both local and provincial issues. In addition to being provincially well-known

as the Chair of the Scientific Panel on Clayoquot Sound in 1993–1994, which led to Clayoquot Sound being designated as a United Nations Biosphere Reserve, she had been an avid outspoken and forceful environmental protester.

Her drive led to the creation of the Comox Lake Ecological Reserve, for which she was appointed the first voluntary warden.

Chris Pielou had a delightful lack of patience for fools and people she disdainfully referred to as "twits." She hated presentations of "pretty pictures"—she demanded substance in everything, had and always met the highest environmental standards. And she had cause to demand high standards—because she always met them herself.

She was known world-wide as a preeminent bio-statistician. As a brilliant ecological mathematician, she pioneered multivariate statistics in ecological studies, which is now the universal standard for ecological research. After obtaining a PhD in mathematics, she went on to do a second PhD on mathematical ecology at The University of London, and went on to teach at Yale, Dalhousie, and ultimately at Lethbridge University on a Canada Research Chair, which gave her a free hand to do the research she wanted to do. And that led to her world on arctic ecology. She published widely, both professionally and as a consultant. Late in life, she wrote a series of popular books for naturalists, which endeavoured to make the wonder of science accessible to everybody, such as books on flora and fauna, and on popularized physics, such as *The Energy of Nature* (highly recommended if one wants to understand what a biologist looks at beyond the individual organisms and their populations, after being a naturalist – its like understanding the orchestra and everything that brought it about after you have identified the individual oboe).

She combined an understanding of mathematical modelling with a practical insight into the structure of the natural world. She was herself a product of a very English view of Darwin's theory of evolution. In 1979, she used this background in an early work written for her graduate course at Dalhousie on evolutionary biology to write a book on biogeography—the geographical distribution and evolution of species, summarily entitled with her typical terseness: "*Biogeography*."—No unnecessary flourishes or subtitles. If one expected the usual descriptiveness—chapter 6 hit the reader and student with what she rightly felt was the ineluctable mathematical basis of Island Biogeography! In 1992, as all useful books should be, it was reprinted, and remains unique in its treatment of the subject.

This diminutive lady was not only a giant in the recognition of women's equality in science, she was widely recognized internationally for her endeavours and merit. UBC granted her yet another honorary PhD in 2001. Part of her 2001 address to UBC's graduating class is worth quoting, if only because it encapsulates the quintessential Chris, and it is a belief I share:

"This may explain why so many people say, complacently, 'Of course, I'm lousy at math but ...' and then go on to imply that their mental powers are perfect apart from this trivial defect. Well, it isn't trivial – a person who blocks out math is a mental couch potato."

Diminutive she was—trivial she was not. There was seriousness even in her wit. Sharp as ever at 90, she once pointed out to me

that most anti-environmentalists were dunces at math, and in particular, one who caused me grief at UBC and her grief on the Scientific Panel, was a forester who was, in her words, "a mathematical dullard and fraud"—and she could prove it, he had failed her statistics class at Yale!

Today the world is poorer, and nature is diminished, CVN has lost a very great friend, leader and mentor, and the naturalists' and environmentalists' community is greatly diminished internationally. She burnt with a bright green fire only committed environmentalists know, and she was proud of her environmental advocacy. We owe it to Chris to perpetuate her environmental commitment, as she once said to me: "Fight every day, and have the math to prove it!" And so we will, death be damned... I am sure she would appreciate that.

Loys Maingon

ALBERTA News

By Brian Free, CSEB Member

Whirling Disease Now in Alberta

Alberta already has an active campaign to keep zebra and quagga mussels out of the province through boat inspections and education. Now we can add whirling disease as another reason to exercise due diligence when boats and fishing gear are moved between waterbodies.

In August, tests confirmed that whirling disease is present in Johnson Lake in Banff National Park. This fish disease affects salmonids, and it has been present in the United States since the 1950s, mainly in the western and northeastern states. This is the first confirmed case in Canada.

This disease is not harmful to humans but can affect fish populations through increased mortality. It can be transmitted to other water bodies through gear and equipment used for swimming, boating, and fishing.

In Alberta, rainbow trout, Westslope cutthroat trout, and whitefish are most susceptible to the disease. Affected fish may exhibit any of the following signs:

- whirling swimming pattern
- skeletal deformities of the body or head, for example, shortening of the mandible and indentations on the top of the head
- tail may appear dark or even black.

Biology lesson: The causal agent is the myxozoan, *Myxobolus cerebralis*. Originally thought to be protozoans, myxozoans are now considered a form of cnidarian (=jellyfish). Spores are released when infected fish die and then ingested by *Tubifex* worms living in the mud. Inside the worm, the parasite takes on a new form capable of infecting young salmonids. *M. cerebralis* gets into the cartilage near a fish's organ of equilibrium and multiplies very rapidly. This produces increased pressure on the organ, which causes the fish to swim erratically, affecting its ability to forage and to escape predators. Hence the high mortality rates among infected fish.

Altalink Installing Reflectors Along Power Lines to Protect Birds

Migratory birds will soon be making their way to southern wintering habitat, and there are many hazards along the way that can result in mortalities. One of these obstacles are power lines that cross in their flight path. Using a small cart that moves along the transmission line, Altalink, which is one of Alberta's largest transmission line companies, is installing 7,500 reflectors, one every 5 m to 10 m, to deter bird strike, primarily swans, around Frank Lake, which is near High River, Alberta.



The project is unique, as it is the first time Altalink is marking the conductors along the 500 KV line along Frank Lake. Usually it is only the overhead shield wires, which protect the line from lightning, but since the line near Frank Lake does not have shield wires, the conductors are being marked.

They started the project after concerns were raised by local biologist Greg Wagner who prepared a report that noted 11 dead trumpeter swans and a snowy owl carcass since 2015. Altalink took this information very seriously, and initiated the project to try to reduce wire strikes and resulting mortality.

They hope to have the project complete before this fall's migration in September and October.

Trumpeter swans, which stop at southern Alberta lakes in April as they migrate, were recently removed from the province's threatened species list.

They are, however, still a species of special concern, with an estimated 1,700 of the swans left across Alberta.

Source: PostMedia news reports

SASKATCHEWAN News

By Robert Stedwill, CSEB Past President & Sask. Chapter Chair

What I thought was going to be a non-report from Saskatchewan, after trying to get other Saskatchewan CSEB members to contribute without much success, it hit me that the major environmental issue that occurred in the Province this year was the oil spill in the North Saskatchewan River.

The spill of approximately 250 000 litres of oil "and other toxins" on Friday, August 22 has created a nightmare for both the public and the provincial government regulatory agencies. I suppose on the bright side, this spill and its aftermath will be the source of scientific papers for years to come!

The spill occurred from a Husky Energy pipeline at Maidstone, Saskatchewan, which is routed under the North Saskatchewan River. It was built in 1997. Prior to this time there had been no issues associated with the line; however, once a new 23 kilometre expansion to Husky's Saskatchewan Gathering System was connected to the older pipeline and oil started to flow, the leak occurred. As we are all aware, oil and water do not mix, and the

fallout was immediate. The City of North Battleford (population 14 000) and Prince Albert (population 35 000) had to shut down both their water supply systems, as both take their water from the North Saskatchewan River. Both cities enacted emergency water restrictions and have successfully operated on reserves and building temporary pipelines to alternative water sources. Prince Albert built a 20 cm irrigation water pipeline on the ground (20-30 km) to a point on the South Saskatchewan River near the Muskoday First Nation. And yes, the impact to fish and wildlife was evident, and no doubt will be the subject of future reports on the impact of the spill.

As of today, about 80% of the oil has been recovered, but it is unlikely that all the oil will be recovered as some of the oil has sunk to the bottom of the river and is likely tied up in river sediments.

There is a bigger question now as to whether the spill could have been prevented. Apparently, the new 23 km expansion pipeline connected to the older pipeline never underwent an environmental impact assessment (EIA) in 2014 when the new line was proposed, as it was classed as a "non-development". There is a suggestion that had it undergone an assessment, the older pipeline to which it would eventually become connected to, would have been identified as an "integrity risk", and upgrades or repairs may have been undertaken as a result of the assessment findings. It is all conjecture at this point, however, as the cause of the spill is still being investigated.

There are certainly some quarters that believe the identification of a pipeline as a "non-development" under the Environmental Assessment Act is counter to good environmental management and protection, particularly those projects close to bodies of water, or in this case, under a body of water. In my day, working within the environmental assessment process here in Saskatchewan, I was always appalled at those projects that by-passed the assessment process, because they were "out of sight and out of mind".

The clean-up continues, booms are still in place, the government agencies responsible are now inspecting all old pipelines in the province, particularly those near or under bodies of water. I suspect as well, there will also be a critical review of the Province's environmental assessment process, with regard to what is, or isn't a development; especially when it comes to pipelines!

If and when the CSEB holds its workshop on the "Impacts of Oil and Gas Developments on Ecosystems and the Environment, expect a lot of papers and presentations from Saskatchewan scientists and researchers!

Check out the CSEB Video at
<http://youtu.be/J7cOuDbBf9c> or
<https://www.youtube.com/watch?v=J7cOuDbBf9c>

MANITOBA News

Submitted by Gary Ash, CSEB Newsletter Editor

PROVINCE WELCOMES ALAMOS GOLD INC. PLAN TO BEGIN FEASIBILITY STUDY ON PROJECT NEAR LYNN LAKE

Growth, Enterprise and Trade Minister Cliff Cullen today welcomed news that Canadian mining company Alamos Gold Inc. will soon begin work on a feasibility study at its Lynn Lake gold project.

"The decision by Alamos Gold Inc. to undertake a feasibility study of the geologic potential of their Lynn Lake project represents a significant step forward for this project and highlights the excellent opportunities that exist in Manitoba for expansion of the mining industry," said Cullen. "Our government welcomes this commitment by Alamos and looks forward to continuing to develop our positive relationship with this and other interested mining corporations."

A 2014 Preliminary Economic Assessment (PEA) completed by Alamos's predecessor estimated an initial capital investment of \$185 million in the Lynn Lake project would allow for average annual production of 145,000 ounces. That scale of production would generate annual revenues of approximately \$250 million based on current gold prices, the minister said.

Alamos' feasibility study is expected to advance the analysis provided by the 2014 PEA and will result in an updated estimate of the project's potential costs and production volumes, the minister noted, adding Alamos expects the study to be completed by fall 2017.

Feasibility studies provide a verifiable analysis of the economic potential of a mineral deposit and represent an important step toward mine development. These studies generally include the following components;

- mineral resource estimate,
- metallurgical testing,
- production design and optimization,
- process plant site selection, and
- tailings management facility site selection and design.

Baseline environmental studies are already underway within the study area.

Source: Manitoba News Release 1 September 2016

Environmental Group Regrets Manitoba's Review Of Pesticide Ban

A Manitoba-based environmental advocacy group says it's disappointed Brian Pallister's government is reviewing the newly-implemented ban on cosmetic pesticides in the province.

"We regret that this is being opened up for discussion again," said Karen Peters, executive director of the Manitoba Eco-Network, adding that the current pesticide restrictions were beneficial to Manitobans.

"We think the existing law was protecting vulnerable people, children, pregnant people and animals," said Peters.

Sustainable Development Minister Cathy Cox issued a call for public feedback on the ban, which prohibits certain chemicals to control weeds on lawns and around sidewalks, schools and hospitals.

The legislation came into effect under the previous NDP government in 2015. At the time, then Minister of Conservation and Water Stewardship Gord Mackintosh said "synthetic pesticides pose a risk to human life, especially among children."

Manitoba weeds out cosmetic pesticides in new legislation

While in opposition, Progressive Conservative leader Brian Pallister urged the Selinger government to reconsider the cosmetic pesticide ban.

Within weeks of taking office, the PCs said they were open to reviewing the legislation.

The province is now gathering information that would be used in such a review. Cox said in a press release that she "wants to hear from Manitobans about their experiences" with the regulations.

"The purpose of the legislation is to reduce the exposure of people and pets to herbicides used in lawn care for non-essential or cosmetic purposes," she said in the press release.

"We are committed to finding the right balance between protecting the environment, minimizing the impact, and providing usable, aesthetic green spaces in our communities."

In 2015 the World Health Organization listed glyphosate, a key ingredient in Roundup, as a probable carcinogen.

However, its toxicity to humans is still a hotly debated matter.

For further information, see the following:

<http://www.cbc.ca/news/canada/manitoba/cosmetic-pesticides-ban-cbc-investigation-cathy-cox-1.3613678>

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<http://www.cbc.ca/news/canada/manitoba/manitoba-pesticide-ban-debate-reignites-1.1327459>

Source: CBC News, July 18, 2016

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

ONTARIO News

Submitted by Eloise Boileau, CSEB Ontario Member

THE WESTERN CHORUS FROG

The Western Chorus Frog (*Pseudacris triseriata*) can be found in Southern Ontario and the Montérégie and Outaouais regions of Québec.¹



Figure 1. Physical characteristics of the Western Chorus Frog

There are two distinct populations in Eastern Canada, but only one of them is endangered: the Great Lakes / St. Lawrence – Canadian Shield (GLSLCS) population. This population was listed as threatened in 2010 in the Species at Risk Act.²

The habitat of the Western Chorus Frog is primarily terrestrial, but it needs shallow ponds to complete its breeding. The frog requires these ponds to be temporary because there's a lower density of predators such as large amphibians and fishes.²

The main threats to the Western Chorus Frog are the loss of habitat, the degradation, and the fragmentation. In the last 10 years, more than 35% of the habitats have been lost in Québec, and 30% in Ontario. This habitat loss is due mainly to the variation of surface water levels caused by changes in land drainage, beaver dams, and climate change. We can also note the residential developments and agricultural expansion as threats to their natural habitat.²

The preciseness of their habitat combined with the increasing threats lead to an emergency order to prevent activities that may further damage their habitat.²

THE EMERGENCY ORDER

The Minister of Environment is under the impression that the Western Chorus Frog faces imminent threats to the recovery of its population and the Emergency Order is there to protect areas that have been identified.¹

Therefore, the Emergency Order was registered on July 8, 2016 with the objective to "accelerate the coming into force of protections for the Western Chorus Frog (GLSLCS) to help prevent activities that may further damage [their] habitat."¹

In these identified areas there are now a number of prohibited activities, such as removing, compacting or plowing the soil, draining or flooding the ground, and altering surface water in any manner.¹

The Emergency Order, unlike the previous one (referred to as the Original Order), allows for immediate enforcement of infractions to prevent further damage to the environment.¹

Anyone convicted of an indictable offence as listed in the Emergency Order, could be fined up to \$250,000 and/or face

up to 5 years of imprisonment. As for corporations other than nonprofit organizations, the fine could be as high as \$1,000,000.²

THE ORIGINAL ORDER

The Original Order (OO) was registered on June 30, 2016 and allowed a 30-day period before enforcing infractions. During this period, Environment and Climate Change Canada officials would meet with stakeholders and promote compliance to ensure that they were aware of how the OO could affect their activities. This period also gave them time to comply before the OO came into force.¹

The Original Order has been replaced by the Emergency Order mostly to remove the 30-day delay before enforcing the infractions. As stated by Mark Dionne, government biologist, to CBC News, "it is important to act now [to] assure the immediate protection of the species."³

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ATLANTIC News

Submitted by Pat Stewart, CSEB Atlantic Director

###! Hits Tidal Turbines in Bay of Fundy

With a new pair of tidal turbines scheduled for deployment in the Minas Passage, Bay of Fundy, Nova Scotia, later this fall, local opposition from fishers has been heating up and issues on the global scale have been muddying the waters of this renewable energy project.

Cape Sharp Tidal Energy Inc, a consortium of international tidal developer OpenHydro of Ireland and Emera—Nova Scotia's main electricity generator—are planning to place two large turbines in Minas Passage this Fall. Minas Passage is the narrow strait connecting the outer bay of Fundy with the its inner inland sea—Minas Basin—where the highest tides in the world occur.

Meanwhile, earlier this year, a group of fishers in Minas Basin began a largely political campaign against the project, which they claim will have unknown impacts on fish and marine mammals in the area¹.

A similar project in Puget Sound, Washington State, using OpenHydro turbines, was cancelled two years ago due to the high cost of the project and associated environmental monitoring when the US federal government backed down on funding the project.



Figure 1. One of two Cape Sharp Tidal Energy turbines scheduled for installation in Minas Passage, Bay of Fundy, later this year. (photo credit, Halifax Chronicle Herald).

The Nova Scotia fishers started a public information campaign and approached the Nova Scotia government in May with their concerns, which momentarily put a hold on development at the site. Later the group, spearheaded by the The Bay of Fundy Inshore Fishermen's Association, petitioned for a legal injunction on development², focusing on the adequacy of environmental assessment process. Information gathering is underway and some federal departments, such as the Canadian Environmental Assessment Agency, have received access for information requests.

Meanwhile, plans for placing the giant turbines—capable of generating 4 megawatts each—and transmitting the power into the electrical grid through cables laid last year, are moving forward.

The Cape Sharp Tidal initiative is a component of the Fundy Tidal Energy Demonstration Project, a project begun by the Nova Scotia government which has enabled use of a 1 x 1.5 km area of seabed on the northern side of Minas Passage near Parrsboro for projects to demonstrate and test tidal technologies. Currently six separate consortia of tidal energy developers have been assigned spots on the rugged seabed, where they can test their turbines.

The test site and concept, which sports a location with the highest currents, and which now goes under the name of the Fundy Ocean Research Centre for Energy (FORCE) was subjected to a Federal-Provincial environmental assessment process in 2008-2009.

Objectors point to the ecological importance of Minas Basin which can't be denied. Minas Basin IS important, in particular for its use by shorebirds—which have a major migratory stop on the extensive mudflats there—and fish, including several species at risk, which use the mix of inflowing freshwaters and estuarine conditions and productivity, but important commercial fish also pass through Minas Passage into Minas Basin past the Minas Passage tidal site. The inner bay of Fundy is not a hot spot for marine mammals (whales, dolphins, porpoises and seals) unlike the outer Bay of Fundy 100s of km west, or to seabirds. The big question is how big the effect on ecological resources the development of tidal resources will be.

Although there are opinions on both sides, most researchers and experts don't think the current development, in particular its limited scope in the context of a demonstration project, will be a major impact. Regulators have taken a 'wait and see' approach,

using the precautionary principle to indicate that society can't stop all activities because the outcomes are unknown.

'Adaptive Management' is also a good buzzword to be used in this context, but it couldn't be more applicable. In their view, if problems arise, the project can always be stopped. Some of the fishers have pointed out, however, that in practice this doesn't always happen.

Witness Nova Scotia's first venture into tidal power generation with an enclosed tidal race turbine in Annapolis Royal, installed by Nova Scotia Power Inc (an Emera company) in 1984. This project had obvious effects which were well-documented, damaging and killing fish which had to pass through the turbine, located in a causeway between a tidal basin and the sea, and even changing

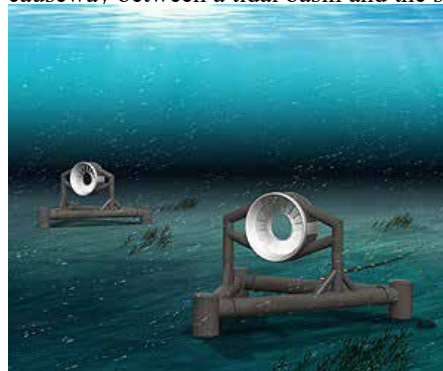


Figure 2. Configuration of turbine deployed in Minas Passage in 2011.

the size structure of some migratory populations which made it through or around the turbine and continued to survive upstream.

If governments want to reap the big benefits of tidal development, they have to be prepared to wield 'a big stick' and stop projects when harm to the

environment is shown. With Annapolis Royal, as the fishers have pointed out, this didn't happen. At this political level, the concern expressed by fishers over the current project, has substantial credence.

Cape Sharp Tidal's OpenHydro and Emera partners, which are putting the big turbine in this year, have been most aggressive, deploying the first test turbine at their site in 2011. The smaller turbine placed then, like the current models, resembles a cowled fan (think jet engine, see illustration) but with a donut shaped hole in the centre. That effort proved underdesigned for the tidal conditions and turbine blades broke—bringing an end to the test—within three weeks.

The newer turbines are larger and grid-connected. When they get in—if they get in—there will be a surge of energy and support for tidal energy from some of us, and a surge in anxiety over the fate of the precious Bay of Fundy resources for many. Let's hope the overall outcome is positive.

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TERRITORIES News

Submitted by Anne Wilson, CSEB Vice President.

NWT and NU Regional Update:

The Sept. long weekend was spent taking a long drive to Yellowknife (from Edmonton) and back. The fall colors are a little different this year – more oranges in with the yellows of the birch and other deciduous trees, and the tamarack are already bright golden in places. Water levels have recovered somewhat, with decent rains bringing early relief from the forest fire season compared to the last two years. I was taken aback at the expanses of burned forest that were seen all the way from Yellowknife to south of Fort Providence. For the first time I can remember, we saw no bison on the highway in the Mackenzie Bison sanctuary. Local opinion is that with the extensive burned areas, there is a lot of the initial successional vegetation available to the bison, and they don't have to go to the ditches to graze.

I have been working with my northern colleagues on the upcoming Canadian Ecotoxicity Workshop, to be held in Edmonton Sept. 25-28, 2016, and the strong scientific program will include numerous presentations on research and issues that are relevant to the North. Information is available at <http://ecotoxcan.ca>. I'm really looking forward to seeing long-time colleagues and friends at the CEW!

Mining and Other Development News

There continues to be activity in the mining sector, although economic conditions have affected the industry. Ongoing environmental assessments (EAs) underway in the NWT and Nunavut include:

- Agnico Eagle has submitted the Final Environmental Impact Statement for its Amaruq satellite resource ore body, called "Whale Tail" project. This would extend the mine life by several years, with ore trucked to the Meadowbank mill via a 50 km road. Technical meetings and hearings will be scheduled for fall/winter.
- Sabina's Back River gold project (NU) received a surprise decision from the Nunavut Impact Review Board (NIRB) – it was rejected, primarily on the basis of concerns for caribou impacts. This decision is being challenged by various groups, including local Inuit associations, who are asking the federal Minister to reject the report's decision.
- TMAC Resources received a positive decision from the NIRB, for its proposal to bring the Doris North gold mine into production with expanded operations in the Hope Bay Belt. Water licence hearings are scheduled for Sept. to amended terms and conditions.
- Submission of the Hope Bay Phase 2 development proposal is expected this fall.

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- **Prairie Creek Mine (Canadian Zinc Corp.):** The road Environmental Assessment continues, with another round of information requests to the company. The company is also working to assemble financing needed to take the mining project into production.
- **No recent progress on the environmental assessment of an access road upgrade in Howard's Pass** through the western NWT, for the Selwyn mine project (YT). The Terms of Reference have been issued, and scoping is still underway.
- **Baffinland's Mary River project** has applied to increase the shipping season to year-round; the Phase 2 EIS submission is expected this fall.
- **Revised terms of reference** were issued last February for the impact assessment of the Mackenzie Valley Highway project, now reduced to 333 km of all-season gravel road connecting Wrigley and Norman Wells. This EA is still waiting on the submission of the Developer's Assessment Report.

In the regulatory forum there is ongoing activity for various proponent, whether they are moving towards development or have applied for amendments to their water licences, or renewals.

- **Jay Pipe Expansion - Ekati Diamond Mine (Dominion Diamond Ekati Corp).** The Jay Pipe is located under Lac du Sauvage, and is proposed to be accessed by constructing a ring dike around the kimberlite pipe. Following on the positive Environmental Assessment decision, the company is has applied for a water licence amendment which would allow construction and eventual discharge of effluent into Lac du Sauvage and Lac de Gras. Technical meetings are scheduled for October, and hearings for Dec.
- **Snap Lake Diamond Mine (DeBeers Canada Inc.)** continue to develop closure plans while in care and maintenance status.
- **Diavik** continues with the second season of construction of the A21 dyke, to allow them to access ore from an underwater pipe. They had applied for an amendment to how TSS is regulated under their water licence, and were surprised with an amendment that was more stringent than the original conditions they were seeking relief from. Diavik ultimately withdrew the original amendment request, and is back to the original terms.
- **North American Tungsten Limited's Cantung Mine** is being managed by the federal government, which has custody and control of the site and is sorting out what plans and licence requirements need to be met in closure status.
- **Fortune Minerals** has not advanced further, and is working on financing to move the project to construction. The road access issue is being addressed with the territorial government proposing construction of an all-season road.
- **DeBeers Canada Gahcho Kue Diamond Mine** is moving from construction to operations now, becoming the third operating diamond mine in the NWT. Their Interim Closure and Reclamation Plan is currently out for review – “begin with the end in mind” is a really good planning approach.
- **The Avalon Rare Metals project** is on hold, due to financing.
- **Agnico Eagle Mines' Meliadine Gold project** is continuing exploration activities, but also constructing water management structures and infrastructure in anticipation of moving to full mine construction in 2017.
- **The Lupin gold mine** has been in “care and maintenance” for years, and the new owners have renewed the water licence with the stated intention of developing the Ulu deposit and reopening the mill. There are some administrative issues to work out first though, and monitoring requirements are outstanding.
- **The Giant Mine Remediation project team** is exploring remedial development options prior to submitting an updated water licence application. Terms of the long-expired water licence still apply however, and the mine is still complying with the MMER requirements.
- **The Iqaluit water licence renewal** was issued, and good progress is being made on waste management issues. The Sept. 7th announcement of federal funding for the wastewater treatment plant was very good news!
- **Other municipal water licences** are being renewed, with site specific evaluations of the terms and conditions, as the Wastewater Systems Effluent Regulations don't apply north of 60.
- **The DND military base at Alert** has applied for a water licence renewal. The interesting thing here is the difficulty in treating wastewater when the summer lasts only about 6 weeks!

Full details for current environmental assessments are available on the Board's web site at <http://www.reviewboard.ca/registry> and regulatory files at <http://www.mvlwb.ca/Boards/mv/SitePages/registry.aspx>.

Closing:

If you are connected to activities in the Yukon, NT or NU, there is a vacancy for a Director, and I would love to welcome someone on board. If you are doing work north of 60 that you would like to highlight in the newsletter, or running some seminars or other training opportunities, please let us know. The CSEB provides a valuable networking and communication forum, and a voice for biologists if there are any issues to be raised. 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.wilson2@canada.ca.

UPCOMING Meetings

Canadian Society of Environmental Biologists Webinar Series:

Dr. Sarah Dudas, Impact of microplastic contamination in marine foodchains. Monday October 17 at 11 am (Pacific Standard Time). For more information, see <https://cseb-scbe.org/>

Canadian Climate Forum : Symposium 2016 - Moving Towards Sustainable Energy. October 20-21, 2016, Ottawa ON. For more information, see <http://www.climateforum.ca>

FNPA Energy Forum: First Nation Renewable Energy in Saskatchewan. November 16, Saskatoon SK. For more information, see <http://www.fnpa.ca/Events>

Canadian Conference for Fisheries Research and Society of Canadian Limnologists Annual Meeting. January 5-8, 2017, Hyatt Regency, Montreal, QC. For more information, see <http://www1.uwindsor.ca/glier/ccfr/ccfrccrp-2017>.

IAIA17. Impact Assessment Conference 2017. Apr 4 - 7, 2017, Montreal, QC. For more information, see <http://conferences.iaia.org/2017/index.php>

The Children & Nature Network International Conference: Kids Need Nature, Nature Needs Kids. April 18-21, 2016, Vancouver, BC. For more information see <http://cwfcfc.org/en/events/conferences/the-children-nature-network.html>

International Conference on Water, Informatics, Sustainability, & Environment - iWISE2017. July 3-5, 2017, Ottawa, ON. For more information, see <https://www.sciencetarget.com/iwise2017>

ICCE 2017. 6th International Conference & Exhibition on Clean Energy, Aug 21 to Wed Aug 23, 2017, Toronto, ON. For more information, see <http://icce2017.iaemm.com>

American Fisheries Society 147th Annual Meeting. August 20-24, 2017, Tampa Florida. For more information, see <http://afsannualmeeting.fisheries.org/>

NOTICE OF CSEB ANNUAL GENERAL MEETING

To be held on
in Early December, 2016

By Webinar

Date and Time to be Announced

Please check CSEB website
for login details

CALL FOR NOMINATIONS:

Positions Available Include the Following:

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Please submit nominations or interest to
anne.wilson2@canada.ca

by

November 1, 2016

CSEB Newsletter Contributors Needed

CSEB has need for Regional Newsletter Contributors and Guest Editors for special editions of the quarterly newsletter.

If you are interested in contributing, please contact Gary Ash at garyash@shaw.ca. It is not an onerous task, and will greatly help strengthen the organization.

Your help would be greatly appreciated.

CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS

LA SOCIÉTÉ CANADIENNE DES BIOLOGISTES DE L'ENVIRONNEMENT

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Associate Members: persons who support the purposes and activities of the Society but who do not qualify for Regular or Student membership.

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