Vol. 76, Number 2 • Summer 2019

THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Bulletin

In this Issue:

CSEB Bulletin SCBE

VOLUME 76, ISSUE 2, Summer, 2019

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

Webmaster: Brian Free • Email: bfree@cseb-scbe.org

In this issue

Date of Issue - July 2019

Printed in Canada ISSN: 0318-5133

Front Cover: Aquatic monitoring, South Macmillan River, YT.

Back Cover: Top: Baseline aquatic assessment, Damoti Lake area, NT. Bottom: *Eriophorum vaginatum*, Kitikmeot Region, NU.
Photo Credits: Sharleen Hamm, CSEB Territories Director.

CSEB BULLETIN 2019

Vol. 76, Number 2, Summer 2019

The Canadian Society of Environmental Biologists Bulletin is a quarterly publication. The Bulletin 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 Bulletin 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.
Editor: Gary Ash
Layout: Gary Ash
Printing: Lasertext Digital Print & Copy Centre, Edmonton, AB.

LE BULLETIN de la SCBE 2019

Vol. 76, Numéro 2, Été 2019

Le Bulletin de la SCBE est une publication trimestriel de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activité 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 diverssifié d'environnementalistes Canadien. Les membres sont invités a contribuer des articles, photos (noir et blanc) ou des messages qui sont d'intérêt nationale en sciences biologiques et environnementales. Les lettres à l'editeur sont bienvenues.

Tout la correspondence 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'editeur: Gary Ash, Editor, courriel:** garyash@shaw.ca
Rédacteur en chef: Gary Ash
Impression: LaserText Digital Print & Copy Centre, Edmonton, AB.

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 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.

NATIONAL News

PRESIDENT'S Report

By Curt Schroeder, CSEB President

I'm sure many CSEB members have been following the Trans Mountain Pipeline saga. The Federal Court overturned the initial authorization by Cabinet, and further consultation was required to get NEB approval. he proponent re-initiated Phase III consultations, which included any new information related to the impact of increased oil tanker traffic and the impact on the Salish Sea's southern resident killer whales and prime Chinook salmon feeding grounds. It seems this project planning and environmental reviews have now run their course. Upon consultation and resubmission, NEB approval was granted.

On June 18th, 2019, the proposed construction was approved by Governor in Council. The next phase includes NEB oversight on detailed route approvals and a public comment period. For those who have been involved in environmental assessments large or small, as I have in the past, the conclusion always seems a mixed blessing. Bill C-69 titled "The Modernization of the National Energy Board and Canadian Environmental Assessment Agency", just passed by Parliament this month (June) will overhaul the *National Energy Board Act* (NEBA) and the *Canadian Environment Assessment Agency Act* (CEAA). In its place the NEB will become the Canadian Energy Regulator with an altered federal environmental assessment process and a new "Impact Assessment Agency".

It would be appropriate for the CSEB to address these new environmental processes, as public comment is sought on this legislation. I hope we're up to this challenge.

All the best,
Curt Schroeder
President

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

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

Philosophy and Life's Realities

Does a Degree in Biological Sciences Make You Rich?

As we all know, doctors, dentists, lawyers and engineers tend to make a lot more than environmental biologists…but we do it because we love it…right?

Not surprisingly, the Institute for Fiscal Studies in the UK determined that Medicine and Dentistry were most likely to have the highest post-graduation income (five years post-graduation), followed closely by graduates from programs of Economics, Mathematics, and Veterinary Sciences. The potential earnings for Biological Sciences grads were 20 – 50% behind the highest post-grad income, about on par with Education, but somewhat higher than graduates of Arts, Psychology, and Communications.

What was most interesting was the effect of the choice of university on future potential earnings. While some of the biggest differentials are for universities with specialist course curricula (e.g., dance and drama focused schools experienced 2–3 times lower average incomes as compared to something like the London School of Economics), even broad curriculum universities experienced a range of average salaries from 1–2 times.

I guess the core message is, even though we are in it because we love it and will likely see lower income than others, choose your university carefully. And remember you are only in it for about 40 years and the doctors, dentists, lawyers, and engineers will have a lot more CPP and OAS clawed back at tax time.

Colliding Galaxies – The End is Near, Sort of!

Talk about environmental impact…the bad news is there is an impending collision between the Milky Way and Large Magellanic Cloud (LMC) that, if it happens, may spell the end for our galaxy. The good news is it is not a certainty and we have a bit of time to get ready for it!

The LMC is one of the many satellite galaxies that orbit the Milky Way. Researchers at Durham University (near Newcastle in the UK), reporting in the Monthly Notices of the Royal Astronomical Society, projected that, rather than spinning around and moving away from the Milky Way, as it is now, there is a possibility the LMC could turn back toward us and collide with our galaxy.

Don't go giving all your possessions away or selling your house and moving into an underground shelter! The folks at Durham figure the chances of imminent demise were only 1 – 3%, and all of this will potentially happen in about 2.5 billion years.

There is actually some good news that would result from a collision with the LMC. If that happened, the resulting cosmic calamity will likely delay the apparently inevitable collision

of the Milky Way with the Andromeda Galaxy…in about four billion years.

2019 is the International Year of the Periodic Table

It is 2019 and chemists will get their recognition throughout the year. UNESCO (United Nations Educational, Scientific and Cultural Organization) has designated 2019 as the International Year of the Periodic Table of Elements. 2019 is the 150th anniversary of Dmitri Mendeleev's efforts to organize the increasing number of elements.

Personally, I won't be celebrating! If you were like me in undergrad, inorganic chemistry was something to endure rather than celebrate!

But chemists should probably not feel particularly special…2019 is also the Year of Indigenous Languages and the International Year of Moderation. Wildlife biologists should not feel left out though…2024 has already been pegged as the International Year of Camelids. Personally, I like llamas but I am always unsure of the proper pronunciation and I much prefer the scientific name… go *Lama glama*!

Emojis Matter, Apparently!

I have always had a problem with the "cartooning and personification" of animals! But, to tell you the truth I never paid attention to emojis…until now! You might not have noticed the addition of a squid emoji to Apple's arsenal. I'm not sure how you would use it but it is cute. It has also apparently annoyed biologists. The problem, (obvious in the image below) is the squid emoji is not anatomically correct.

Clearly, the siphon is on the wrong side of the body. The Monterey Bay Aquarium has entered into the debate and has asked for a correction.

The squid emoji was added to Apple's arsenal in 2016. This is not Apple's first biological error. Earlier last year, biological outrage erupted when Apple released an anatomically incorrect lobster emoji (lacking the correct number of legs). Apple has corrected that error but I don't have the interest to check if Apple has updated the squid!

By the way, other platforms must have environmental biologists on staff since the error does not appear to have been repeated elsewhere!

Anthropogenic Silence

Have you ever dreamed of a world without people? A group, Sounding Nature, can help (http://citiesandmemory.com/sounding-nature/) and provide a glimpse into parts of the world without that annoying anthropogenic noise!

Sounding Nature and its producing company Cities and Memory has collected more than 500 recordings of natural sounds from more than 50 countries.

They have created a map with natural sounds from around the world along with a "re-imagined sound" using various musical artists.

If Concrete Were a Country!

Let's play a game – if Concrete were a country, what would its greenhouse gas emissions be? The answer may surprise you.

The use of concrete is thought to have begun about 8000 years ago in Syria and Jordan to build structures such as floors and underground cisterns. The Romans further refined the use of concrete and used it to manufacture much larger and more complex above-ground structures. But it wasn't until the 19th Century when modern cement evolved in England (Joseph Aspdin) that modern concrete was born and began to cover the earth.

According to Chatham House (The Royal Institute of International Affairs, London) cement is the source of about 8% of the world's CO_2 emissions. If it were a country, it would be the third largest emitter of CO_2, behind China and USA. Cement production dwarfs the contribution of the aviation industry (2.5%) and is close behind global agriculture (12%).

Poured, formed, or bricked, concrete is globally ubiquitous. Cities tend to be recognizable by their concrete buildings, both positively and negatively!

The demand for concrete is expected to double over the first half of the 21st Century. Unfortunately, the new process for making cement (high thermal combustion needs) and an apparently insatiable demand for concrete since the discovery of Portland cement has put this material squarely in the sights of greenhouse gas emission reduction proponents.

A Harsh Lesson in Reality for Flat-Earthers

In an interesting twist, flat-earthers have the opportunity to join a dedicated cruise to rub shoulders with like-minded individuals and help galvanize their beliefs.

But they might not want to visit the bridge of the cruise ship or at least close their ears when the ship's crew describes the navigation system that helps the crew determine where they are. There is a clue in the name of that system…GPS, aka Global Positioning System. That system relies on the fact that the earth is not flat!

GPS relies on a system of 24 main satellites around the earth. A minimum of three satellites is needed to determine a position of any one ship. If the earth was a flat disc, those three satellites may be adequate. But because travellers in all parts of the globe want to know where they are, more satellites are needed to provide line-of-sight coverage for all locations around the globe.

I am sure the flat-earthers have a response to this inconvenient fact…"it is all part of the scam".

Of course, all of the ships in the world's oceans that have GPS, including the one I used to have to go chasing salmon and halibut, would have to be in on the earth-is-a-globe scam. All ships navigate on the principle that the earth is round……or do they?

forestry
university of british columbia

CoAdapTree
Healthy Trees for Future Climates

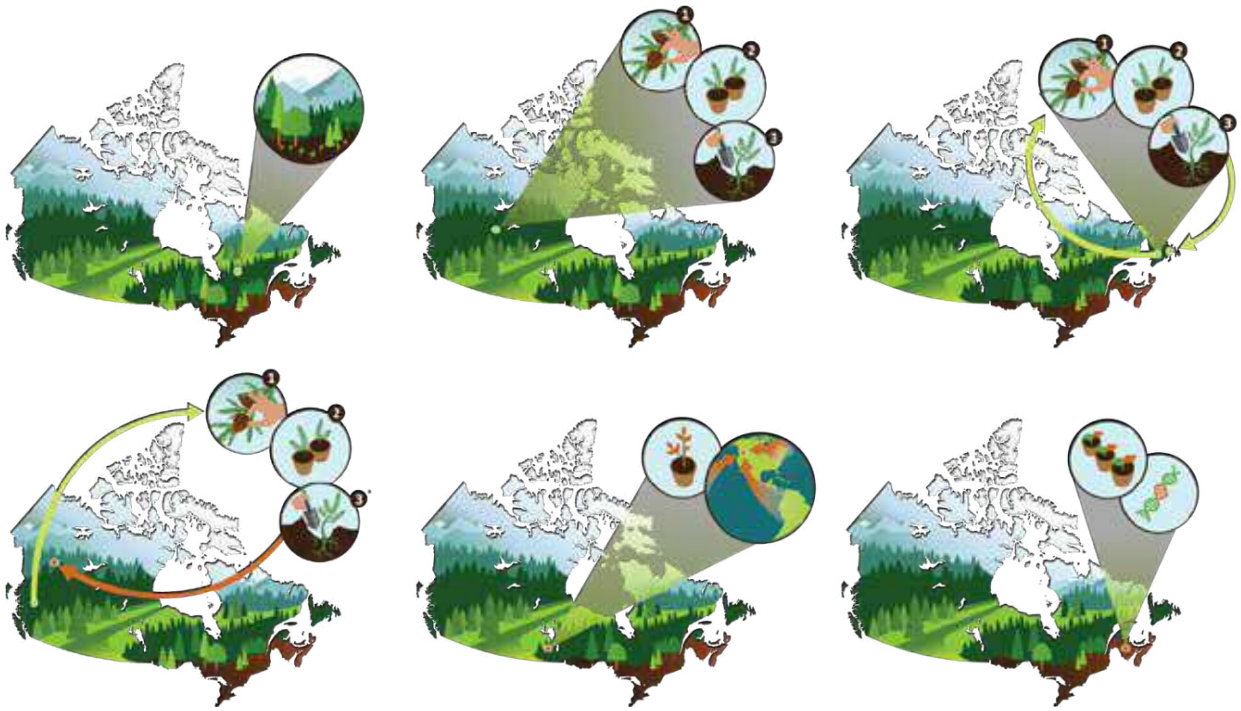
Which reforestation practices should be used to adapt to climate change?

Researchers from the University of British Columbia invite forestry and conservation practitioners and scientists to share their views about reforestation strategies to adapt to climate change in Canada's forests. The questionnaire will require approximately 15 minutes to complete.

15 prizes of $100 will be raffled. Winners will be given the choice of either donating the money to a charity of their choosing or receiving a gift card.

Follow this link to the survey:
https://ubc.ca1.qualtrics.com/jfe/form/SV_6tV5YO8ZOLEZ9Rj

Une version française est aussi disponible:
https://ubc.ca1.qualtrics.com/jfe/form/SV_6tV5YO8ZOLEZ9Rj?Q_Language=FR-CA



forestry
university of british columbia

CoAdapTree
Healthy Trees for Future Climates

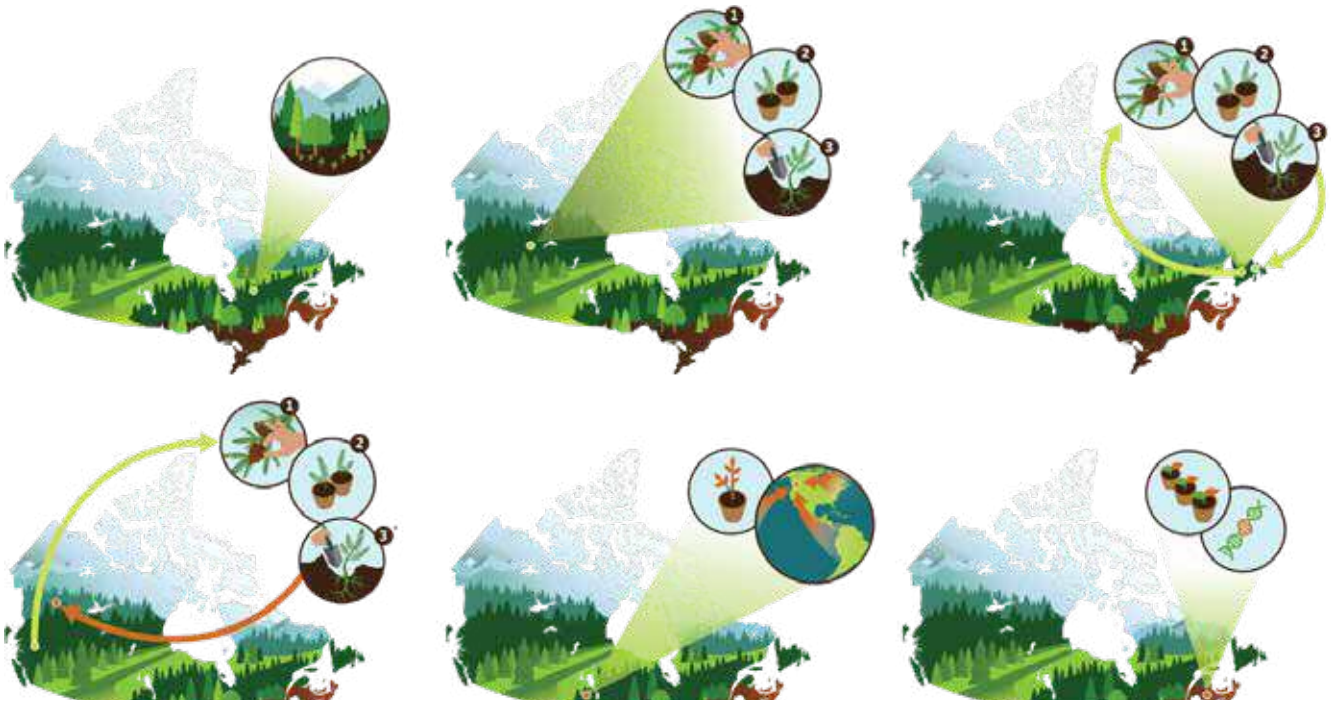
Quelles pratiques de reboisement sont les plus appropriées à l'ère des changements climatiques?

Des chercheurs de l'Université de la Colombie-Britannique invitent les praticiens et scientifiques des forêts et de la conservation à partager leurs points de vue sur les stratégies de reboisement pour l'adaptation aux changements climatiques dans les forêts du Canada.

Le questionnaire nécessitera environ 15 minutes à compléter. 15 prix de 100 $ seront tirés au sort parmi les participants. Les gagnants auront le choix de remettre leur prix à un organisme de bienfaisance de leur choix ou de recevoir une carte-cadeau.

Suivez ce lien URL vers le sondage:
https://ubc.ca1.qualtrics.com/jfe/form/SV_6tV5YO8ZOLEZ9Rj?Q_Language=FR-CA

An English version is also available:
https://ubc.ca1.qualtrics.com/jfe/form/SV_6tV5YO8ZOLEZ9Rj



Response Regarding Creation of Departmental Science Advisors

From: Message des sous-ministres / Message from the Deputy Ministers (EC) <ec.messagedessousministres-messagefromdeputyministers.ec@canada.ca>

Sent: July 2, 2019 7:00 AM

To: EC.F EC (All\Tous) DOE \ MDE F.EC <EC.ECAllTousDOEMDE_ET.EC@canada.ca>

Subject: Nomination du premier conseiller scientifique ministériel d'ECCC / Appointment of ECCC's first Departmental Science Advisor

English follows

La science est le fondement du travail d'Environnement et Changement climatique Canada (ECCC). Elle appuie l'élaboration de notre réglementation, l'application des lois environnementales, nos services météorologiques et climatiques et constitue la base de notre leadership national en matière de lutte contre les changements climatiques.

Le 28 novembre 2018, ECCC a lancé un processus de recrutement d'un conseiller scientifique ministériel. Aujourd'hui, c'est avec grand plaisir que nous annonçons la nomination de Shawn J. Marshall, de l'Université de Calgary, au poste de premier conseiller scientifique ministériel d'ECCC, à la suite d'un processus de sélection ouvert, transparent et fondé sur le mérite. Nous aimerions profiter de l'occasion pour féliciter et souhaiter la bienvenue à M. Marshall dans la famille d'ECCC.

M. Marshall est un professeur accompli du département de géographie de l'Université de Calgary et compte plus de 100 publications évaluées par des pairs. Son intérêt pour la recherche glaciologique sur le terrain et sa carrière universitaire l'ont amené à s'intéresser aux processus glaciers-climat et à la réaction des glaciers aux changements climatiques.

M. Marshall relèvera du sous-ministre au cours de son échange à temps partiel de deux ans. Plus précisément, il fournira des avis d'expert aux sous-ministres concernant la manière de favoriser une culture de l'excellence scientifique, d'exploiter les possibilités de partenariats et de collaboration supplémentaires avec les chercheurs et les réseaux externes et de miser sur les perspectives en matière d'activités scientifiques externes pour appuyer les priorités scientifiques. Il participera également à des discussions interministérielles de haut niveau sur les sciences au gouvernement et collaborera avec le conseiller scientifique en chef et les conseillers scientifiques des autres ministères et les organismes à vocation scientifique.

Nous sommes impatients de travailler en étroite collaboration avec Shawn J. Marshall pour promouvoir une solide culture de la recherche scientifique et de l'innovation au Canada.

Stephen Lucas
Sous-ministre
Martine Dubuc
Sous-ministre déléguée

Science is the foundation of ECCC's work. It supports our regulatory development, environmental enforcement, our weather and climate services, and it is the basis of our national leadership to take action on climate change.

Back on November 28, 2018, ECCC launched a process to recruit a Departmental Science Advisor. Today, it is with great pleasure that we announce the appointment of Dr. Shawn J. Marshall from the University of Calgary, as ECCC's first Departmental Science Advisor, following an open, transparent, and merit-based selection process. We would like to take this opportunity to congratulate and welcome Dr. Marshall, as part of the ECCC family.

Dr. Marshall is an accomplished professor at the University of Calgary in the Geography Department with over 100 peer-reviewed publications. His interest in field-based glaciological research and his academic career have focused his interests in glacier-climate processes, and glacier response to climate change.

Dr. Marshall will report to the Deputy Minister during his two-year part-time interchange. More specifically, he will provide specialized advice on how to encourage a culture of scientific excellence, harness opportunities for additional partnerships and collaboration with external researchers and networks, and leverage external science perspectives on science priorities. Dr. Marshall will also participate in senior level interdepartmental discussions on government science, and collaborate with the Chief Science Advisor and science advisors from other science-based departments and agencies.

We look forward to working closely with Dr. Marshall to promote a strong culture of scientific research and innovation in Canada.

Stephen Lucas
Deputy Minister
Martine Dubuc
Associate Deputy Minister

Update on the New *Fisheries Act* – The Senate Bids Farewell to the "Deeming Provision"

Michael Finley, Associate, Gowling WLG

June, 2019

On May 27, 2019 the Standing Senate Committee on Fisheries and Oceans released its report on Bill C-68, the new federal *Fisheries Act* (the "Act"). A previous article discussed the Act's broader protections for fish and fish habitat, including changes to the definition of "fish habitat". Of particular interest was the introduction, at the House Committee stage, of a "deeming provision" that deemed water flow (previously understood to be a component of habitat) to be fish habitat itself:

> 2(2) For the purposes of this Act, the quantity, timing and quality of the water flow that are necessary to sustain the freshwater or estuarine ecosystems of a fish habitat are deemed to be a fish habitat.

The proposed change in definition prompted expressions of concern even before Bill C-68 came before the Senate Committee. The Minister of Fisheries, Oceans and the Canadian Coast Guard acknowledged this in his speech introducing Bill C-68 at the Senate:

> I also know there has been a lot of concern in relation to the flow amendment in proposed section 2(2). That amendment was made in the house committee by MP Elizabeth May. Again, as indicated at second reading, we are open to amendments that will strengthen the bill to provide better certainty for proponents while also ensuring that fish and fish habitat are protected.

The Senate Committee heard from a variety of stakeholders, including farmers' organizations, forestry interests, and major hydroelectric operators from different provinces, all of whom were specifically concerned about the "deeming provision" in s. 2(2). These witnesses generally noted the deeming provision compounded their already-existing concerns about the breadth of the Act. In particular, they were worried that (1) this provision could imply onerous permitting obligations with respect to management of insignificant bodies of water (like ditches or agricultural ponds) and (2) might impair daily operations at dams and other control structures that routinely alter flow for various reasons, including to protect the safety of downstream residents.

Witnesses also expressed concerns with respect to the inclusion of "water frequented by fish" in the definition of Fish Habitat with respect to, and jurisdictional overlap, given flow regimes are governed by a variety of provincial statues such as the Ontario *Water Resources Act*. Representatives of hydro-power operators noted, for example, that they believed that consideration of flow was already embedded in everything they did, from water management plans, to permits and operational decisions.

The Senate Committee, based on this testimony, removed s. 2(2) from Bill C-68 and also removed the phrase "water frequented by fish" from the definition of "fish habitat". That definition is now limited to areas "on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas". Regarding the change to the definition of "fish habitat", the Senator moving for the amendment noted that:

> "The committee heard evidence from witnesses that by including "water frequented by fish" in the definition of fish habitat, it would result in locations that are not essential for the fisheries life cycle process to become subject to the Act. […] As you're aware, we have also heard similar concerns for the definition of the water flow, that it would place an abundance of administrative and operational and financial burdens on industry, municipalities and DFO.
>
> With the amendment to remove the "water frequented by fish," we maintain the important protection to the essential areas to life cycle processes while having a balance that will not distribute and complicate the work for the different industries, such as mining. By taking out the "water frequented by fish" from the definition, we are achieving the important balance of essential protection to fish habitat while allowing industry to maintain their work and not to overly burden DFO with further administrative work."

There was essentially no opposition from senators to removing the deeming provision at s. 2(2). In fact, that amendment was proposed by the government itself, through its Government Representative in the Senate:

> I understand from transcripts and seeing the committee reports that you heard from numerous witnesses that the addition of 2.2 is problematic and creates uncertainty, particularly in the agricultural context, due to the lack of clarity.
>
> As the Government Representative in the Senate, you recall during second reading debate that I committed to this change in response to Senator Plett's comments. I'm now fulfilling that commitment with the amendment you have before you.

These approvals will be welcome to those parties who are concerned about the potential breadth of the new *Fisheries Act*. Nonetheless, clarity is still required. It is expected that this clarification will be provided through a number of further documents, including codes of conduct for particular industries (agriculture, for example) and through regulations.

As for the timing of the further documents, the Fisheries and Oceans Canada representative present at the hearing suggested that a list of designated projects, for the purposes of Bill C-68, may be created through regulations within 18-24 months, in consultation with stakeholders. The same representative noted that codes of conduct and standards with respect to matters such as agricultural water management are intended to be developed within the first year of the Act coming into force.

Political Winds Blow Northward

Adam Chamberlain and Chris Hummel, Gowling WLG
June, 2019

The Arctic has a very long history of avoiding the limelight. But, with the relentless changes related to climate change and escalating rhetoric over territorial sovereignty, the Far North increasingly finds itself at center stage.

As both a bastion of ecology and culture and a trove of untapped resources, the Arctic is no stranger to the tension between environmental protection and economic progress. Recent milestones in both Indigenous territorial conservation and international geo-politics highlight the recurring themes that shape Arctic governance, and set the stage for the significant changes that lie ahead.

Thaidene Nëné and Tallurutiup Imanga – Indigenous groups lead the charge on conservation

While international geo-politics swirl, Canadian Indigenous groups in the north have embarked on land protection initiatives of a significant scale. In the Northwest Territories, Thaidene Nëné National Park Reserve has entered Preliminary Screening following a proposal from Dene and Métis governments. Meanwhile, in Nunavut, Inuit organizations continue negotiations for some of the world's largest marine protected areas.

Thaidene Nëné means 'Land of the Ancestors' in the Dënesųłiné language. The proposed Thaidene Nëné protected area would span over 26 000 km^2. Of that, 14 000 km^2 would form the National Park Reserve land.[1] The proposed area, found northeast of Lutsel K'e First Nation, was proposed by Akaitcho First Nations, Northwest Territory Métis in consultation with Tlicho Government and North Slave Métis Alliance. These Governments are in the middle of negotiating with the Government of Northwest Territories, Parks Canada, and various Indigenous Governments.[2]

The park would protect Crown Lands surface and subsurface rights from disposition, but also protect existing third party leases.[3] The scale of this park is significant and there are many in the resource extraction sector who are concerned that it will have significant negative implications for the mining sector in the Northwest Territories and the potential growth of high value jobs in the coming decades. This concern is highlighted by the fact that currently operating diamond mines will reach the end of their operating lives in the not too distant future.

In Nunavut, negotiations continue for Tallurutiup Imanga – one of the world's largest marine protected areas, proposed at 109 000 km^2. Tallurutiup Imanga – a joint effort between the Qikiqtani Inuit Association and Parks Canada – would limit submarine oil exploration and establish a Guardian program to integrate traditional knowledge with ecological monitoring and park management.[4] Negotiations have proceeded rapidly and may reach an agreement prior to the upcoming federal election.

Additionally, in April 2019, QIA and Parks Canada announced an intention to negotiate the creation of yet another large marine protected area, known as Tuvaijuittuq, in the High Arctic surrounding Ellesmere Island.[5]

The trend towards northern territorial protection demonstrates a desire to balance development and conservation, and signals the concurrent interests of Indigenous and federal governments in asserting international sovereignty over Arctic lands and waters.

One additional and less discussed issue in the examples described above is the involvement of other stakeholders in these processes. To varying degrees, industry, affected communities and governments have (from time to time) expressed concerns that their input may not have been considered by the principal players in these initiatives. Bringing everyone to the table is not always as easy as it might sound, especially in the massive geography of the Canadian North.

1 Government of the Northwest Territories, *Establishment of the Territorial Protected Area of Thaidene Nene under the proposed Protected Areas Act (2019 May)*

2 Mackenzie Valley Review Board, Preliminary Screening of a Proposal to Establish Thaidene Nene National Park, (2019 May 8), available at http://reviewboard.ca/registry/preliminary-screenings.

3 Preliminary Screening of a Proposal to Establish Thaidene Nene National Park

4 Parks Canada, Parks Canada announces funding to Qikiqtani Inuit Association for pilot Guardian program in Arctic Bay, (2018 July 18) https://www.canada.ca/en/parks-canada/news/2018/07/parks-canada-announces-funding-to-qikiqtani-inuit-association-for-pilot-guardian-program-in-arctic-bay.html.

5 Nunavut News, More marine protected areas may be on the way near Nunavut northernmost hamlets, (2019 April 19). https://nunavutnews.com/nunavut-news/more-marine-protected-areas-may-be-on-the-way-near-nunavut-northernmost-hamlets/.

REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

BC Adrift in a Time of Environmental Emergencies

"To me the land does not stop when it dips into the ocean."
- Nicolaisen in Robert Macfarlane Underland (2019)

At a time when the failure of BC's government to live up to to its electoral promises on the environment has become so notorious that it makes national headlines with titles such as: "*A change in government fails to alter BC's environmental path,*"[1] the recent announcement that BC will not be implementing a "Species at Risk Act" anytime soon[2] comes as the coda on a dystopian rhapsody.

Talk of a " BC Endangered Species Act" may just be that. Species protected by the Federal *Endangered Species Act*, receive little protection from mining and forestry interests in BC, as the recent loss of endangered whitebark pines indicates.[3]

The continued absence of an enforceable regulatory instrument to protect species at risk in BC comes at a time when data show that we face an unprecedented biodiversity collapse. For informed scientists, the data are clear. Since 1970, wildlife populations around the world have collapsed by 60%. In Canada, 50% of wildlife species are currently in decline.[4] Recent work documents accelerated plant extinctions.[5] In BC, the continued collapse of caribou populations, and the provincial inability to initiate a recovery plan,[6] are indicative that the environment is not the government's priority. Resource development continues to be the priority.

This abdication of environmental leadership comes at a particularly critical time for the web of life, which decades of unsustainable exploitation, pollution, overfishing, and economic pillage have brought to a perilous brink.

In the wake of a succession of disturbing UN IPCC reports issued this fall and over the past three months, Environment Canada has released a report indicating that northern Canada is warming twice as fast as the global average.[7] Although the problems posed by global development and climate change have been known for about 50 years, the sense of the inevitable extreme urgency of the state of the planet has really started with Global Outlook 6,[8] and includes a more recent assessment of concerns for human health.[9] There seems to be a growing realization that the concerns that this presents for climate change is no longer a remote future concern, but a present everyday reality whose progress seemingly outstrips our collective ability to respond.

In early May, the IPBES report confirmed that we face the potential loss of over one million species in a biodiversity collapse accelerated by climate change.[10] Additionally it is becoming clear that there is a logical correlation between the decline in 75% of insects, 75% of insectivorous birds, and 75 to 80% of wetlands. An increasing number of municipalities have been declaring "climate emergencies", and now even the national government has joined in. (Whether that declaration is mere political posturing is a separate question.)[11] There seems to be a sudden realization that "the system" has failed and continues to fail, particularly among a younger generation that faces a 10 to 12 year horizon in which to turn around a global climate emergency, which is related to a wetland emergency and a forest emergency. Things have finally reached a point at which mainstream media is willing to admit that the "new normal" is abnormal.[12]

In a time of global ecological crises, how exactly is BC responding?

The answer to that comes daily in the form of broken political promises and government actions that place polluters and environmental vandals above the law. Just as Canada seems to have a problem with "the rule of law" as illustrated by the SNC Lavalin scandal, so does BC. The progress of the environmental crisis is intimately related to the deterioration of "rule of law", as highlighted by the special rapporteur to the United Nations.[13]

No event in BC brings this out more than the response by both NDP and Liberal governments over the past five years to the Mount Polley Mine disaster. The parent company of the Mount Polley Mine, Imperial Metals Inc., continues to operate as a respectable corporate citizen as it receives further license to continue to discharge heavy metals into Quesnel Lake. Over the past five years, Imperial Metals has never faced any fines, penalties, or charges.[14] The Ministry of Environment has even retroactively altered and amended mining plans and permits to enable the offender to escape any public prosecution whatsoever. In fact, in the face of a lack of government will to press charges, private prosecution undertaken by Chief Bev Sellars was taken over by the Office of the Attorney General, so that government could drop said charges, and continue to protect Imperial Metals.[15]

In keeping with the analyses of University of Victoria's "West Coast Law", BC does not seem to enforce its own environmental laws, and has a policy of not allowing private environmental prosecutions that might enforce them. Given that the government treats citizen's directly affected by corporate misdemeanours as "special interest groups", it deems that it has the exclusive right, to determine what is and is not "in the public interest." On this basis, it also deems that it has the right to disregard public concerns and interfere in the legitimate pursuit of justice, contrary to normal public expectations. In BC, environmental offenders are demonstrably exempt from the rule of law.

This is not the only high profile instance of "legal protectionism"[16] currently under public scrutiny. After decades of public, First Nations and environmental concerns and mounting scientific data, over the levels of selenium and other heavy metals emanating from the Teck Resources coal mines in the Elk Valley, for which the Horgan government is proposing to issue more permits, American senators have had to intervene and demand that BC enforce its laws and respect international treaties.[17]

Not too surprisingly, the subtext of this legal protectionism is the fact that BC government officials and Canadian commissioners on

the International Joint Commission do not respect the importance of objective scientific data. Politics take precedence over science, and law. Therefore, it comes as no surprise that American representatives have justifiably lodged official complaints that Canadian commissioners have been knowingly suppressing data.[18] This seemingly regular practice seems to be a regrettably socially acceptable occurrence:

> "Last July, U.S. representatives on the commission accused Canadian commissioners of suppressing data on coal mining pollution flowing from BC's Elk Valley into Montana."[19]

In brief, this means that the science behind BC's environmental laws is also tacitly considered to be dispensable. Governments that pay lip service to the law, also pay lip service to science, and deliver neither to the public.

Laws are relatively simple. They constrain proximate causes of harm and the intentions driving them. If we stop to consider the difficulties inherent in twentieth-century legal precedents related to the prosecution of point source and non-point source pollution, the magnitude of the problems we now face is staggering.[20] Environmental problems that were theoretically solved by legislation decades ago, continue to be the subject of legal quarrels, as illustrated by subtle applications of the *Clean Water Act*.[21] Problems posed by the complex legacies that drive climate change, forest and wetland emergencies are daunting. In the absence of clear government leadership and respect for the rule of law, they become intractable.

Legally, we think in simple short-term proximate relationships. The problem that this poses is well illustrated by the recent discovery by Dr. Josh Kurek that the DDT legacy of forest spraying in New Brunswick between 1958 and 1968 still endures. The unclear implications of this and the limited ability of human beings to deal with the time-frame has been well-articulated by Dr. Jon Smol of Queen's University:

> "There's this legacy effect 50 years later in the aquatic ecosystem that has important implications for lake ecology. Nature is slow to pardon our mistakes and we're overly optimistic.
>
> "Governments think four years," Smol said. "CEOs, at best, seem to think in 90-day cycles.
>
> "Ecosystems don't keep a political or industrial timetable. Things happen on much longer time cycles."[22]

We focus perhaps too optimistically on nature's "resilience" to overcome the insults that our naive industrial age has inflicted. Characteristically, we overlook the processes which the legacy of these insults has disrupted or set into motion. As Smol and Kurek point out, DDT kills grazers and may be behind toxic algal blooms that have plagued freshwater lakes ever since the national DDT spraying programme. However, it is wrong to think of this problem as just a DDT problem. It is symptomatic of the cavalier way in which we treat the environment as collections of objects on the landscape for us to dispose of, as though our actions have no consequences. As Kurek notes:

> "You could substitute DDTs with plastic pollution, with greenhouse gases, with salting on our roads—any contaminant that you put in our environment over a massive region is going to have tremendous effects and sometimes surprise effects."

We are not equipped for the "surprises" left by legacies. If we focus only on nominal reductive categories, we are misled into believing that systems are by definition "resilient." In so doing, we overlook the processes associated with them, and how the modifications we make set in motion other heretofore unknown or unsuspected processes. We tragically dismiss the potential fragility of complex ecosystems that can, and often do, produce "surprise effects" and "unknowns" that are now rapidly mounting as climate change alters entire ecosystems.

In the cycle of natural events that track the passage of seasons in British Columbia, the annual March return of gray whales (*Eschrichtius robustus*) seen blowing off Amphitrite Point normally inaugurates the return of gentle weather. This year, the return has been marred by the death of over 140 gray whales (at last count at the time of writing this article) whose carcasses have washed ashore from Baja California to the coasts of the Bering Sea.[23] These 140 whales are a subsample of total losses out of a population of some 2,000 migrating individuals. Losses are estimates to be at a minimum of 280 individuals, given that a similar number is likely to have just died and sunk, without being washed ashore and recorded. That suggests that grey whale mortality since the beginning of the migration in February is at least 14% of the total population. Disturbingly, mortality appears to be related to starvation as a result of the effects of climate change on ocean productivity.

These numbers are not unique to grey whales. They seem to be symptomatic of the developing state of entire food chains. Thousands of common murres and tufted puffins have been washing up dead at St. Paul's island in Alaska, also showing signs of starvation.[24] In this respect the fate of the Southern Killer Whales should serve as a canary in the coal mine, as starvation has long been the usual source of mortality for that endangered species. There is an ongoing cascade of wildlife population collapses from caribou to shore birds to Chinook Salmon and to orcas. This is only a uniquely "whale problem" if we partition ocean ecosystems from terrestrial ecosystems. To do so overlooks the natural processes that they share, which makes our home an ocean-planet.

Although some terrestrial birds appear to be rebounding, the latest NABCI numbers from *The State of Canada's Birds* (2019)[25] indicate a 40% decline in shorebirds that depend on coastal productivity and a 57-59% decline in insectivorous birds that depend on grassland and wetland insect productivity (**Figure 1**). As noted by the authors of this latest report, declines in shoreline, grassland, and aerial insectivorous birds are driven by coastal land impacts, development and agricultural practices.

These numbers and trends in coastal declines should give a province that is so extensively and culturally dominated by its coastline cause to heed international calls for "transformative action."

It therefore is of some concern that BC's NDP government has not only reneged on its electoral promises, but has renewed the clear-cutting of some of Vancouver Island's last remaining productive old growth forests. This should not be taken as just a "tree-hugging" or "forest resources" issue. The destruction of

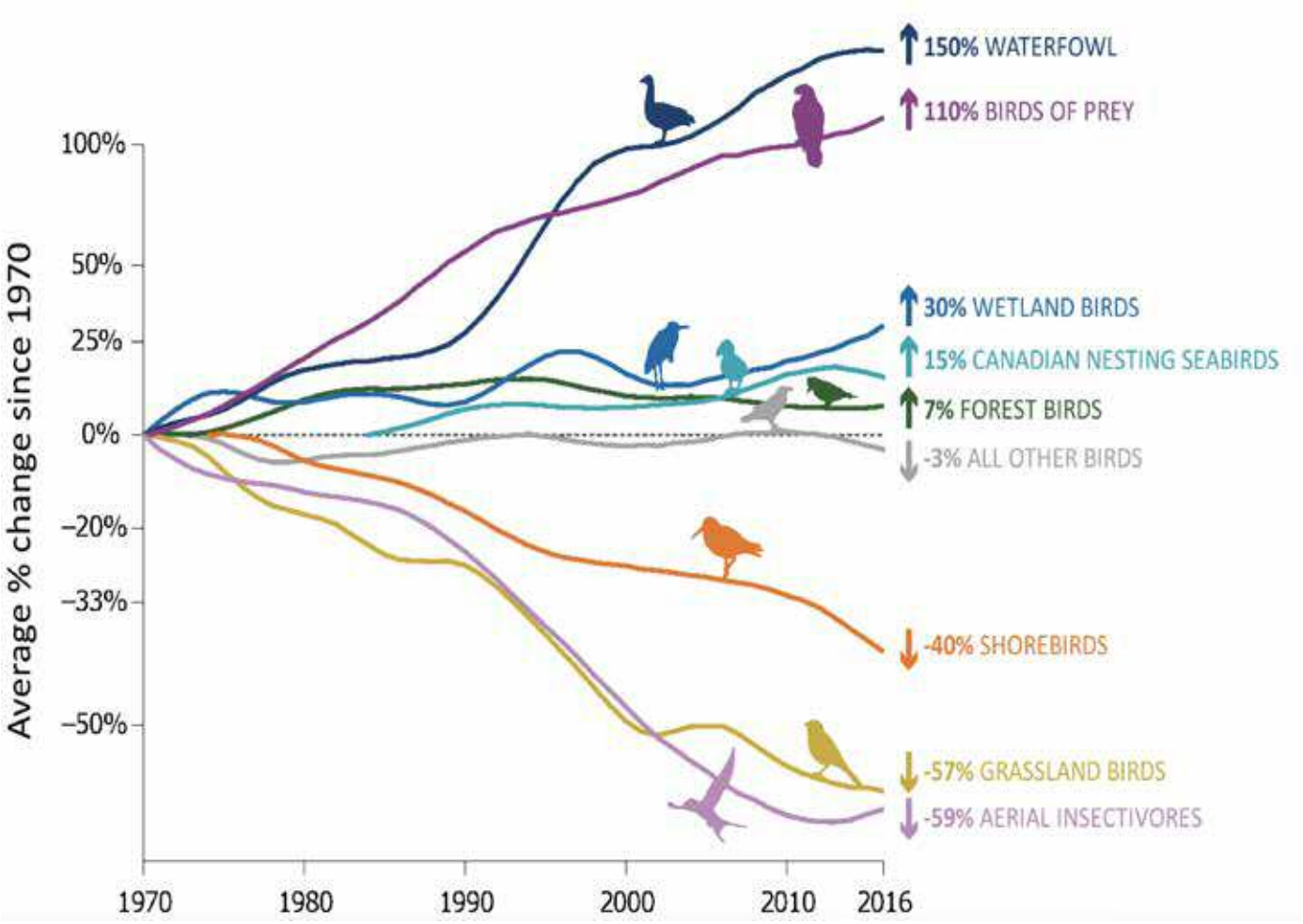


Figure 1: Graph of Trends in Canadian Bird Populations (NABCI, State of Canada's Birds Report 2019).

the last productive old-growth forests of Vancouver Island simply highlights the extent to which BC's government seems to be unaware of the biogeochemical process that sustain ecosystems. BC's government's destruction of old growth is drawing large protests by people concerned with the irreversible loss of old-growth forests, and the cultural values associated with them.

Absent from the discussion of old-growth is the role that they play in both regional climate control and in the productivity of coastal marine ecosystems.

The latter point is born out if we compare DFO's map of the productive critical habitat of the endangered Southern Killer Whales with the map of "Remaining Old-Growth Coastal Rainforest." As **Figure 2** indicates, Southern Killer Whale critical habitat corresponds to coastal old growth distribution from Bamfield to Sheridan Point, as well as areas around Mayne and Saturna Islands. The third critical habitat is the extensive wetlands of Point Roberts in the uniquely productive Fraser delta.

It is no coincidence that SKR critical habitat corresponds to the rich, wet humic productive areas of both endangered wetlands and endangered productive old-growth. Both are essential to the production of kelp forests, which are themselves essential to the herring cycle that maintains salmon, and in particular Chinook Salmon productivity. These ecosystems truly "hang together".

In destroying the one, BC's government destroys the other. It cannot realistically claim to care for whales while contributing directly to the destruction of old-growth forests essential to the production humic terrestrial inputs that make their critical habitat possible.

Coastal BC, as most of Canada, has lost about 80% of its wetlands. The Point Roberts wetlands are now threatened by a vast, and extremely controversial extension of Port Vancouver.[26] The Point Roberts wetlands are an essential staging ground for millions of birds annually, and are essential for the productivity of eelgrasses that are nursing grounds to endangered keystone species such as the Eulachon (*Thaleichthys pacificus*) and Chinook Salmon (*Oncorhynchus tshawytscha*). While still productive, the past 50 years of development in the municipality of Delta, have not been kind to these wetlands. Far from their former extension and vast productivity, in the words of Environment Canada scientists, *"The Project is located in a geographic area where the documented continuing loss of wetlands has reached critical levels.*[27]

Figure 2. Maps of Remaining Old Growth and Southern Killer Whale Critical Habitat.

Both coastal wetlands and coastal old growth temperate forests have reached critical levels, largely because they were not perceived, and continue not to be perceived, as essential to the web of life and rich diversity of this province that has thus far sustained its fabled prosperity.

The productivity of wetlands and old-growth forests depends on a simple point. They both are essential sources of humic substances and aerosols. Humic substances make metals, such as iron, bio-available to chloroplasts. Chloroplasts are the essential unit of life that made the Great Oxygenation Event and the evolution of multicellular life possible 2.4 billion years ago. Chloroplasts evolved from the concentration of microbially-produced humic substances in the biosphere that bound iron. It is impossible to produce a chloroplast without a humic chelator. In our most productive marine waters, our coastal waters, terrestrially-derived humic substances make up 85% of the total solution. The importance of the relationship between kelp productivity and forested environment has been demonstrated by the work of K. Matsunaga et al. in 1999, and all work that has followed on the implications of abstraction of humic substances through standard drainage practices in agriculture and forestry.[28]

Therefore, if, as we already have done, we collapse 80% of old-growth forests and 80% of wetlands, it only stands to reason that we should expect to lose 80% of kelp productivity, as well as the complex marine life it supports. While climate change is undoubtedly a driver in the global kelp collapse that has occurred and has been well- documented over the past half century,[29] terrestrial development that alters inputs into the ocean also contributes to the deregulation of the marine environment's productivity. Dead whales and dead puffins become just part of the norm to be expected from the processes we are driving.

Coastal temperate rainforests are not just a collection of trees, they are superorganisms that put out aerosols, and control the production of massive concentrations of humic substances. They are a huge thermostat that acts as a biogechemical buffer and regulator. Their atmospheric role is not unlike that of coastal mangrove forests that buffer lowlands from hurricanes. As has been known for some time, the terpenes and isoprenes that they release for signalling not only forms a blue radiation above forests, they modulate regional temperatures and contribute to the formation of rain nuclei,[30] and therefore regulate evapotranspiration and precipitation across Vancouver Island. A simple commonsense application of the Coriolis effect and the adiabatic movement of air cells learnt in first-year geography should suggest that cutting what little is left of old-growth forests is quite likely to exacerbate dry conditions in the rain-shadow zone to the east.

It, therefore, should come as no surprise that east Vancouver Island and the Sunshine Coast are experiencing an extreme Level 3 drought, that has closed forestry operations and brought salmon-bearing rivers to all-time lows.[31] As has long been predicted, the drought is not only shrinking glaciers, it has deregulated hydroperiods, which has resulted in the drying of rivers. The ensuing drought has resulted in an accelerated death of large patches of salal (*Gualtheria shallon*), as well as red cedar (*Thuja plicata*) and Douglas fir (*Pseudotsuga menziesii*). It is altering basic microbial processes essential to ecosystem functioning. Although a notable wave of plant deaths is attributed in a general way to the drought, it is more interesting to consider that the dry conditions dehydrate the first 15 cm of humus that covers most of the ground. The drying of humic soils effectively sterilizes the humic layer and closes down the microbial loop that powers the humic substance cycle. This has consequences for both terrestrial organisms and their marine kin that are dependent on humic productivity. Coastal humic productivity sustains entire food chains from plankton to whales to Grizzly bears and migratory birds. It is always small, seemingly insignificant, things that sustain giant economies.

Therefore, just as BC's government cannot honestly talk about caring for whales while destroying their critical habitat, nor can it

talk seriously about developing a climate change plan, and being concerned about climate change, as it effectively vandalizes the West Coast's natural thermostat.

The good news in BC comes from private efforts of the Nature Conservancy of Canada to save 40 endangered species—since a non-existent "B.C. Endangered Species Act" won't do it—in a 79 square kilometre watershed on the west side of Kootenay Lake.[32] Similar efforts are underway by First Nations to preserve 40,000 square kilometres in the Kaska Indigenous Protected and Conserved Area, stretching from the Yukon to the Cassiar Mountains and Rocky Mountain Trench. As reported, although this effort is actively supported by the federal government, unfortunately this First Nations' project is being blocked by BC's government in order to protect yet undetermined mining interests[33] … (Proving Voltaire: "*Plus ca change plus c'est la meme chose*.")

The real question that hangs over these conservation proposals is that of their viability as climate change proceeds. If we remember that forests are organisms that regulate their own micro-environment, as most plants are prone to doing individually, the conservation of large intact tracts may remain our best hope for the future. Indeed, research shows that older intact forests are less vulnerable to climate change.[34]

However, the environment will always remain most vulnerable to governments that actively disregard their own environmental laws, the rule of law and science.

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SASKATCHEWAN News

Submitted by Robert Stedwill, CSEB Saskatchewan Member

Husky Oil Operations entered guilty pleas earlier in June on federal and provincial charges related to its 2016 oil spill into the North Saskatchewan River and will pay fines totalling $3.82 million.

It was fined $2.5 million under the federal *Fisheries Act* and $200,000 for a violation of the federal *Migratory Birds Convention Act*. It was also fined $800,000 under the Saskatchewan *Environmental Management and Protection Act* and assessed a 40% victim impact surcharge of $320,000.

As a refresher, on July 21, 2016 a leak was discovered on a pipeline crossing the North Saskatchewan River. The pipeline was isolated at the river crossing and spill response crews were dispatched. Approximately 225 cubic metres (225,000 litres) of crude blended with condensate were released, with about 60% of the volume contained on land. The cause was determined to be ground movement over time.

Improvements to Husky's operations include updated leak response protocols, regular geotechnical reviews of pipelines and fibre optic sensing technology installed on all new large diameter and higher consequence projects.

The spill offered a unique opportunity to assess the impacts of diluted bitumen (dilbit) on the ecology of a freshwater riverine environment. Under a grant from the National Contaminants Advisory Group (NCAG) Timothy Jardine of the University of Saskatchewan is evaluating the fish community structure and health of individual fish at nine sites—three in the immediate vicinity of the spill, two upstream, and four downstream—representing a range of exposure conditions. To establish energy and contaminant pathways, the food web is being sampled from top to bottom. Health indicators being examined include the presence of lesions, tumours, breaks in DNA (genetic material), and presence of proteins involved in detoxification. The goal is to determine: how far impacts of the spill have spread along this important river system; how these contaminants move through the food web at a given location; and whether impacts on fish species are evident up to two years after the spill. The data generated by this research will be incorporated into computer models, by Fisheries and Oceans Canada and others, to predict the extent of contamination and potential impacts in the event of a future pipeline spill into a river system. This capability is extremely valuable in light of ongoing proposals for new pipeline developments to transport dilbit.

CSEB Research Webinars

Check the CSEB Website at
www.cseb-scbe.org
for upcoming webinars and registration information.

MANITOBA News

Submitted by Robert Stedwill, CSEB Member

You will recall previous reports from Manitoba regarding the infestation of zebra mussels (*Dressena polymorpha*) in Lake Winnipeg and the inflowing waters of the Red River. Also included in the list is Cedar Lake. The problem has become so critical, that shorelines are difficult to walk on.

This is a picture of the bivalves being washed up on Victoria Beach on Lake Winnipeg last August.

A new potential locale can now be added to the list—Shoal Lake, which straddles the Ontario/Manitoba border, and the source of drinking water for the City of Winnipeg.

A single intact veliger was found in one of six water samples taken from the lake, according to a news release issued jointly in April by the provinces of Manitoba and Ontario.

It was found in a water sample that was taken in August 2018 near the Clytie Bay public boat launch on the northeast side of the lake. Scott Higgins with the International Institute for Sustainable Development and Experimental Lakes Area has indicated that there is a real risk of the mussels getting a foothold in the Lake of the Woods in Ontario if they are indeed now in Shoal Lake, as the two bodies are connected.

Higgins has indicated that the chemistry of Shoal Lake and Lake of the Woods may, however, be inhibiting the proliferation of the mussels, due to the fact that Precambrian Shield lakes are low in calcium, thereby limiting shell development.

To date, no zebra mussels have been detected in the City of Winnipeg's water supply system, however, intensive monitoring is expected to continue, not only in the City's supply system, but also Shoal Lake and Lake of the Woods by the governments of Manitoba and Ontario.

ATLANTIC News

Peter Wells, CSEB Atlantic Member, forwarded this note:

Sent: Monday, June 24, 2019 7:34 PM

To: 'scientists-warning@lists.oregonstate.edu'

Subject: [Scientists-warning] Two more scientists' warnings just published-see attached

Dear Alliance of World Scientists Member, In addition to the warning on wetlands by Finlayson et al. that was published earlier, I am pleased to inform you that two new scientists' warning papers were published last week. I am attaching these two new articles which include Scientists' Warning on the Conservation of Subterranean Ecosystems by Mammola et al. and Scientists' warning to humanity: microorganisms and climate change by Cavicchioli et al. (http://scientistswarning.forestry.oregonstate.edu/sites/sw/files/news_stories/Warning_microorganisms.pdf) For those with microbiology training, you are invited to become a signatory on the microorganism article at https://www.babs.unsw.edu.au/research/microbiologists-warning-humanity

Below see a list other scientists' warning articles that are in the works.

Best, William J. Ripple, Distinguished Professor of Ecology, Oregon State University

Also,

We are still accepting signatures on the World Scientists' Warning to Humanity: a Second Notice.

Please join 21,000 scientists from 184 countries in signing the paper at http://scientistswarning.forestry.oregonstate.edu/

The Scientists' Warning has now been added to Congressional Record in the U.S. Congress. To see, just click here

http://scientistswarning.forestry.oregonstate.edu/sites/sw/files/Warning_CongressionalRecord_Jun2019.pdf

Narrow-focused scientists' warning articles that are planned, in preparation, in review, or published are shown below. Those that are published are underlined. Please write me at scientistswarning@oregonstate.edu if you have corrections, additions, or deletions to this working list. Thanks, Bill Ripple (list updated June 24, 2019 and any errors are mine.)

Topic/Working Title	Lead Author
The Second Warning to Humanity – Providing a Context for Wetland Management and Policy	C. Finlayson
Scientists' Warning on Marine Conservation	David Johns
Scientists' Warning on Indigenous Knowledge	Dana Lepofsky
Scientists' Warning on Congo Fish Conservation	Tchalondawa Kisekelwa
Scientists' Warning on the Conservation of Subterranean Habitats	Stefano Mammola
Scientists' Warning on Inland Water Conservation	Lars Tranvik
Scientists' Warning on Invasive Alien Species	Petr Pyšek
Scientists' Warning on Coral Reefs	Carla Elliff
Scientists' Warning on Medicinal Plants	Wendy Applequist
Scientists' Warning on Pollination Conservation	Peter Kevan
Scientists' Warning on Limbless Subterranean Amphibians	Ramachandran Kotharambath
Scientists' Warning on Deserts	Glenda Wardle
Scientists' Warning for Gynecologists	Jan Greguš, MD
Scientists' Warning on Old Arctic Sea Ice	Benjamin Lange
Scientists' Warning on Bird Conservation	Jeff Snyder
Scientists' warning on insect conservation	Michael Samways
Scientists' warning on the arthropod-borne pathogens	Agustín Estrada-Peña
Scientists' Warning on the connection with nature	Jerónimo Torres-Porras
Scientists' Warning on climate change and infectious diseases	Kyrre Kausrud
Scientists' Warning on Pesticide Impact	Gwenaël Imfeld
Scientists' warning and forest disturbances	Alex Leverkus
Scientists'' Warning on Food Gardens	Daniela Soleri
Scientists' Warning on chemical pollution	Thomas Backhaus
Scientists warning to humanity and animal behavior	Wolfgang Goymann
Scientists' Warning on Soundscape	Jérôme Sueur
Scientists' warning on endocrine-disrupting chemicals	Martin L. Kaonga
Scientist's Warning on Human Population Growth	William Lidicker
Scientists' Warning to Humanity – Endangered Food Webs	Ruben Heleno
Scientists' Warning on Large Lakes Conservation	Jean-Philippe Jenny
Scientists' Warning on Sea Ice	Peter Wadhams
Scientists' Warning on the World's Population	Helen Kopnina
Scientists' Warning on Semiarid Savannas	Ana Andreu
Scientists' Warning on Freshwaters	James S. Albert
Scientists' Warning to Humanity: microorganisms and climate change	Rick Cavicchioli
Scientists' Warning from Conservation Physiologists	Christine Madliger
Scientists' Warning on Wildfires	Sean C P Coogan
Scientists' Warning on Affluence	Tommy Wiedmann
Scientists' Warning on Beaches and Coastal Wetlands	Chip Fletcher
Scientists' Warning on our Deep Ocean	Rachel Jeffreys
Scientists' Warning is a Warning to Science	Marek Cuhra
Emergency Climate Warming above 1.5°C	Peter Carter
Scientists' Warning for Health Systems	Jade Khalife
Scientists' warning on landscape homogenization	Victor Arroyo-Rodriguez
Warning on ElectroMagnetic Waves	Gauthier LASOU
Scientists' Warning on Ethical Security	Jean S. Renouf
Scientists' Warning on Refugees and the Environmental Crisis	Mukul Sharif
Scientists' Warning on the Vital Signs of the Climate Crisis	William Ripple

TERRITORIES News

Submitted by Anne Wilson, CSEB Territories Director .

I was grateful to spend a week in Iqaluit recently, and enjoyed the almost continuous daylight (~ 3 hours of twilight) and the tundra landscapes. When I arrived on June 16th, the sea ice in the bay extended all the way to the shore, and within several days the ice had almost disappeared from the bay. Locals said that this was the first time they could remember that this had happened before July. During the week of technical meetings I was attending, there were many more accounts of changes to marine systems from the Inuit of several Baffin Island communities. It becomes difficult to separate natural variability from climate change impacts and impacts associated with shipping activities.

Development Activities:

There are several developments in the NWT and NU that are proceeding through the environmental assessment and regulatory processes.

- In the Environmental Assessment forum, a second set of technical meetings was held in Iqaluit in June for the Baffinland Iron Mines Phase 2 EA. Baffinland has applied to increase production to 12 Mtpa (double), which involves construction of a north railway to transport ore to the marine port for shipping to markets. If the already permitted south railway is constructed, production would eventually increase to 30 Mtpa. EA hearings are scheduled for next September in Pond Inlet, and an overlapping Water Licence amendment process is underway.
- Two of the Northern mines proposed disposing of tailings in mined-out pits. Current closure plans involve reconnecting the pits to the large, pristine lakes that they are adjacent to, once water quality is acceptable, and the addition of tailings raises questions for closure. While the Meadowbank Gold Mine received approval of their proposed in-pit tailings disposal from the Nunavut Water Board, the request from Diavik Diamond mine was referred to Environmental Assessment by the Mackenzie Valley Environmental Impact Review Board.
- Agnico Eagle received approval last year to mine the Whale Tail gold project, which would involve trucking ore to the Meadowbank Gold Mine for milling. Further ore bodies have been identified for development, and there is an Environmental Assessment underway for the expansion of the satellite gold development. Public hearings will be held in late August for the EA, and the Water Licence process has already started, with technical meetings in fall.

- The Giant Mine Remediation Team submitted their Type A Water Licence application on April 1, 2019, and the project is undergoing public review. Technical Meetings are scheduled for July and September, with public hearings in January 2020.
- The Snap Lake Diamond Mine is moving towards final closure, with full decommissioning of the mine site. This coincides with renewal of their Type A water licence, which will focus on closure conditions. The public hearing is scheduled for Oct 2019.

On June 20th, Agnico-Eagle Mines held a ribbon cutting ceremony to celebrate the opening of the Meliadine Gold Mine, which expects to produce 230,000 ounces of gold by the end of 2019. This is the company's second gold mine in Nunavut, and Agnico-Eagle marked the occasion with a $1 million donation to two community groups in Rankin Inlet, in support of firefighting and literacy.

The groundwork is being done to develop northern-specific regulations for municipal effluent quality, similar to the Wastewater System Effluent Regulations that apply south of 60. The process will take several years, but has been launched with public meetings held in Iqaluit and Yellowknife to learn more about challenges and existing regimes, as well as providing information.

On a broader scale, some really interesting work is being launched in the Central Arctic. From the MOSAIC website https://www.mosaic-expedition.org/:

> "In September 2019, the German research icebreaker Polarstern will depart from Tromsø, Norway and, once it has reached its destination, will spend the next year drifting through the Arctic Ocean, trapped in the ice. A total of 600 people from 17 countries, who will be supplied by other icebreakers and aircraft, will participate in the expedition – and several times that number of researchers will subsequently use the data gathered to take climate and ecosystem research to the next level. The mission will be spearheaded by the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI)."

Since 1980, more than 95% of the oldest, thickest sea ice in the Arctic has disappeared, and this year is on track to see the lowest amount of sea ice in recorded history. The expedition will explore the Arctic climate system and will make "…direct in-situ observations of the climate processes that couple the atmosphere, ocean, sea ice, biogeochemistry and ecosystem. The results of MOSAiC will contribute to enhance understanding of the regional and global consequences of Arctic climate change and sea-ice loss and improve weather and climate predictions."

And to wind up with a good-news story, recently published work on ringed seals shows declining levels of persistent organic pollutants. Sampling was done of seals taken in subsistence hunts between 1972 and 2016, and an extensive suite of persistent organic pollutants (POPs) was measured in the seal blubber. While the rates of decrease were variable between regions and POPs, and there was an increase in one compound, overall it appears that reduced emissions from primary sources are having the desired result. https://www.sciencedirect.com/science/article/pii/S0048969719306266

Submitted by Sharleen Hamm, RPBio, CSEB Territories Director:

As promised, here's some long overdue Yukon content! Stay tuned for more input from Yukoners in both the fall webinar series and fall/winter Bulletins……

Kluane National Park (Kluane), located in the south western corner of Yukon, established in 1972 encompasses over 22,000 km^2, 83% of which is covered by ice or water. Kluane boasts a tremendous resume of astonishing natural features including Canada's tallest mountain, Mount Logan (5,959 m, or 6,050 m, depending on who you talk to); North America's most genetically diverse population of grizzly bears; the world's largest non-polar icefield; the greatest ecological diversity in northern Canada brought about by the transition from northern interior to coastal biogeoclimatic zones; comprising a portion of the Kluane/Wrangell-St.Elias/Glacier Bay/Tatshenshini-Alsek UNESCO World Heritage site, collectively, the largest internationally protected area in the world; a portion of the Alsek River, a Canadian Heritage River. Located in the traditional territory of the Southern Tutchone people, Kluane is managed in partnership with the Kluane First Nation and the Champagne and Aishihik First Nations.

Under the Canada *National Parks Act* (the Act), national parks are established for the benefit, education, and enjoyment of Canadians, to be used and maintained unimpaired for future generations. National park reserves are established where a park area, or proposed park area, is subject to a claim of aboriginal rights that has been accepted for negotiation by the Government of Canada. Once settled, the national park reserve area may become part of the national park. Further, the Act designates the protection of natural resources and processes, by maintaining or restoring ecological integrity, as the Minister's first priority (see paragraphs 4-8 of the Act; https://laws-lois.justice.gc.ca/eng/acts/n-14.01/page-1.html).

The Act also requires that a management plan (the Plan) be prepared for each park, and periodically reviewed and updated. The Plan needs to include a long term ecological vision for the park along with objectives, indicators, and provisions for protection and restoration. The current Plan was issued in 2010 (read it here: https://www.pc.gc.ca/en/pn-np/yt/kluane/gestion-management/plan). Parks Canada has now started the process to review this Plan, in order to have a new plan tabled in Parliament in 2020. Preliminary consultation on a variety of topics is underway. Considering all stakeholder input received by June 30, 2019, the Kluane National Park and Reserve Management Board will draft the next version of the Plan, and consultation on the draft Plan will follow in 2020.

Key areas of discussion for the 2020 plan include the following:

- Protecting the cultural resources;
- Considering a landscape management approach to support grizzly bear protection;
- Supporting different visitor experiences;
- Zoning changes to reflect current and future use and conservation strategies.

Provide your input into the draft Plan by:

- Attending an open house;
- Emailing your comments to pc.plankluane.pc@canada.ca;
- Writing a letter to Box 5495, Haines Junction, YT, Y0B 1L0;
- Checking the park website for updates www.parkscanada.ca/Kluane.

For more info, and/or to provide input, check out this link: https://www.pc.gc.ca/en/pn-np/yt/kluane/gestion-management/consultation/mai-2019-may.

CSEB Regional Directors Needed

CSEB has Regional Director vacancies as follows:

- Territories
- Ontario
- Saskatchewan
- Quebec
- Manitoba
- Alberta
- Atlantic

If you are interested in taking on one of these positions, please contact Curt Schroeder at President@cseb-scbe.org. It is not an onerous task, and will greatly help strengthen the organization. Your help would be greatly appreciated.

John Lilley Undergraduate Scholarship in Environmental Science

In 2008, the John Lilley Environmental Scholarship was established in memory of our past President and long-time supporter and friend, John Lilley. The $600 (current value) scholarship is at the University of Alberta and is awarded to a student with superior academic achievement entering the second year of study for a Bachelor of Science in Environmental and Conservation Sciences in the Faculty of Agricultural, Life and Environmental Sciences. Selection is based on demonstrated involvement with a not-for-profit environmental organization and academic standing.

The recipients since 2008 have been as follows:

Year of Award	Name of Student
2008	Chen, Qiting
2009	Veillard, Marie Frances
2010	Zhang, Daiwei
2011	Jacklin, Meghan Lynn
2012	Cherlet, Erin Alexandra
2013	O'Neill, Megan Nicole
2014	Wheatley, Melissa
2015	Suhertan, Ellis
2016	Huang, Rebecca
2017 (2)	Moir, Anthony and Thomasson, Charlotte
2018 (2)	Conor Griffiths and Kevin Qwttrim

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LA SOCIETE 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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Membres Réguliers: les personnes ayant un degré ou diplôme d'un collège ou une université dans une discipline des sciences biologiques et qui sont ou qui ont déjà éte engagé professionnellement en aménagement, enseignement ou recherche tenant a l'environnement ainsi que ressources naturelles.

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Membres Associés: les personnes qui supportent les activités et les objectifs de la Société mais qui ne se qualifient pas comme membre régulier ou étudiant.

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