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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Bulletin

In this Issue:

CSEB Bulletin SCBE

VOLUME 78, ISSUE 1, SPRING, 2021

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In this issue

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Front Cover: Drilling hole for ice-fishing, Ferguson Lake, NU. Photo Credit: M. Buchan.

Back Cover Top: On the land, Victoria Island, NU. Photo Credit: M. Buchan.

Centre Left Inset: EDI Environmental Dynamics wildlife biologists taking a break from looking for moose during a stratified random block moose survey in the Cariboo Region. Photo credit: Pablo Jost; Right Insets: Wood Duck (*Aix sponsa*) and Pileated Woodpecker (*Dryocopus pileatus*) in Sir Sanford Fleming Park, Halifax. Photo Credit Peter Wells; Bottom: Egg picking, Victoria Island, NU. Photo Credit M. Buchan.

CSEB BULLETIN 2021

Vol. 78, Number 1, Spring 2021

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.
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LE BULLETIN de la SCBE 2021

Vol. 78, Numéro 1, Printemps 2021

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

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

January 2021 started off with mild winter temperatures and then a polar vortex descended over most of Canada. A rare moment occurred when all 10 provincial capitals experienced daily highs of less than 0° C. Record-breaking cold temperatures lasted for several weeks. In Regina, where I live, the temperature and wind chill reached -48° C at one point. Across much of the U.S., rare frigid temperatures caused record amounts of snow and ice, as far south as the Gulf Coast. With a pandemic also affecting our daily lives, we are reminded that natural forces can have a short-term impact on society over a wide area. Put climate change on top of that, and change can be long-term and potentially even more disruptive.

Rapid and long-term environmental change can alter habitats, increasing the rate of habitat change. Environmental biologists are only too well aware of the importance of understanding the rate of environmental change. Neglecting the associated importance of cascading biodiversity loss is to ignore the potential of harm to life on earth. Can life on earth adapt to potentially abrupt climate change? This cold spell and pandemic should make us pause and think about environmental change and its effect on human life and other living organisms.

CSEB 2020 AGM

Held 11 January 2021 at 1:00 PM PST via teleconference

President's Report - Curt Schroeder

- COVID-19 has presented challenges to work
- Website redevelopment
- Bulletin reports
- Answer member emails (job opportunities)
- Consultation request from DFO
- Advocacy – letter to Globe and Mail
- Need for renewal

Secretary-Treasurer's Report - Anne Wilson

- CSEB finances were tracked using Quicken, and reported using a Cash Basis
- Reviewed income and expenses on an Accrual Basis to see what annual balances were compared to budget
- 2019 audit was completed – many thanks to auditors Brian Free and Gary Ash for their work.

2019 Balance Sheet – Cash Accounting Basis

2019 Balance Sheet (Cash Accounting Basis)

Opening Checking Account Balance (Jan. 1, 2019)		$11,899.30	
GIC Value (Jan 1, 2019)		$1,641.73	
	Total (Jan 1, 2019):		**$ 13,541.03**
2019 Receipts Deposited			
Total income deposited in 2019 [a]		$5,395.58	
2019 Expenses Paid			
Expenses paid through bank account in 2019 [b]		$3,390.20	
2019 Net Income (Loss)			**$2,005.38**
Closing Checking Account Balance (Dec 31, 2019)		$13,904.68	
GIC Value (Dec 31, 2019)		$1,641.73	
	Total (Dec. 31, 2019):		**$15,546.41**

Notes:

[a] Does not include $2,104.02 prepaid 2019 membership dues collected in 2018. Includes $1.054.89 membership dues for 2020 collected in 2019

[b] Inlcudes $159.43 cheque from 2018 that did not clear until 2019.

2019 Bottom Line…

Total Assets:	
Cash in hand at Dec. 31, 2019	$13,904.68
2020 Journal payments	-$168.47
2020 web site payment	$32.85
GIC	$1,641.73
Assets as at Dec. 31, 2019	$15,410.79

Draft 2021 Budget - Income

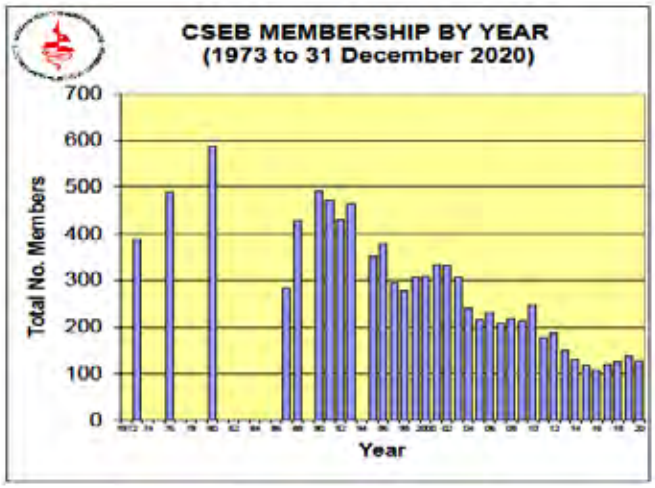
Draft 2021 Budget	2021 Budget	2020 Budget	2020 Actual to Dec. 31	2020 Variance
INCOME				
Advertising Revenue	$375.00	$375.00	$375.00	$0.00
Bank Interest	$0.00	$0.00	$0.00	$0.00
Conference Proceeds (incl sponsorship)	$0.00	$0.00	$0.00	$0.00
Journal Orders	$1,400.00	$1,400.00	$1,377.86	-$22.14
Membership fees	$2,900.00	$3,870.00	$3,028.02	-$841.98
Other Income - Misc	$0.00	$0.00	$0.00	$0.00
Newsletter Subscription	$200.00	$75.00	$205.88	$130.88
Publication Sales	$0.00	$180.00		-$180.00
Donations	$0.00	$0.00	$10.00	$10.00
TOTAL INCOME	**$4,875.00**	**$5,900.00**	**$4,996.76**	**-$903.24**

Draft 2021 Budget - Expenses

EXPENSES	Draft 2021	2020 Budget	2020 Actual	Variance
Admin and office (eg copying)	$20.00	$50.00	$9.66	$40.34
Banking	$0.00	$0.00	$157.79	-$157.79
Chapter Rebates	$0.00	$0.00	$0.00	$0.00
Contingency	$0.00	$1,000.00	$0.00	$1,000.00
Corporate Registration	$15.00	$20.00	$12.00	$8.00
Journal Order Payments	$1,300.00	$1,200.00	$1,261.70	-$61.70
Membership Renewal costs	$0.00	$0.00	$0.00	$0.00
Miscellaneous	$0.00	$145.00	$0.00	$145.00
Newsletter Production	$1,000.00	$800.00	$982.91	-$182.91
Newsletter Mailing	$290.00	$320.00	$267.58	$52.42
Postal box rental	$275.00	$275.00	$271.20	$3.80
Postal box redirect mail	$375.00	$370.00	$367.48	$2.52
Sponsorship	$200.00	$200.00	$0.00	$200.00
Web site	$1,100.00	$850.00	$363.86	$486.14
Webinar Platform	$300.00	$800.00	$0.00	$800.00
TOTAL Expenses	**$4,875.00**	**$6,030.00**	**$3,694.18**	**2335.82**
Total Revenue			**$4,996.76**	
Total Expenses			**3,694.18**	
Net			1,302.58	(Surplus)

2020 CSEB Membership
by Region and Membership Category
as of 31 December 2020

Region	Complimentry	Honourary	Associate	Library	Regular	Student	Total
1 Atlantic	1	1	1	1	4	5	13
2 Quebec					2	1	3
3 Ontario	1		2	1	22	10	36
4 Manitoba					4	1	5
5 Sask.					9	3	12
6 Alberta		1		2	23	4	30
7 BC		1	1		21	4	27
8 Territories					1	1	2
9 USA				1			1
O Foreign							0
Totals	2	3	4	5	86	29	129



Bulletin Editor's Report

- 2020 – Four issues published
- Looking for guest editors for 2021
- Need contributions from membership & Directors
- Bulletin distribution format:
  - Electronic = 98
  - Hard copy = 32 (includes two copies to National Library)
- Looking for photos of Biologists-in-Action for upcoming Bulletin covers
- 2021 Deadlines:15 Feb, 15 May, 15 Sep, 15 Nov
- Thanks to everyone who submitted content during 2020

Canadian Society of Environmental Biologists
2020 Annual General Meeting Draft Minutes
Web Meeting
11 January 2021 at 1:00 pm PST; 4:00 EST

1. **Welcome** - CSEB President Curt Schroeder (Quorum) The AGM was convened at 1:08 (PST) by Curt. Alan Egilson and Stephen McCoy attended, along with Loys Maingon, Curt Schroeder, Anne Wilson, Patrick Stewart, Gary Ash, Sharleen Hamm, Robert Stedwill, Barbara Hard and Brian Free.
2. **Assigned duties**: Moderator (Curt), Recording Secretary (Anne), Time Keeper (Loys), Parliamentarian (Gary)
3. **Approval of Agenda** - Motion to approve by Curt; seconded by Gary, carried.
4. **Approval of Minutes from previous AGM** (10 December 2019 AGM). Minutes were reviewed, and a motion to accept made by Gary, seconded by Loys, carried.
5. **President's Report** - Curt Schroeder
   - COVID19 has presented challenges to work
   - Involved in website redevelopment and will be looking for grant funding as opposed to doing incrementally within our budget.
   - Prepared Bulletin reports
   - Answered member emails, e.g., job opportunities
   - Consultation request from DFO
   - Advocacy – letter to Globe and Mail (not printed)
   - Need for renewal – need to continue to look at what we can do for membership.
6. **1st Vice President's Report** - Patrick Stewart
   Patrick had no activity to report; he and Peter Wells have been doing Bulletin submissions.
7. **2nd Vice President's Report** - Robert Stedwill
   Robert – not a lot going on; referrals have been passed on to Curt or Brian e.g., Great Plains webinar series. Activities in SK have been curtailed.

8. **Secretary-Treasurer's Report** - Anne Wilson
   Discussion of how finances are tracked, and a question on Stripe charges was raised. Charges aren't tracked separately but are taken off the income. The 2019 finances were presented for Cash Basis with a summary for 2019 on Accrual Basis showing budgeted costs. The draft 2021 budget was presented with comparisons to 2020, and commentary on each line item. Motion to accept audited financial statement from last year: made by Anne, seconded by Robert, Carried. Motion to accept draft 2021 budget as our operating budget: made by Anne, seconded by Sharleen, Carried.
9. **Membership Repor**t - Gary Ash
   Gary spoke to the 2020 membership breakdown; included those who renewed 2021 early. 129 members in total; presented by category and with breakdown by region. Numbers of regular members are down from last year. Graph showed the trend in membership by years. Two 2021 reminders to renew have been sent out, but only about 50 members have renewed.
10. **Bulletin Editor's Report** - Gary Ash
    - 4 issues published in 2020; looking for guest editors for 2021
    - Need contributions!
    - 98 electronic and 32 hard copy format
    - Need photos of biologist in action!
    - 2021 deadlines are Feb. 15, May 15, Sept. 15, and Nov. 15 A BIG thank-you to Gary for all his work on the Bulletin! Idea raised of distributing hard copies for free as a promotional item, if could do economically, but is expensive. Would also need mailing lists. Idea of just sending link to web site with access to historic bulletins.
11. **Webinar Chair Report** - Loys Maingon
    - 7 webinars held in 2020
    - About 20 webinars planned for 2021; Loys provided a list of proposed offerings. Suggestion to put up CSEB membership slide before and after each webinar – Gary to send to Loys. As soon as firmed up, we will put webinar list on the web site. Mailing list for notices can be updated with CSEB membership list. Will work on that.
12. **CSEB Website Report** - Brian Free
    Brian was not on the call at this point, presentation shared by Curt. We have a service agreement for website maintenance, and are looking for a grant for updating. Website statistics for visits were presented.
13. **Directors' Reports (Regional)**
    - Ontario – Barbara Hard presented on the changes to the Conservation Authorities Act in Ontario, which has huge implications in favour of development. Loys suggested could be a topic for a webinar. The CSEB could provide a voice for this issue as well as a newsletter article.
    - BC report in writing - Loys; there are a number of large concerns. Noted Site C is an issue; it is central to the energy plan.
    - Northern - 2020 was a quiet year, with activity limited to Bulletin contributions and online networking and individual attendance at virtual Arctic conferences.
    - SK – Curt gave report; highlighted recent Nature Conservancy activity.
    - MB – Robert is trying to contact Bill Paton's colleagues to access his research work. He would also like to establish a contact at the U of M Arctic research station up near Churchill, to provide information for the Bulletin.
    - AB – Gary mentioned the Provincial Government has backed down on de-listing or privatizing provincial parks following outcry.

    Other members asked for any issues – none raised.

    Gary moved that we accept all reports as presented; Loys seconded, Carried.
14. **Elections**

    Call for nominations from the floor. No nominations – Gary moved that nominations cease; Robert seconded, carried. Board is re-elected by acclamation.
15. **New Business** – On-line Conference – Loys Maingon

    Will need to have virtual version of any conference; online workshop suggested.
16. **Topic:** CSEB workshop on climate change for professional biologists, opportunities, and liabilities.

    Consider where provincial and federal climate change and biodiversity plans are going.

    Format – discussed one week vs. one day

    Registration and payment – fee per day/webinar

    Structure – presenter and respondant; 2 webinars plus discussion.

    Division and hierarchy – two speakers per day, for each region of the country e.g., Federal plan, DM followed by NGO. Then BC Plan, Prairies.

    Would need whoever is the spokesperson for the government. Do for each region, and cast CSEB as national organization. Bring in changes expected with change in US government.

    It may be difficult to get government speakers. Two very big topics, should they be split? Or put into simple questions that can be addressed? Limit to climate change? Even climate change is a broad topic. Biodiversity could be more focused as a topic, and incorporate the fact that climate is changing.

    Focus on update on what current plan is; NGO secondarily there to ask questions. Dialogue vs workshop. Needs to be directed to biology!

    Date – Mid-October 2021 event?

    Contact government speakers about 6 months in advance, with prospectus of what we want from them. First step is to determine interest with some outreach; that will help with setting boundaries and scope of dialogue. Will open door to people and introduce what we want to do, then set up dialogue sessions. Make sure folks are comfortable with parameters, can use a letter to reach out. Focus on various environmental biologists from various organizations.

If national, time zones an issue, and would have to tailor a full day format accordingly. Shorter version is better, over several days. Loys noted would be recorded and available after.

Next steps – move to email discussions and put on next board meeting agenda.

Loys will develop proposal further. Gary suggested we bring in people who indicated interest in conference planning on their renewal forms – good idea!

Idea to put on YouTube? How would that affect paid registrations?

Start with canvassing government agencies? Loys will start with a draft letter for each of us to adapt for our regions. If governments don't respond, we can go to academia.

17. **Next board meeting:** Feb. 8th at 9 PST/ 10 MST / 11 CST / 12 EST / 1 AST

18. **Adjournment** at 4:30 pm MST. Gary moved to adjourn, Loys seconded, carried.

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

Science or "Science" 2021

An observation – over the past year it has become harder to find 'interesting' articles for the Bulletin. I wondered whether I had become more discriminating but very quickly concluded that was highly unlikely! Maybe 'science' had all of a sudden become more serious in a COVID world! Maybe the era of "The Journal of Irreproducible Results" and "The Ig Nobel Prize" had ended and science had lost its sense of humour. I continued to mine the old, reliable sources as well as some new ones and was eventually rewarded with outstanding items such as "Spider Butts Look Like Faces" and "Cuttlefish Wearing 3-D Glasses". With my faith in environmental scientists restored, I will continue searching for worthy topics!

Rivers, Fish and Updates

How Deep Is A River?

Thanks to the discovery of some very specialized dead fish, it turns out some rivers can be VERY deep!

After the appearance of a few previously unidentified specimens of a de-pigmented 'blind' cichlid (*Lamprologus lethops*) in the Congo River in 2011, researchers began to assess the lower reaches of the river to better understand its physical dynamics. Further confounding the assessment was the realization that only dead or dying *L. lethops* were being found and they exhibited signs of barotrauma, essentially a fish equivalent of what divers call the bends.

Using depth sounders and acoustic current profilers, the researchers discovered some parts of the lower Congo River had depths of more than 200 metres. Even more surprising was the discovery of extreme underwater currents and underwater 'waterfalls' that created very strong jet streams of water from the bottom to the surface. Any fish swept into one of these currents could be rapidly jetted to the surface and die due to barotrauma.

Melanie Stiassny, a curator in the Department of Ichthyology at the American Museum of Natural History in New York City, led the assessment and has concluded that the extreme currents and depths have likely created environmental barriers that contributed to the evolution of the de-pigmented fish.

Subsequently, several other 'blind' and de-pigmented fish species have been found in similar habitats in the Congo River, including the following: an elephant fish; mochokid, clariid and claroteid catfish; and four different species of spiny eels.

Toadfish Don't Like Music Festivals

Well, not exactly! What they apparently don't like are loud sounds like those created by some music festivals.

Virginia Key, in Biscayne Bay just east of Miami, Florida hosts an annual Ultra Music Festival. Researchers from the University of Miami, Rosenstiel School of Marine and Atmospheric Science, placed recording devices in the waters surrounding Virginia Key, Florida and in aquaria containing toadfish that were placed near the stages at the festival to measure sound levels. They also tested toadfish for potential effects of exposure to sound. They found elevated levels of cortisol (a hormone associated with stress) in samples taken from toadfish in the waters around Virginia Key, during Florida's Ultra Music Festival.

This may seem to be overkill or misplaced research but the Florida Ultra Music Festival appears to have a bit of a history of community concerns regarding noise levels, and greatly increased land and water-based traffic. Consequently, various levels of government have become involved to help understand the potential effects and potential solutions.

Toadfish were selected for assessment since they are a primary food source for local bottlenose dolphins. It seems that toadfish rely on hearing the social calls of dolphins as a way to pre-emptively avoid being eaten. The increased noise from the music and the increased boat traffic related to the festival were considered as a potential threat to the toadfish that may create an unfair advantage for the dolphins.

Toadfish have been rewarded with at least a year's reprieve since the Ultra Music Festival has been postponed due to COVID-19.

First Bonefish Spawned and Hatched in Captivity

Researchers at Florida Atlantic University (Harbor Branch Oceanographic Institute) and the Bonefish and Tarpon Trust have successfully spawned and hatched bonefish in captivity for the first time. Using locally caught bonefish, researchers have spent the past several years trying to identify the conditions necessary for spawning of bonefish and for fertilization, hatching, and nutrition of the larvae. To date, the team has been able to rear hatched larvae for as long as eight days. Bonefish stay in the planktonic larval stage for 42–72 days so, unfortunately, the research still has a long way to go.

Bonefish spawning in the wild involves local migrations of large schools from shallow flats and shallow coral areas to deeper water. Spawning ultimately culminates in aggregate broadcast

spawning in deep areas of the ocean, with the eggs at the mercy of local currents. This makes it difficult to assess the environmental clues related to spawning and to collect recently spawned eggs and newly hatched planktonic larvae.

Bonefish (12 different species in the genus *Albula*) are harvested in subsistence fisheries around the world and are highly sought after and economically important as a sport species. The IUCN generally classifies bonefish as Near-Threatened (IUCN 3.1) but broad understanding of conservation status for the various species is not well known due to a lack of definitive data.

UPDATE – Mantis Shrimp - If they are so strong, why don't they break their own shells?

Mantis shrimp are known for having the fastest 'punch' of any animal on the planet (equivalent to 23 metres per second), with a force of 1,500 newtons per punch. But with all that energy, why do they not harm themselves?

In research published in the journal *Nature Materials* (19: 1236–1243, August 17, 2020), David Kisailus, University of California-Irvine, discovered impact-resistant nanoparticles covering the clubs of the peacock mantis (*Odontodactylus scyllarus*). Transmission electron and atomic force microscopy found a dense nanocrystal matrix of hydroxyapatite that rotates and breaks under high stress—but reforms in time, ready to punch again. Under low stress, the particles deform and reform similar to marshmallow.

UPDATE – Pumice Raft Lands in Australia

The pumice raft generated from the eruption of the exotically named Volcano F in August 2019 (or more precisely #0403-091 near the Vava'u Islands in the Kingdom of Tonga) began washing up on the east coast of Australia in the spring of 2020. Debris from the pumice raft, and its resident organisms, now covers about 1,300 km of Australia's eastern coastline, from Townsville in Queensland's north to northern New South Wales.

The debate continues whether the pumice rocks provide a diversity 'life raft' for the Great Barrier Reef or if the invading inhabitants are simply unwanted invading species. The fact remains that undersea volcanoes have been erupting for millennia and will continue to do so for the foreseeable future.

UPDATE - Setback for Dog Owners Why our dogs may not be as smart as we think!

Most dogs acquire the ability to distinguish individual speech sounds. But recent research from the Department of Ethnology at the University of Hungary has shown that, while dogs can hear the different sounds, they seem to have 'attentional and processing bias' that prevents dog brains from distinguishing words that differ by a single speech sound (e.g.,'sit' vs 'set' and 'dog' vs 'dig).

Until around one year of age, dogs and human infants learn vocabulary at about the same rate but, at that point and beyond, human babies learn that different sounds matter and their vocabulary learning quickly out-paces that of dogs.

TECHNICAL WRITING SERIES

Submitted by Sean Mitchell, CSEB BC Director

Strategic Creativity: Technical Writing to Engage Your Audience

Over the last three years, I have taught a course through Natural Resources Training Group called T*echnical Writing for Professionals* and, as part of that course, I provide the students with examples of current writing by professionals retrieved from the internet — passages from policy papers, proposals, environmental assessments, and technical reports. One of the striking things is how quickly naive and relatively untrained writers can identify troubling flaws and problematic writing in these purportedly professionally written and reviewed documents. The students quickly come to realize that much of the technical writing they see and have to read is poorly written. The problems range from unpersuasive arguments to non-strategic use of writing techniques at the paragraph, sentence, and word levels; the reader is bored by excessive repetition of information and obviously no attempt by the writer to engage their audience.

This is not a new phenomenon, though it has appreciably worsened over the last two decades. But I know from my other writing practices that good writing is pleasurable for the writer and engaging for the reader. It is this disjunction between the joy and value of writing on the one hand and the current state in which it is done on the other that has motivated me to develop the course I now teach, as well as to develop a forthcoming book — titled "*Strategic Creativity: Technical Writing to Engage Your Audience"* — encapsulating the content of the course. To further spread the reach of the messages of effective and engaging writing, I have offered to provide a regular column to this Bulletin outlining some strategies and techniques to create prose that is more engaging, persuasive, and enjoyable to your audience. This is the inaugural column, and as such I would like to start with my approach and my philosophy.

This philosophy is largely grounded in two precepts. The first is that writing is a relationship: It is an agreement between myself as the writer and you as the reader. Our compact is that I will write and communicate to the best of my ability, and you will provide a reasonable attention to follow. I will write with integrity and honesty and you will read critically but fairly. In this, I bear the greater load because if your attention drifts or you find fault, that is my responsibility, not yours.

The second precept, nay, guiding mantra, is "The writer works so the reader doesn't have to". This is my rock, my touchstone, my north star. I am the one trying to communicate the idea, so my job is to do all the heavy lifting so you don't have to. My responsibility is to bring my skills, knowledge, and experience to the task so you may sit with your feet up in an armchair with a scotch and enjoy yourself. Those are our roles.

To meet the two goals above, I must prioritize and strive constantly for your engagement. I know you are busy, with lots on your mind, so how can I keep you interested and reading? I will use every tool I can to do this, drawing on disparate fields

such as story-telling, film-making, creative non-fiction, poetry… any devices I think will help me keep your attention… including quotations.

> *"My job? To take the most precious of gifts you can give me, your attention…"*
>
> *~ Daniel Atlas in Now You See Me (2013)*[1]

That, in the briefest nutshell, is where I am coming from and where I believe technical writing should be going. But this column is not about me, rather about practices to improve our writing. I would like to begin by asking writers to critically evaluate some of the conventions we frequently use. Are they useful? Or are they imprisoning? Do we slavishly follow them without considering how they may impede the understanding of the reader with whom we are working so hard to create a relationship? There are many of these conventions, but today I would like to explore just one — acronyms. In the world of consulting, I have seen a trend over my writing life to an increase in these beasts; like an invasive species, they have expanded and proliferated in our veldt of words. Westslope cutthroat trout becomes WCT. BC's Ministry of Forests, Lands, Natural Resource Operations and Rural Development (surely a mouthful) is instead FLNRORD. In our misplaced focus on conciseness, we think replacing words with capital letters is sound strategy. But is it? Does doing this actually improve our communication — the focus of our writing?

Capital letters are very attractive. They draw our eye to them, which is why they are used to start a sentence (emphasizing the preceding period) or for proper names (draw attention to the specific noun). But when we litter our writing with them — for example, "the WCT identified by FLNRORD were upstream of the falls" — our eye jumps to these dominant features and then lingers too long. It breaks up the flow and smoothness of our reading. Badly. Not only that, but in our use of acronyms we are making our reader work; they now have to remember two things: the acronym and the original name. So, for the supposed sake of conciseness, I am asking you, the reader, to remember that when I write FLNRORD I actually mean Ministry of Forests, Lands, Natural Resource Operations and Rural Development. As a writer I certainly do not want to tax my reader… but that is exactly what acronyms do.

Some acronyms are okay to use. These are the ones universally known, such as BC, DFO, RCMP. Another class are those that we can sound out phonetically — COSEWIC, SCUBA, LEED. These do not force the reader to search his memory for what we mean. But they still suffer the other problem: attracting the eye and dominating a sentence. In my writing, I personally try to use as few acronyms as possible, and then only when necessary. How do you get around using them? The same way we did before they invaded technical writing — by using synonyms. Rather than referring to the finned creature in my hand as a WCT (do you remember what this acronym stands for from two paragraphs ago?), I can call it a Westslope cutthroat trout, a cutthroat trout, a trout, a 'cuttie', a fish, a salmonid, even *O. clarki lewisi* if I wish. Likewise FLNRORD: call it the Ministry, the agency, the regulator, the government. Not only will this create much better flow within your text, but it makes your writing more interesting by using a diversity of words.

One of the overlooked disadvantages of acronyms is that they are entirely without connotation. Connotation is the meaning of a word beyond its definition. The word 'oak' carries different symbolism and emotional meaning than 'willow' or 'maple', and all of these more weight than the connotation-free 'tree'. These meanings outside of the definition are the connotation of the word. Effective writing uses words loaded with connotation (more on this in a future column). Acronyms wash all connotation from a word, sterilizing the term of potential emotional connection. To those that have seen or worked with Westslope cutthroat trout, the name evokes the beauty of the fish and its cold streams flowing through rugged country; it remains a living animal in the hand, something worthy of consideration and protection. This dissolves away when we use WCT.

So there are, in my opinion, good reasons to do away with, or at the very least dramatically reduce, our use of acronyms. They distract the eye of the reader and so interfere with flow, they require the reader to remember two things rather than one, they remove the very powerful connotation we want in our writing, and simply replacing them with synonyms creates more active, interesting, and varied writing. You can experiment with the effect of this simple change in your writing by taking a few paragraphs in which you use acronyms, and replace them with synonyms. Do they read better? Are they slightly more interesting?

In my experience most people dislike acronyms but feel forced to use them by convention. Take a chance, replace them with synonyms of the original word… you will learn new words and your text will read in a more engaging way.

Next column — Conciseness: an inappropriate goal of writing.

[1] A 2013 film by Summit Entertainment; screenplay by: Ed Solomon, Boaz Yakim, and Edward Ricourt.

IN Memoriam

Geoffrey Lewis Robins

June 2, 1939 - November 2, 2019

We have recently learned of the passing of a CSEB Honorary Life Member in November 2019. Geoff, who was at the inaugural meeting of CSEB and longtime member, was given the Honorary Life Membership at the 2002 CSEB Meeting in Halifax.

Geoff, age 80, passed away peacefully surrounded by family.

Geoff was an outdoors enthusiast, birder and family man. Born in Birmingham, England, he earned his PhD from the University of Liverpool and emigrated to Canada with his wife Mavis. He worked for many years in the Federal Government and was active in community affairs, helping to kickstart the Nanaimo Hornets Rugby Club and support the Rideau Canoe Club in Ottawa.

He is survived by his wife of 57 years, Mavis (Thackray), sons Simon (Isabelle Belanger) and Duncan (Darcy Cain), daughter Kenna (Marc Creamer) and his loving grandchildren Day, Pascale, Liam, Canyon, Philippe, Ella, Sarah and Lucas.

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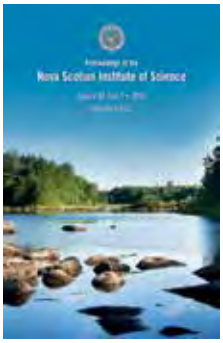

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REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

The Wedge and the Edge, by Ploidy!

"The land was not untouched, but it was unspoiled."
-Donald J. Hughes (1983)[1]

The essence of British Columbia is its biodiversity.

There are many ironies to that simple statement. After many promises, this province still has no *Species at Risk Act* with which to protect its "essence." Then, if and when legislation comes into being, genetic biodiversity may not be its focus. Few people really seem to understand what biodiversity is, beyond "species diversity." There is little political appetite for biodiversity protection of small species, let alone genes. Genetic diversity as the foundation of biodiversity rarely enters in the public conversation. That may be because the government of BC, and the people who elect it, have little or no interest in actually protecting the province or its natural heritage. At best, nature remains a consumer product, either to be extracted as a natural resource, or trampled in recreation.

Beyond recreation, there is still no recognition of the rights of the land or the rights of rivers, such as we now see articulated even in Quebec where distrust in the provincial government moved the municipality of Minganie and the Innu Council of Ekuanitshit to formally grant the Magpie River legal personhood, which includes "the protection of its biodiversity."[2]

This comes at a timely moment when it is becoming increasingly clear that the demands we have been making on this planet, together with the economic reasoning that we have been using to manage nature as just a set of resources is bringing us to the edge, or as Toby Ord puts it, "to the precipice."[3] The mentality that has brought us to the brink is epitomized by the persistent failure of DFO to move beyond "stock management" and recognize that the only wedge we have against the systemic environmental collapse that we are beginning to witness, lies in managing by population. That means managing for stewardship, and according to legal and moral obligations to future generations rather than for immediate returns. Stewardship as management for (not "of") genetic diversity means recognizing, as First Nations culture and good science always have, the rights of the land and of rivers that benefit the many over the rights of a market economy that only benefits a few.

It would be easy to assail the statement that the essence of British Columbia is its biodiversity by challenging either the philosophical concept of "essence," or the arbitrariness of the colonialist cultural and political construct that is "British Columbia." There has, however, always been a touchstone essential to both the geographies and cultures of Pacific North-America, Pacific salmon. The salmon species of the genus "*Oncorhynchus*" have formed the basis of First Nations' economies for thousands of years before they were commercialized to support the short-lived settler prosperity of the last 150 years. If, as some anthropologists and historians have argued, the ability to form an enduring relationship with our environment is a sign of cultural sophistication and maturity, then the collapsing diversity we witness about us should be taken as an indictment of our cultural failure to form a meaningful constructive relationship with the land.

Ironically, this "essence" is highly variable. Although West Coast commercial and recreational fishermen recognize only five or six species, and rarely identify "sub-populations," officially biologists recognize 10 to 12 (or more) species of Pacific salmon in the genus "*Oncorhynchus*."[4] Within each species there are an untold number of genetically variant populations, which is, or at least "was" at the time of contact, proportional with the variety of potential habitats.

The essence of *Oncorhynchus* is therefore a tautology, a self-contradiction. The essence of BC is variability itself, adapted to respond to environmental extremes. It is a mosaic of microhabitats, each composed of individualized communities of uniquely-adapted species. There is a delicate tension between the uniqueness of genetic fit and the uniqueness of specific habitat. Failure to understand that comes with a failure to appreciate the value of the living landscape around us, and what we lose when we replace it with homogenized landscapes of nursery or hatchery products planted and grown for commercial purposes.

Our geology drives genetic diversity. Just as most British Columbians are unaware of genetic diversity, they also remain blissfully unaware that we live in a tectonically active zone. We build mainly on deltas, screes, or alluvial deposits at the bases of steep, young mountains and the mouths of rivers, home to ecosystems driven by erosion and disturbance, and for the most part we live at the water's edge prone to floods and tsunamis. We seek a permanence of homogeneous developments on largely unstable foundations. Unlike the humans, salmon seem to have picked up on creativity of that instability 65 to 95 million years ago.[5] In response, the Salmonidae developed twice as many chromosome arms and twice as much DNA as their relatives. They became autotetraploids to meet the challenges of habitat variety and instability by being able to speciate rapidly.

Oncorhynchus evolved in the Miocene, a period of extreme volcanism, geological uplift, and violent terrain accretion, which witnessed the formation of the province. That "autotetraploid" event in their genetic history served the *Oncorhynchus* genus well in the geologically disruptive Miocene 20 million years ago. To this day, having four copies of extra chromosomes distributed across a broad variation of small watershed-specific populations have made Pacific salmon populations particularly well disposed to adaptation and rapid speciation. Genetic diversity is an essential

survival mechanism for any species, terrestrial and aquatic, adapted to ecosystems characterized by instability and periodic disturbance.

"Genetic diversity" made *Oncorhynchus* particularly well-adapted to the geological instability and variability of the West Coast. It defines us in every way. That is indeed the essence of the land and cultures that we call British Columbia, because it is the basis of its biological resilience. The more we continue to disregard and erode the genetic diversity of the species about us, the more we endanger their long-term viability, and the more precarious the environment we hand to future generations becomes.

That our coastal environment is inherently geologically unstable should have been made particularly obvious to all British Columbians in mid-December, 2020. A 12 kilometre landslide that took out a lake sent a 100 metre wave down the Southgate River valley in Bute Inlet in late November. It is a measure of how unaware we are of our land that the November event was only reported after the massive debris plume out of Bute Inlet was noticed in mid-December.[6] The mechanism for this event was not unlike the deadly Uttarakhand slide in Himalayan India that occurred in early January. In both cases, it appears that a build-up of melted water behind a glacial dam burst and caused an avalanche of ice and rock resulting in a destructive chain reaction downstream in a narrow subalpine mountain valley. In both cases, climate change has become a previously over-looked factor in geophysical assessments, as indicated by civil engineering experts reporting on the Himalayan situation:

> *"While the concept of extreme flooding and even seismic events at dams is usually already mitigated by good civil engineering design, climate change now means events that were previously rare, such as glacial landslides or glacial lake outburst floods (GLOFs) caused by melting ice, are becoming more frequent."*[7]

These disturbances in BC and the Himalayas have always been part of the natural instability of high gradient landscapes, but, as is being increasingly noticed by professionals, climate change is increasing their incidence.

Although engineers note that the frequency of and magnitude of landslides is likely to increase with climate change, the mechanisms for the relationship between climate change and seismic disturbances is largely unstudied. While most of the technical literature focuses on the impact of melting alpine permafrost and melt-water until as recently as 2018, less consideration has been given to the role that "rock moisture" plays. Rock moisture is poorly understood because people think of rock as a dry or dehydrated material. The importance of "rock moisture" in bedrock and its function in the hydrological cycle is not well studied and is frequently overlooked in modelling. Yet, as one (lone) recent study shows, up to 27% of annual rainfall is stored in bedrock. In this state, rock moisture is a major contributor to plant evapotranspiration.[8] This dynamic storage zone fluctuates with climate.

Rock moisture is one of the most important factors in "rock strength." [9] The resistance of rock to fracturing is proportional to the moisture levels of rock. The greater the moisture of rock is, the more it is resistant to fracturing. Increases of as little as 1% moisture dramatically increase the stability of rock. With the increase in extremes of rainfall events, droughts and temperatures that characterize climate change, rock moisture, particularly in exposed rock faces, also fluctuates dramatically. The fluctuation of rock moisture as a response to extreme climate events drives micro-seismic events; that is, micro-earthquakes below 1 on the Richter scale, associated with the weakening of exposed rock surfaces and resulting rock slides.

God and gravity notwithstanding, mass wastage events such as rock slides and landslides are responses to demonstrable measurable physical processes that do not always require apparent or direct human agency. The slide at Bute Inlet was not caused by forestry development. Like the slide at Big Bar on the Fraser River, which resulted in a collapse of salmon populations upstream, the Bute Inlet and the Uttarakhand slides were a product of normal biogeochemical processes set into motion by climate change. These are responses to the changing dynamics of our physical environment governed by the basic laws of physics, with important consequences for both the geology and biology of this planet. As long as climate change continues to develop, British Columbians should expect more rock slides like the Bute Inlet and Big Bar events.

As the civil engineering statement above indicated, climate change impacts are increasing the instability and unpredictability of the natural environment about us. Until now, we have been content to assume that even in tectonic regions like the Pacific Coast or the Himalayas, geological events would be driven by periodic volcanic or tectonic forces, removed from the general stability of the environment around us. With climate change, that stability in high gradient environments and topography can no longer be taken for granted or discounted.

We need to rethink a comforting illusion.

As a recent report released in February indicates, we appear to be seeing the beginnings of large systemic changes driven by climate change, leading to ecosystemic collapses. The model study by Johannes Lohmann and Peter D. Ditlevsen from *Physics of Ice, Climate, and Earth*, The Niels Bohr Institute, the University of Copenhagen, Denmark, concludes that major physical systems are shifting. This well-publicized report suggests that the Atlantic Meridonial Overturning Circulation (AMOC), which is part of the ocean conveyor-belt currents that modulate global climate, is experiencing significant changes.[10] Changes in AMOC could potentially affect other climate sub-systems approaching tipping points. The global implications are consistent with the findings of a report by UK, US, and Australian scientists studying ecosystems from Australia to Antarctica. Their data leads them to conclude that southern hemisphere ecosystems are currently collapsing.[11] The drivers of these collapses are "pressures from global climate change and regional human impacts, categorized as chronic 'presses' (e.g., changes in temperature and precipitation, land clearing) or acute 'pulses' (e.g., heat-waves, storms, fires, and pollution after storms)."[12]

Similar drivers could be observed in northern ecosystems, and we should expect similar reports from the northern hemisphere. While some of the drivers can be addressed in the short term to mitigate and hopefully reverse full blown ecosystem collapses, reversing climate change momentum will require a much longer term commitment, and a change in attitudes towards nature, as suggested by the title of the latest United Nations report *Making Peace with Nature*.[13]

To make peace with nature, we may need to abandon the twin illusions of "resilience" and "sustainability," touted by politicians as a way to just continue business as usual. *Making Peace with Nature* unfortunately confronts neither. Like most political documents, it acknowledges that in the light of the ongoing COVID pandemic, biodiversity collapse poses a serious ongoing risk to human health and human economies. However, it presents no real solutions. It simply returns to the failed Brundtland formula of "sustainability" fixes within an unsustainable economy of endless growth leading to promises of endless prosperity for everybody, all of which remain the source of our on-going problems.

Nature is not endless. It has known quantifiable limits. As we witness the global collapse of ecosystems, and the sudden re-organization of entire watersheds near us, as we have at the landslide of the Southgate river, we might reflect that nature is profoundly fragile, and that the future of the species about us, let alone that of humanity, is increasingly precarious.

We need to embrace a greater sense of the fragility of nature, and reverence for nature. We have treated, and continue to treat nature as a larder that we can raid at will and manage grossly, with little regard for its complexity. Even our conservation areas, our "green zones," our parks increasing show that we treat nature as a playground to be trashed. We love our parks to death. Like Donald Trump, everybody loves nature as a golf course, but would willingly trash the Arctic National Wildlife Refuge to sustain the golfing industry. Nature, it seems, is there to be despoiled for our pleasure. As Daniel Pauly once correctly observed, once we collapse a species or place, we just move on the next one down the chain, and quickly forget the existence of the former.[14] We show very little care. We treat everything as disposable and somehow replaceable or "restorable".

This is particularly obvious when we consider the lessons that can be drawn from the Southgate River and Big Bar landslides. The reaction of Chief Blaney and DFO officials at the possible loss of a generation of coho and chum salmon to the slide was immediately to call for the re-building of "the stock" from hatchery stock in order to sustain "food security," which is another way to say "the economy".[15] Similarly, the approval of the construction of an artificial fishway to facilitate future passage at Big Bar has been complemented with a flurry of hatchery enhancement projects.[16] The approach is that the priority is to "rebuild the stocks." There is no care or craft in supporting even the rapid speciation potential of nature. Furthermore, there is no consideration given to the increasingly high probability that the Big Bar slide is not an isolated event, but as professional engineering reports indicate, part of a new normal set of hazards.

However well-intentioned and socially or economically necessary these projects may be deemed to be by stakeholders and politicians, these are really short-term band-aid solutions in a developing environment of ecological collapses and large systemic changes. There seems to be on all sides little awareness of the changes developing around us and the growing precariousness of our situation. This is all pretending that the habitat systems are stable, or that simplified proxies can be restored or re-engineered at will.

The reality is that the collapse of West Coast salmon lies in the collapse of wild salmon genetics. Notwithstanding the good intentions of DFO's "Wild Salmon Policy,"[17] the vast majority of BC salmon are now largely hatchery stock. Little attention is given to the importance of a largely lost diversity of small populations. In spite of decades of promises that the stock would be returned to "historic numbers," BC's salmon collapse continues. As noted by Dr. Bob Rangeley in Oceana's Canadian Fish Audit:

> *"Out of 33 critical stocks, only six have rebuilding plans. A lot more are scheduled for the coming years, but at the rate we're going it's going to take 37 years to get through those plans, and that's assuming no more stocks get into the critical zone."* [18]

That assumes of course that we can rebuild "the stock" for economic purposes, not necessarily for the purpose of increasing the genetic diversity of small diverse populations back to what it was at the time of contact. The challenge is much bigger than the commercial approach of management by stock. That was, in fact, a problem that Carrie Holt inadvertently highlighted in a webinar presentation for the CSEB.[19] The DFO conservation strategy is not intended to prioritize the interest of the salmon populations. It is intended to maintain the diversity of "the stock", the fisheries stock (not the "populations"), while continuing to make it available as an economic resource. In other words, the economy continues to be the priority and conservation pays the piper.

What this leads to has been shown this fall by H.H. Price with a second study that came out in January on the collapse of population and wild genetic diversity in the Skeena, *"Portofolio Simplification arising from a century of change in salmon population diversity and artificial production"*.[20] Based on long-term data from 1912 onwards, what is reported is that one population, the Babine population, makes up 91% of returns in the Skeena fishery. The Babine population consists mainly of hatchery stock. It now dominates returns, with many smaller populations having been extirpated. Population diversity has declined by 70%. Life histories needed to respond to changes in ocean conditions have shifted or disappeared. The return of wild salmon is 31% of historic numbers. As we know from standard fisheries modelling, 30% is a the critical limit at which fisheries should be shut down. Abundance has contracted throughout the entire watershed, and population diversity has declined by 70%. While the raw numbers of returns appear similar to historic trends thanks to hatchery production, as pointed out by Price and others, the actual low genetic diversity of these sockeye makes them extremely vulnerable to climate change impacts.

Price's work is important because his data on the Skeena sockeye populations is a unique long-term glimpse at the impacts of our fishery management practices. These findings and conclusions drawn from this unique long-term data set are applicable to all of our industrial fisheries, and to all of our industrial resource management practices.

The Skeena fishery is one of our most successful fisheries. Price's results are a condemnation of stock management practices for commercial fisheries, which have resulted in: " the lost stabilizing portfolio effects that this watershed complex hosted a century ago, which ultimately may weaken its resilience to increasingly variable environments" (p.8). What Price ultimately advocates

is an abandonment of an approach by "stock management" and its economic correlate: coastal commercial fisheries. What is being, increasingly suggested by research is the closing of the fishing industry as we have known it for the past 150 years, because it is now endangering the viability of the salmon at a time of increased climate change-driven instability. Price, together with an increasing number of young fisheries scientists, is proposing a return to First Nations' "terminal fisheries" (i.e., in-stream fisheries that can target specific returning populations). Management by populations, rather than by general stock would increase stewardship responsibilities to the environment and promote the maintenance and enhancement of the genetic integrity and resilience.

Fundamental to this reasoning, though largely unarticulated in Price's scientific publication, is the logical reality that the major driver behind the collapse of genetic biodiversity and the dangers that it poses for the survival of BC's salmon, and the First Nations and settler cultures that have relied on the salmon fishery, is the practice of putting the economy first. As Donna McIntyre, the fisheries director for the Babine Lake Nation aptly notes, hatchery enhancement and the artificial spawning channels that flow into Babine Lake are "a blessing and a curse. While they feed Lake Babine's people, they create a false understanding about the overall health of the watershed's sockeye population," [21]

And that reflection is as applicable to all of BC, as it is to our global situation. Prioritizing the economy is a short-term blessing and a long-term curse that undermines the protection of biodiversity, which future generations will need in times of growing adversity and environmental extremes.

However, in BC, our government appears to have little concern for the state of the environment or the need to understand our environmental limits. It prioritizes economic considerations. What it does not understand is that there is a need to show economic leadership, as First Nations and young biologists appear to be doing when they recognize that the time has come for the coastal commercial fisheries to be closed and recreational fisheries on First Nations territories need to be heavily regulated if we are to preserve ecological values essential to functioning ecosystems. The point that our politicians do not seem to understand is that First Nations are not necessarily interested in being integrated into the prosperity of a failing colonial economy. The mindset that clouds the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) discussion is that our politicians interpret UNDRIP as just another avenue to assimilation that will elevate the economic standing of First Nations. The signals indicate that in signing UNDRIP, the Horgan government only understood it as an avenue to First Nations integration, rather than as an opportunity for economic and cultural diversity.

The government's monolithic thinking has been obvious in its handling of fisheries, conservation and energy projects. It endangers us all.

After dubious promises made before the 2017 elections to emulate the State of Washington and remove Atlantic salmon fish farms, the NDP government manipulated the situation to continue to support and expand the fish farming industry by offering First Nations "partnerships" in the aquaculture industry. Years of petitions from First Nations were met by steadfast tone-deafness in Victoria. It took a decision from Ottawa to respect the UN Declaration of Rights of Indigenous Peoples and close down the Discovery Bay farms.[22] This is an estimated loss of 1,500 jobs regionally.[23] The government reaction, after years of prevarication that it would "protect the environment" and close down these farms, was to protest the fish farm closures because of the loss of "well-paying" jobs.[24] The allegiance of the Horgan government was never to the environment or First Nations' rights, but to the benefits of a failing monolithic industrial economy.

The government's recent decision on Site C, which has now skyrocketed from a $5-billion to an official $16-billion project, has been based on exactly the same logic: "The premier said more than 4,000 people are currently employed because of Site C construction, and he is not willing to have them lose their work." [25] These are 4,000 jobs subsidized by the taxpayers on a geotechnically unstable dam site that will never pay for itself. At $16 billion, the province could have subsidized jobs in alternative energy. To compound the problem, the dam site itself will be a major contributor to climate change, both through dam emissions and as an economic driver of the fossil fuel industry that the BC government wishes to promote. These 4,000 jobs that will end in three years are traded for the destruction of one of BC's few large and most productive agricultural valleys. These 4,000 short-term jobs override 5,000 years of cultural presence in violation of Treaty 8, and as pointed out by the Union of BC Chiefs, in clear violation of the government's own obligations to UNDRIP.[26] Site C will stand as a monument to BC's geologically and ecologically unstable future built out of short-term economics, with little or no regard for either the environment or the rights of First Nations.

Even simple conservation of the Spotted Owl (*Strix occidentalis*), which has been an iconic public touchstone for the past 30 years and has persistently been presented by a succession provincial governments as a protected species, finds little protection in BC when it comes to "jobs." After many protestations, and once again only after the intervention of the federal government, BC recently put a "temporary halt" on logging old growth that is home to the last three Spotted Owls in the province. That came after a year of petitioning from the Spo'zem Nation on whose territories the last Spotted Owls were found.[27] One can spin this diplomatically as a wonderful last-minute agreement, but the reality is that BC's NDP government's only priority is jobs for a self-endangered resource economy that has already destroyed most of BC's natural capital. The stay is only temporary because as long as there is old growth, there will be well-paying jobs to cut down old growth, and in BC, jobs come first. However, as the only source of our economy, our "natural capital," becomes more unstable, genetic diversity is always the fulcrum at the edge of things, and nature may laugh last.

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ALBERTA News

Submitted by Brian Free, CSEB Alberta Regional Director

Although Alberta is well known for its oil and gas reserves, coal is another important energy resource. In 2014, nine mine sites produced approximately 30.8 million tonnes (Mt) of marketable coal. Sub-bituminous coal accounted for 78% of the total, metallurgical bituminous coal the remaining 22%.

Last June, the Government of Alberta quietly rescinded the Coal Policy. This policy had been in place since 1976 and an important effect was to protect sensitive lands in the Eastern Slopes of the Rocky Mountains from coal mining. These alpine and foothills areas are highly valued for their scenic landscapes and biodiversity and they include the headwaters for major rivers in central and southern Alberta.

It wasn't until January that news of this policy change became more widely known. The opposition was very vocal, with thousands of people signing petitions and even popular entertainers like Corb Lund and k.d. lang weighing in. (Google them if you must!) Rural politicians and ranchers in southwest Alberta are particularly upset. Concerns have been focused on the lack of transparency in removing the policy, the potential impact on highly valued Alberta landscapes, and concerns that mining operations could release selenium into rivers that serve as drinking water sources.

In the face of growing public opposition, the Alberta government has reinstated the 1976 policy and cancelled a number of coal leases in the region. However, it is reported that the cancelled leases only cover some of the coal exploration leases the government issued since rescinding the Coal Policy.

The Alberta Government has announced that they now intend to update the 1976 Coal Policy and will include public consultation in this process. CSEB members who are interested in this issue can receive regular updates about engagement opportunities by submitting their contact information to https://www.alberta.ca/coal-policy-development-engagement.aspx

Alberta's Chief Scientist

Alberta Environment and Parks has a "Chief Scientist" whose job it is to provide scientific oversight for the provincial environmental science program. The current Chief Scientist is Dr. Jonathan Thompson. Dr. Thompson has contributed to wildlife and wetland science and environmental monitoring efforts in Alberta for over 30 years including 12 years as an Adjunct Professor in Biological Sciences at the University of Alberta.

There are also two panels advising the Chief Scientist and the Minister of Environment and Parks; the Science Advisory Panel with a number of scientists from Canada, US and the United Kingdom. As well, there is an Indigenous Wisdom Advisory Panel with elders and prominent First Nations and Métis representatives, so that an indigenous perspective can augment our western science.

Of special interest to CSEB members is the series of webinars sponsored by the Office of the Chief Scientist. They are held

bi-weekly at 1:30 p.m. Mountain Time. You can subscribe to the series by emailing aep.ocs@gov.ab.ca with the Subject Line: "Subscribe to Science Seminar Mailing List". The slide decks from past webinars can be viewed at https://albertagov.app.box.com/s/64no3bp520n4e7g54d0dpb11tr8wuzl7.

Alberta Creates World's Largest Contiguous Protected Boreal Forest Area

Alberta's government is planning a massive expansion of protected forest in the Kitaskino Nuwenëné Wildland.

The expansion will add about 143,800 hectares of land to the protected area in northeastern Alberta – almost three times the size of Waterton Lakes National Park.

The expansion aligns with the Alberta Crown Land Vision, which guides our management of Alberta's rich, natural heritage of Crown lands. Expanding the Kitaskino Nuwenëné Wildland will:

- Help protect the landscape, watersheds and wildlife in the area, including bison and woodland caribou.
- Support Indigenous Peoples' traditional activities, including the exercise of treaty rights.
- Create recreation opportunities for Albertans. Backcountry recreation opportunities will be available in the area and the landscape would keep its wild, undeveloped character. Recreation opportunities would be wilderness-oriented, such as remote backcountry experiences, hunting and fishing, and connecting with nature. In the future, trails and backcountry campsites may be provided to support safe and sustainable recreation opportunities.

"Alberta's northern boreal forests are an important wildlife habitat. Today's announcement creates the largest protected forest area in Alberta history. This will protect an important ecosystem for generations to come, allowing for backcountry recreation and Indigenous communities to practice traditional activities, like hunting, trapping and fishing. This is a classic Alberta partnership between industry, First Nations and government."
– Jason Kenney, Premier

"Alberta's government is committed to a common-sense approach to conservation planning that recognizes the importance of collaboration between government, Indigenous communities and industry. The proposed expansion of Kitaskino Nuwenëné Wildland is yet another example of that commitment – and will add to the largest contiguous area of boreal protected land in the world once completed. I look forward to working closely with industry partners, land users and Indigenous communities to make this fantastic project a reality."
– Jason Nixon, Minister of Environment and Parks

"The expansion of Kitaskino Nuwenëné Wildland Park is part of our vision for protecting the Peace Athabasca Delta and important resources like caribou and wood bison. We applaud the collaborative effort that brought us to this point, including the broad support from our partners in the energy and forestry sectors, the provincial and federal governments and other Indigenous nations. This is a big, shared achievement."
– Chief Peter Powder, Mikisew Cree First Nation

The Government of Alberta has worked toward this expansion since the establishment of the Kitaskino Nuwenëné Wildland in 2019. Mikisew Cree First Nation led collaborative work on a potential expansion, and discussions have occurred with other Indigenous communities, industry stakeholders, and the Government of Alberta.

Industry stakeholders, including Athabasca Oil Corporation, have contributed to the proposed expansion plans by agreeing to surrender their Crown mineral agreements in the area.

"We are pleased to contribute leased land to this important collaborative conservation effort between government, Indigenous communities and industry. Sustainability leadership is a core element of Cenovus's strategy, and with our contribution to the proposed Kitaskino Nuwenëné Wildland Park expansion, we are progressing two key sustainability priorities – engagement with Indigenous communities and land stewardship, including the protection of caribou."
– Rhona DelFrari, chief sustainability officer and senior vice-president, Stakeholder Engagement, Cenovus.

"Since 2019, Athabasca Oil has been collaborating with the Mikisew Cree First Nation and the Government of Alberta to expand the Kitaskino Nuwenëné Wildland Park. Athabasca Oil has relinquished over 95,000 hectares of mineral rights to help make this park expansion a reality. The expansion of the park will help the province meet its biodiversity and conservation goals in this culturally and ecologically significant area. This represents a significant success for Indigenous communities, industry and Albertans."
– Rob Broen, president and CEO, Athabasca Oil Corporation.

Quick Facts

- Kitaskino means "our land" in Cree and Nuwenëné means "our land" in Dene.
- In 2019, the Government of Alberta established the Kitaskino Nuwenëné Wildland – over 160,000 hectares of land just south of Wood Buffalo National Park.
- The expanded area is located between the Birch River Wildland Provincial Park and existing Kitaskino Nuwenëné Wildland, south of Wood Buffalo National Park.
- Almost all of the proposed expansion overlaps with woodland caribou habitat.
- The expansion area overlaps a small portion of the Ronald Lake bison herd range.
- Both woodland caribou and wood bison are identified as species at risk.

Source: Alberta Government Website

Dr. David Schindler

August 3, 1940 — March 4, 2021

Canada lost a renowned biologist earlier this month, who will certainly be missed. We will be following up with a more detailed article in our next CSEB Bulletin.

SASKATCHEWAN News

Submitted by Curt Schroeder, CSEB President and Saskatchewan Member

The Saskatchewan portion of the Keystone XL pipeline was destined to traverse approximately 267 km through the southwest corner of the province until new US President Biden signed an order stopping further pipeline development in the United States. There were many environmental challenges associated with this proposed development, but economic benefits as well. Saskatchewan and Alberta governments were major proponents, with Alberta's significant investment now likely a write-off. Oil transportation may well switch to rail, which is generally seen as more expensive and environmentally more costly. Whether those costs are passed on to consumers will likely depend on supply and demand pressures globally.

The environmental arguments against the pipeline focus on crude oil spills, which can harm property, affect human health including fatalities to fish and wildlife, and drinking water supplies. Oil on the surface of water bodies blocks sunlight, damages fish eggs, and impacts plankton. Oil can linger in the environment for years, despite cleanup efforts, continuing to affect fish, wildlife, and society. Tourism in oil spill areas could drop significantly. These impacts depend on the type of liquid being transported by the pipeline and the adjacent landscape.

However, Canada determined that these environmental risks are small or manageable, and approved the construction of the Canadian portion of the pipeline.

President Biden noted that the pipeline is inconsistent with his administration's economic and climate change plan. Perhaps the KXL pipeline is a turning point in the energy policy in North America. With the emergence of electric vehicles, consumer demand for oil in the transportation sector can only decline.

MANITOBA News

Submitted by Robert Stedwill, CSEB Vice President

Coordinated Aquatic Monitoring Program (CAMP)

My experience has been that many of the difficulties associated with environmental monitoring have been due to the lack of coordination between various agencies monitoring various aspects of the environment, at increased cost due to duplication of effort. Having worked for an electrical utility in Saskatchewan in the environmental area, I know of what I speak. The Coordinated Aquatic Monitoring Program in Manitoba makes considerable sense when dealing with government.

This past year marks the 12th year of aquatic monitoring coordination since implementing CAMP in 2008/09.

"The program was initiated to address comments received from communities and the Clean Environment Commission about the need for system-wide monitoring to better understand the effects of hydroelectric operations on the aquatic environment. In 2006, Manitoba and Manitoba Hydro signed a Memorandum of Understanding (MOU) and the CAMP partnership was established. The MOU outlined the objectives of the program and requires an annual summary of activities.

The Coordinated Aquatic Monitoring Program is an ecosystem-based monitoring program that samples key biological/chemical/physical parameters at different levels of the food web.

These variables, along with hydrometric data, are used to describe the ecological condition and status of aquatic ecosystem health in the waterways in which Manitoba Hydro operates. The selected parameters were determined based on the best advice of scientists and regulators that participated in annual CAMP workshops that started in November 2007. Attendees included representatives from Manitoba Conservation and Water Stewardship, Manitoba Hydro, Fisheries and Oceans Canada, University of Manitoba, Environment Canada and North/South Consultants Inc.

"The program is assessed annually and adjusted to ensure that it maintains scientific credibility and is on scope for meeting the objectives of the MOU." The most recent report suggests that the program has been successful and most of the fieldwork was accomplished as planned, and the program goals were met overall.

"Recent [and future] developments to the program include the following:

- Testing the feasibility of installing water quality data loggers in generating stations.
- Increasing communication products and plain-language documents.
- Completion of the 6-Year Technical Reports and Summary Document.
- Implementation of ArcGIS Online to view the CAMP data.
- Increasing collaborations with communities.
- Exploration of the addition of shoreline health monitoring.

Additional items to be developed over the next few years include the following:

- Development of a pilot program for shoreline health monitoring.
- Continuation of community participation.
- Investigating opportunities for citizen science to complement the CAMP data".

CanWhite Sands Corporation Project

CanWhite Sands is a Calgary-based company looking to create a multi-million-dollar silica sand facility in the Rural Municipality of Springfield (RM), but obviously local residents have concerns

ranging from water quality impacts to noise pollution and impact on real estate values. The $80 million project would extract and process the resource from a large area in the RM. The proposal is to develop a high purity silica sand facility and extraction project in Vivian, Manitoba. Sand will be mined and processed for transport by rail in the Vivian area for use in the high purity silica markets, such as medical glass, renewable energy, batteries, fibre optics, electronics, and others. CanWhite filed a formal Facility Project *Environment Act* Proposal (EAP) July 3, 2020, and intends to file a subsequent Extraction EAP in Spring 2021. CanWhite is also seeking local municipal approval from the RM of Springfield as the project progresses through the approval process, and information requested becomes available. As requested by Manitoba Conservation and Climate, Environmental Approvals Branch (MCC), CanWhite Sands Corp. and AECOM Canada Ltd. (AECOM) hosted a meeting December 15th, 2020 to discuss the Vivian Sand Facility Project, to provide further details and an update on the project to the public. This meeting followed an earlier meeting held on May 26, 2020, when the project was first introduced to the local community. This meeting updated the public on the latest project time-lines and activities, responded to many of the questions and comments brought forward during the Public Comments and the Technical Advisory Committee (TAC) assessment period filed with MCC since the first public meeting, and provided an opportunity for the public to ask further questions. Due to the ongoing COVID-19 pandemic, permission was granted by MCC to host the meeting on a virtual platform, with an interface to allow interaction from the public. Topics that were brought up through live questions, speakers, and emailed questions varied.

Many questions had previously been asked during the public review period or the first public meeting, ranging from high level questions on job opportunities and community benefits, to more technical specific questions on air quality such as odour, dust, and air pollutants, as well as aquifer impacts such as those that might affect wells. All questions that could be answered were responded to, with those remaining appropriate questions to be included for topics in the upcoming Extraction EAP. It is interesting to note, that even in the middle of a pandemic, an environmental approval process can carry on, with no interruption.

ONTARIO News

By Barbara Hard, CSEB Ontario Director

Significant changes to the *Conservation Authorities Act* were introduced at the end of the year 2020.

The role of conservation authorities is to protect Ontario's environment and ensure people and property are safe from flooding and other natural hazards.

On November 5, 2020, the Province of Ontario introduced Bill 229 pursuant to the *Protect, Support, and Recover from COVID-19 Act* (Budget Measures), 2020.

The Bill proposes to amend numerous Acts including the *Conservation Authorities Act* (CAA) and the *Planning Act*. Proposed changes to the CAA significantly impact the land use planning regime. In particular, the changes affect an applicant's appeal rights for development permits and associated fees. The proposed changes also impose decision-making time-lines on Conservation Authorities and limit the role of Conservation Authorities in the municipal planning process and their ability to ensure a watershed-based approach for conservation of natural resources.

Planning Act amendments exclude Conservation Authorities from the definition of "public body," which means that Conservation Authorities are no longer permitted to appeal a municipal council's decision to the Local Planning Appeal Tribunal (LPAT), nor are they permitted to become a party to a *Planning Act* appeal.

ATLANTIC News

By Peter Wells, CSEB Atlantic Member

The following is a potpourri of current environmental issues in Nova Scotia, of interest perhaps to the aspiring and engaged environmental biologist! Apologies to the other Atlantic provinces for my lack of information, hopefully soon to be filled in by others.

Conservation and Protection

The Continued Lobster Fishery Dispute

The lobster dispute continues unabated and unresolved, with native communities asking for access to the fishery year-round, despite DFO regulations. Miller (2020) provided a roadmap for solving the dispute, focusing on how to protect the lobster stocks based on science (what we know about lobster biology) and recognizing that in the era of climate change, it is better for all parties to manage the stocks with considerable caution.

Oceana Canada Report – Fourth Annual Fishery Audit

Oceana Canada has released its fourth annual fishery audit, showing that "just 26.5 percent of the stocks managed by DFO are healthy, and the number of healthy fish populations has declined by 8% from 2017 to 2020" (Dean-Simmons 2020a). This report covers all of Canada. It drew a firm response from DFO, with the usual platitudes about restoring and protecting fish stocks, species at risk, and habitats. In the meantime, real concerns persist regarding salmon, capelin, mackerel, and herring.

North Atlantic Right Whales At Risk To Ship Strikes

There are still major concerns about the effects of ships, large or small, on this whale (Campbell 2020c). A study was published recently in Marine Mammal Science, assessing the impacts of ship strikes using biophysical models and emphasizing the increased need for vessel exclusion zones and fisheries closures to protect the whales, which spend a lot of time at the surface (Kelley et al. 2020). Its population is down to approximately 400 individuals, and recently, two more deaths have been reported off the Florida coast, both new-born calves. It is clearly a species on its way to

extinction unless protection measures prove to be successful over the next few decades.

Sable Island and Its Horses

The Sable Island National Park Reserve has been granted new monies "to study and protect the habitat of the wild horses, grey seals, and the "sweat bee" (Campbell 2021a). In particular, the influence of the horses (popularly called ponies) on the island's sand dune and freshwater pond habitats will be studied, installing exclosure fences in a Fences in the Sand research project. More interpretive material will also be prepared, designed for virtual visitors.

Forestry, the Mainland Moose, and Other Species At Risk

The forest clear cutting issue warmed up in late fall 2020, with members of an environmental group, Extinction Rebellion, and others blocking access roads to a logging operation in southwest NS, in an effort to reduce logging in prime moose habitat (Campbell 2020d,e; Malcolm 2021). A petition from Nature Nova Scotia received 29,000 signatures, illustrating the concern of citizens about both the clear cutting and the threat to endangered species. Clear cutting on Crown Land seems to have increased, with the government being slow to implement the much mentioned Lahey report and the *Endangered Species Act*. Clear cuts are very apparent along some of the major highways, such as Hwy. 8 from Liverpool to Annapolis Royal in the southern part of the province, with no attempt to either hide them or leave patches of woodland as required by law. Citizens continue to speak out on the issue, concerned about the fate of both the forests and the forest dependent species, many of which are close to extirpation from NS (e.g., pine marten, Canada lynx, mainland moose, wood turtle, barn swallow, rusty blackbird, Canada warbler, Bicknell's thrush, eastern wood peewee, chimney swift, rams-head lady slipper, eastern whip-poor-will, white cedar, and American elm), according to an informed science high school teacher (Malcolm 2021). Clearly, this issue begs more discussion and hard decisions, especially now that the province has a new Premier with an environmental bent.

Protecting the Owls Head Park Reserve

Opposition continues regarding the delisting of a provincial park, the Owls Head Park Reserve, in order to sell it to an American developer for a golf course, a scandal that received a lot of press in 2020 despite people's attention being on the COVID-19 pandemic. It is hoped that the new Premier will reverse the decision (Campbell 2021b), given the many ecological values of the park, and that the park will continue to be protected from such development under the provincial Parks and Protected Areas Plan. This story showed that the Province's provincial parks are not really protected by legislation and currently any of them can be delisted at any time, for any reason, by the sitting government.

(Over)development of Peggy's Cove

Peggy's Cove, near Halifax and one of Nova Scotia's prime tourist attractions, is undergoing some infrastructure renewal to better accommodate the growing number of visitors (Peddle 2021; Angel 2021). Roads are being widened and a viewing platform will be constructed near the rocks to allow better and unimpeded access to the view. This is attracting a lot of negative community feedback due to the fear of spoiling the village and its iconic beauty. It reminds one of the large viewing platform constructed in Banff National Park near the Athabasca Glacier, criticized for turning the park into a theme park and spoiling natural views.

Federal Govt. Sustainable Ocean Economy Plan and Ocean Protection Plan

A new report, *Transformation for a Sustainable Ocean Economy*, has been released by Fisheries and Oceans Canada (Dean-Simmons 2020b). It describes a number of principles related to sustainably managing ocean resources, i.e., the fisheries, taking into account various conventions and agreements that Canada has signed, such as the 2015 Paris Climate Agreement and the Convention on Biological Diversity. There is a focus on rebuilding wild fish stocks and supporting a range of ocean industries, from aquaculture to tourism. A multi-nation ocean panel is developing an action plan to protect and manage oceans, but it would greatly benefit from advice and input from local coastal communities, according to Tony Charles of Saint Mary's University, Halifax (Campbell 2020a).

Pollution - General

Groundwater Contamination From A Waste Site?

There is an eye opening, well produced, short video documentary (13:43 minutes) on the disruption caused by a construction and demolition debris facility on North Mountain, near Bridgetown. The facility is located in a wetland area that feeds several brooks and some 20 wells on adjoining properties in the Fundy watershed. Residents of Arlington and St. Croix Cove on the Bay of Fundy have been worried that asbestos and autofluff stored on the site are poisoning their wells. The video is accessed at Poisoned Village (Nova Scotia Advocate). This input is courtesy of Dr. Jon Percy, Granville Ferry, NS.

Coastal Monitoring - Gulfwatch Samples Now At The HMSC

The Gulf of Maine Council's long standing Gulfwatch monitoring program has maintained an archive of frozen mussel tissue samples for many years at the Bedford Institute of Oceanography, Dartmouth, NS. These samples are invaluable for analysing the presence and levels of new environmental chemicals of emerging concern. Due to space changes, the samples have been moved to freezers at the Huntsman Marine Science Centre at St. Andrews, NB. They will be re-sorted, inventoried, and made available for scientists interested in chemical contaminants in the Gulf of Maine and Bay of Fundy.

Energy development

Tidal Power – New Tidal Power Platform for Bay of Fundy

A new "next generation" tidal power platform, developed in NS, is soon going to be commissioned and tested in the Bay of Fundy, with eventual deployment in the Minas Channel at the Fundy Ocean Research Centre for Energy (FORCE), Parrsboro (Chronicle Herald 2021a). It is a surface system, relatively easy

to install and maintain, and to monitor for potential environmental impacts on fish, seabirds, and mammals.

Renewal of BP Offshore Drilling/Exploration Licences

BP's exploration licences off NS have been renewed, causing some consternation by the Council of Canadians and Offshore Alliance (Chronicle Herald 2021b) due to BP's less than enviable records for oil spills in the offshore. A moratorium is being called for, as well as "an independent inquiry on the social, economic, and environmental impacts of offshore drilling".

Climate Change

Oceanographic Changes in the Gulf of St. Lawrence

A new ocean climate data report by Fisheries and Oceans Canada on the Gulf of St. Lawrence describes the changing temperatures and stratification of its ocean currents, attributing the changes to global warming (Beswick 2021; CBC News Jan 26th 2021). The Gulf is apparently warming quickly, as shown this winter where it is almost ice free with huge ramifications for species such as seals that pup on the ice. Other species such as cod and snow crab also may be impacted by the warmer waters.

Nova Scotia Reassessing Climate Change Risks

The NS provincial government is updating its climate change risk assessment (Campbell 2020b), in the light of concerns about potential impacts to vulnerable areas, e.g., coastal flooding, enhanced coastal erosion, and government policies regarding energy production and use.

Papers of Interest

A new paper of the fishes and fisheries of Minas Basin, Bay of Fundy, has just been published:

Dadswell, M.J. and Rulifson, R.A. 2021. A review of the fishes and fisheries of Minas Basin and Minas Passage, Nova Scotia, and their potential risk from tidal power development. Proceedings of the Nova Scotian Institute of Science 51(1): 39-125.

Another one that might be of interest is as follows:

Cook, Steven J. et al. 2020. On "success" in applied environmental research — What is it,how can it be achieved, and how does one know when it has been achieved? Environmental Reviews • 26 August 2020 • https://doi.org/10.1139/er-2020-0045

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Campbell, F. 2020d. N.S. 'whacking away' at moose habitat. The Chronicle Herald, Halifax, NS, Nov. 27th, p. A3.

Campbell, F. 2020e. Forestry. Blockades persist despite injunction. The Chronicle Herald, Halifax, NS, Dec. 15th, p. A4.

Campbell, F. 2021a. Project will study horses' impact on Sable Island ecosystem. The Chronicle Herald, Halifax, NS, Feb. 8th, p. A7.

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Miller, R. 2020. Roadmap for solving lobster fishery dispute. The Chronicle Herald, Halifax, NS, Dec. 29th, p. A6.

Peddle, S. 2021. Peggy's Cove plans spark debate. The Chronicle Herald, Halifax, NS, Jan. 22nd , p. A1.

TERRITORIES News

Submitted by Sharleen Hamm, RPBio, Former CSEB Territories Director

The mandate for the Minister of Environment and Climate Change includes creation of Canada Water Agency to find the best ways to keep our water safe, clean, and well-managed. A discussion paper, "Towards the Creation of a Canadian Water Agency" was issued in December 2020 along with discussion questions. Subsequently, a National Freshwater Policy Forum was convened in January, followed by regional forums in February, convening interested public for panel discussion and facilitated break out groups focussed on the discussion questions. I participated in the Northern session, wherein we heard from representatives from the Nunavut Water Board, the Yukon Government Water Resources Branch, Dan Kiye Renewable Resources Council, and the Government of Northwest Territories. Among many things, we discussed territorial water strategies — or lack thereof —, as described below. Themes of collaboration, ongoing engagement, communication, and leveraging existing knowledge and ways of knowing can be observed throughout.

The Yukon Water Strategy and Action Plan was released in 2014. It was a five year plan, including six priorities and 13 specific goals aimed at maintaining the quality, quantity and health of Yukon's ground and surface water, in order to support both people and nature in the territory. In November 2019, the five year review report was released outlining progress made in the following six priority areas:

1. Better understand Yukon's groundwater regime.

2. Maintain and improve access to safe drinking water.
3. Promote the sustainable use of water.
4. Improve the sharing of information about Yukon's water.
5. Improve water management programs.
6. Plan for water needs now and in the future.

Subsequent ongoing work includes the following:

- Developing groundwater management, water well drilling, and monitoring regulations.
- Working towards development of a Yukon wetland policy.
- Advancing transboundary water management agreements.
- Collaborating with researchers and knowledge holders to further advance collective knowledge and understanding of Yukon's water.
- Mapping flood risks for 13 Yukon communities.

The **Northwest Territories Water Stewardship Strategy** was released in 2010 and updated in 2018 (note that the update was released in 11 languages), with Action plans released for 2011-2015 and 2016-2020. The goals of the strategy are as follows:

- Waters that flow into, within, or through the NWT are substantially unaltered in quality, quantity, and rates of flow.
- Residents have access to safe, clean, and plentiful drinking water at all times.
- Aquatic ecosystems are healthy and diverse.
- Residents can rely on their water to sustain their communities and economies.
- Residents are involved in, and knowledgeable about, water stewardship.
- All those making water stewardship decisions work together to communicate and share information.
- Some of the many actions forming the keys to success include the following:
  - Advancing transboundary discussions, agreements, and obligations.
  - Collectively developing comprehensive monitoring and research programs to understand ecosystem health and diversity.
  - Developing consistent approaches to research and monitoring that will increase our ecosystem understanding.
  - Reporting research and monitoring results.
  - Developing and updating guidance and policy documents for water partners to ensure consistent, transparent stewardship actions and decisions.
  - Ensuring water managers have the capacity to fully promote compliance.

More info on NWT's Water Stewardship Strategy can be found here: https://www.nwtwaterstewardship.ca/en/water-stewardship-strategy

Nunavut, on the other hand, is the only Canadian jurisdiction without a water management strategy. As an Institute of Public Government established pursuant to the Nunavut Agreement, the Nunavut Water Board is undertaking development of Nunavut's water management strategy. A draft discussion paper on development of a strategy was released in 2018. It proposes a development process, outlines a framework, and identifies stakeholders. Terms of reference and invitations for a Steering Committee have been issued, and a draft Communication, Consultation, and Engagement Plan drafted. During the northern regional policy forum on the Canada Water Strategy, participants called for prioritizing development of Nunavut's water management strategy.

Documents related to Nunavut's water management strategy development can be found on the NWB ftp site: ftp://ftp.nwb-oen.ca/other%20documents/Water%20Management%20Strategy/

Submitted by Anne Wilson CSEB Territories Director

With northern travels curtailed for the past year for people coming from out of the Territories, virtual connections have replaced in-person meetings and social interactions. Northern regulatory and environmental assessment boards have adapted to virtual platforms, often in tandem with local meeting hubs under strict health protocols. Research and monitoring programs have been challenged by quarantine requirements and border restrictions, but have adapted.

Winter is now being counted in weeks left, rather than months, after a spell of below-average cold weather for the western Arctic. This time of year, the increasing daylight length becomes dramatic, particularly the farther north a community is located. For example, Grise Fjord went from twilight to the sun first rising on Feb. 10th, and gains between 45 and 15 minutes additional light each day until April 23rd, after which the sun does not set next until Aug. 19th!

News Bits:

- Consultations are currently underway on the new Canada Water Agency, and were held for the North on Feb. 18th. More information can be found at https://www.canada.ca/en/environment-climate-change/corporate/transparency/consultations/protecting-canada-fresh-water.html
- The Canadian Arctic Resources Committee (CARC) announced on Feb. 18 that it is permanently shutting down after 50 years of working in the North, having fulfilled its mission of supporting informed decision-making and helping people of the North regain their place in Arctic development. CARC will be publishing a book chronicling progress made on issues important to the NGO, to be published online in May or June.
- COVID testing of wastewater has been done in Yellowknife, and was key in successfully detecting cases that hadn't been previously identified. Results of testing wastewater in the NWT for traces of COVID-19 are now available online; the GNWT's COVID-19 dashboard has added a tab for NWT Wastewater Monitoring. Testing is ongoing in Yellowknife, Hay River, Fort Smith, Fort Simpson, Norman Wells, and Inuvik. The portal includes data collection periods. Whitehorse has also recently initiated testing.
- Dominion Diamond Mines closed the sale of its Ekati Mine to Arctic Canadian Diamond Company Ltd. on Feb. 3, following a 10-week phased restart at the mine beginning in November 2020 and a return to normal operations by Jan. 20, 2021.
- Baffinland Iron Mines's Mary River iron ore mine is undergoing public hearings for a significant expansion of production, including construction of the first rail line in Nunavut. Concerns with the pace of development have been raised by local residents, culminating in a protest by hunters and residents. The standoff at Mary River Mine ended Feb. 11 after a week-long blockade of the airstrip and tote road, which shut down production and travel by workers. Interestingly, the four demands made by the protesters were to the Inuit organizations Nunavut Tunngavik Inc. (NTI) and the Qikiqtani Inuit Association (QIA), which administer the benefits agreements, and not to the mine owners. Baffinland wants to double the mine's output from 6 to 12 million tonnes of iron ore by building a railway and increasing shipping through narwhal habitat. Hearings for the environmental review for the Mary River Iron Mine expansion will continue in Iqaluit, starting on April 12. The Nunavut Impact Review Board says the hearing are meant to give more time for communities to speak and ask questions.
- Students doing work on northern projects can apply for support through the Northern Scientific Training Program, which is now accepting applications for 2021-2022. https://www.canada.ca/en/polar-knowledge/fundingforresearchers/northern-scientific-training-program.html. Applications must be made by the Chairperson of a Northern Studies Committee at a Canadian university or the equivalent; applications from individuals are not accepted. If a student's university does not have a recognized Northern Studies Committee, the candidate may apply through a participating university. The program funds projects on northern topics from all disciplines and in multi-disciplinary fields.
- If you are just interested in learning more about the Arctic, there are a number of free online courses available:
  - Introduction to the Arctic: Climate. The University of Alberta, the University of Tromso, and the University of the Arctic invite you to explore this four week course that examines the environment and climate of the circumpolar North. https://www.coursera.org/learn/arctic-introduction-climate
  - Arctic Climate, Environment, and Geographies of a Changing North. The University of Colorado Boulder offers free audit of this course, which takes an in-depth look at the physical geography of the Arctic and its key climate features, the remarkable unfolding changes that are transforming the Arctic environment, how they are related to each other, and cascading impacts on terrestrial and marine ecosystems. https://www.coursera.org/specializations/

arctic-climate-environment-geographies?action=enroll&aid=true

The pace of environmental assessments and regulatory processes in the North has picked up, with the shift to virtual platforms for technical meetings and hearings allowing processes to occur in a timely fashion once again. Some of the current reviews include the following:

- As noted above, the Environmental Assessment process for Baffinland Iron Mine's proposed Phase 2 expansion public hearings are underway, with the community component scheduled for April 12-21, 2021. The Phase 2 Water Licence amendment process is expected to follow completion of the IA process.
- Agnico Eagle's Meliadine Gold Mine is dealing with higher volumes of saline water than predicted, and following an emergency basis discharge, has applied to permanently increase the Water Licence discharge limits for total dissolved solids into a freshwater lake. Public hearings are scheduled for April 1-2, 2021. They are also undergoing an environmental assessment for the construction of a water line for marine discharge of saline effluent, with hearings expected in late April.
- In the diamond mining sector, De Beers' Gahcho Kué mine application for an expansion for extraction of additional resource has been approved. This will extend the mine life by two years, and will be done without increasing the overall footprint.
- The Diavik Diamond mine Water Licence amendment to dispose of processed kimberlite into mined-out pits and mine workings has been through public hearings and is awaiting a decision from the regulatory board.
- Custodians of the historic Rayrock Mine have applied for a new Type A water licence to carry out remedial activities. The tailings were capped and the site abandoned in the 1990s, but further work is needed to stabilize and encapsulate. Hearings are scheduled for April 13-15, 2021.
- Pine Point Mining Limited has submitted an application to mine the historic Pine Point site lead-zinc deposits, located near Hay River, NWT. This project is undergoing an Environmental Assessment. Management of brackish/poor quality groundwater is expected to be an issue.
- Sabina's Back River Gold project has applied to modify and expand the approved development (not constructed), with technical meetings scheduled for March 23-24, 2021.

Closing:

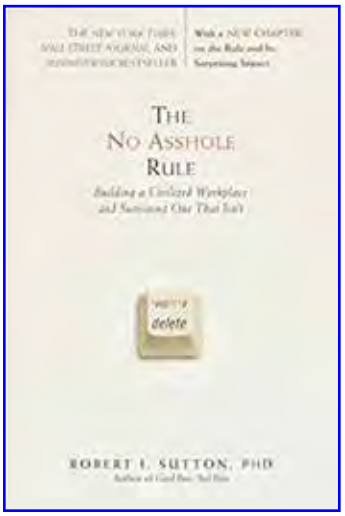
If you are connected to activities in the Yukon, Northwest Territories, or Nunavut, doing work north of 60° that you would like to highlight in the Bulletin, or running some seminars or other training opportunities, please let us know. The CSEB provides a valuable networking and communication forum, and a voice for biologists on 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 Wilson at anne.wilson2@canada.ca. There is also an opening for another Territories Director – please contact Curt Schroeder or myself if you would like to take on this role!

BOOK Review

Submitted by Bob Gainer, CSEB Alberta Member

The No Asshole Rule: Building a Civilized Workplace and Surviving One That Isn't

by Robert I. Sutton. 2010. Business Plus. Available from Amazon.ca ***$16.98 CAD***



I know this sounds a little off topic, but as one of the CSEB's more senior members, I thought it probably applies to us as much as any field of endeavour.

My wife, a psychiatrist, bought me this book. This is strange because I have always bought my own books or borrowed them from libraries or downloaded articles. She is an educated Brit (Scot actually), avoids coarse language, avoids spending money on me, yet she found it in her heart to buy me this book? She said it makes it easier for me to deal with difficult people who I sometimes complain to her about.

"Hmm" I thought to myself, "What does this mean to me?" as I reluctantly accepted her gift. "Another self-help book?" The first one resulted in me giving up alcohol (sob) 25 years ago in order to retain my wife and children. The latest one was on anger management, which I actually am glad for. Now I refuse to react to my wife when she is upset with me and if she continues, I get up and leave, because "that is what the anger management course taught me to do dear." It actually made her madder. "Don't you dare leave when I am speaking to you," but she had to admit I was right. Now she has outsmarted me, again.

I always go to the back of a book and read the conclusion first to see if there is any reason to read it. The conclusion: "I am the biggest asshole. Admitting it is the hardest part." Now I know why my wife bought me this book in the first place, with her money and with such a coarse title! Never underestimate an angry Scot.

Actually it means that, to some degree, we can all be assholes. Accepting that fact allows you to deal with it. "Hi, my name is Bob, I'm an asshole." Just make sure you actually do something about it and don't just talk about it. To stop drinking, I couldn't allow myself even one drink, once in a while, ever, because I knew I couldn't trust myself to control it. Maybe that is why I didn't survive to a second term as a politician at the lowest, municipal level.

My favourite Netflix show is "The Kominsky Report" about two 75+ year old Hollywood characters, played by Michael Douglas and Alan Arkin, dealing with ageing. It is supposed to be a comedy mocking their pathetic lives but there are many clear messages to be learned. After two seasons, the character played by Arkin

finally finds out he has had a life with an anger management problem. For him to start a new relationship with a woman, and for him to repair his relationship with his daughter, he has to learn to deal with it. The problem was, being angry and an asshole was very effective in making his talent agency a great success. What does that say about Hollywood? Unfortunately, he didn't leave it at work and he brought it home, and his poor daughter suffered because of it. Arkin spends the next episodes being a kind and tolerant father. Wow, that was a powerful moment in that show for me. A home run episode. This is what this book and Sutton's message is.

I'm not much for poetry, although I plan to do a book review on Robert Service soon. Sutton quotes a poem by Kurt Vonnegut (2005) about being at a billionaire's party together with Joe Heller, author of the 1960s "awareness" or now "wokeness" novel "Catch 22". Farley must have got some of the inspiration for his Wartime books from this book. Vonnegut says to Heller "Joe, how does it make you feel to know that our host only yesterday may have made more money than your novel earned in its entire history?" And Heller replied "I've got something he can never have. The knowledge that I've got enough." I've paraphrased what was a poem. Another message from Sutton: It is getting easier to "confront the hard facts about myself rather than wallowing in my protective delusions." Asshole know thy self.

I have three children that played several sports but the one that dominates in small prairie towns is hockey. For 15 years, I took them to their games and their practises. For the first three years, I was one of those parents who shouted at the referees and took the rivalry serious. Slowly, I noticed how ridiculous other people looked that were like me and I just stopped. I wouldn't say a thing during the game or practises unless it was positive. I just accepted all the "unfairness" I perceived and kept my mouth shut. Not one word. I stopped reacting, just like I had to do with my wife and just like I had to do to stop drinking.

Now I am a grandfather and I have "in-laws" and "out-laws" from my childrens' marriages. I thought hockey parents could be challenging. It was just warm-up practise for old age. This book describes me alright, but it came awful late in life. All the mistakes and poor choices I made in life I have to live with now. I can't forgive myself knowing what I now know.

Alan Arkin, who also played Yossarian in the movie "Catch 22", in the "Kominsky Report" spends the final few episodes a kindly and friendly dad to his daughter, and a nice guy to his new life partner. Maybe I should start by being kindly and nicer to my wife and kids (their doormat)? There are a few downsides to not being an asshole. You have to get used to feeling like a doormat to those that want to be assholes. This is where not reacting and leaving after awhile comes in.

Sutton says that the success of this book has meant that he, an otherwise sincere academic and writer, has become referred to by his peers as that "Asshole Guy." Hopefully he got some revenues from the book sales. At the start of this review I thought to myself "Hmmm, what does this mean to me?" Now I know.

Upcoming CSEB Research Webinars (Free)

Loys Maingon, our CSEB BC Director, has put together an excellent series of research webinars for the winter/spring period.

- 1:00 PM (EDT) Tuesday March 16. Dr. Anne Bell (Nature Ontario) and Anastasia Lintner (Canadian Environmental law Association) "***Has Ontario abandoned integrated watershed planning?***" https://attendee.gotowebinar.com/register/6649387141719984143
- 7 PM PDT Sunday. March 21. Dr. Eric Hertz. "***The Pacific Salmon Explorer: a novel tool for mobilizing data on salmon and their habitats.***" https://attendee.gotowebinar.com/register/1898953750991755275
- 7 PM PDT Wednesday 24 March. Dr. Jasmine Jane and Genevieve van der Voort (Vancouver Island University) "***Orchid Pollinators of Strathcona Park.***" https://attendee.gotowebinar.com/register/3636962776125682959
- 10 AM PDT Tuesday 6 April. Helen Davis (Artemis Consulting). "***Impacts of Forest Harvesting on the Supply of Bear Dens in Coastal BC.***" https://attendee.gotowebinar.com/register/8961502864772337678
- 12:01 PM PDT April 14. Dr. Will Atlas, Spencer Greening and Dr. Andrea J. Reid, " ***Indigenous Systems of Management for Culturally and Ecologically Resilient Pacific Salmon***" https://attendee.gotowebinar.com/register/4925194579695280398
- 10 AM April 15. Dr. Greg Pyle (U. Lethbridge). "T***he Mount Polley Mine Disaster: An Ecotoxicological Perspective.***" https://attendee.gotowebinar.com/register/4095319486934118925
- 7 PM PDT Sunday 18 April. Dr. Lynne Quarmby. "***Watermelon Snow: Science, Art and a Lone Polar Bear.***" https://attendee.gotowebinar.com/register/6927747201992271885
- 10 AM PDT Tuesday April 20. Dr. Matthew Mitchell PhD (Research Associate) Faculty of Land & Food Systems,(UBC). "***Incorporating ecosystem services into conservation planning in Canada.***" https://attendee.gotowebinar.com/register/7536987694454811917
- 7 PM PDT Sunday May 9 . Dan Tucker (U of A and SWI) Citizen Science "***Engagement in Surveys of Bryophytes and Lichens in Strathcona Provincial Park.***" https://attendee.gotowebinar.com/register/1836621337296864013
- 10 AM PDT Wednesday May 26. Dr. Shannon Berch (BC Environment) "***Preliminary assessment of the ectomycorrhizal fungi of Quercus garryana on Vancouver Island.***" https://attendee.gotowebinar.com/register/6127803014762558477

To register for each of the webinars, click on the links above. For more information, check the CSEB Website at www.cseb-scbe.org.

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