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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Bulletin

In this Issue:

CSEB Bulletin SCBE

VOLUME 80, NUMBER 3, Fall, 2023

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In this issue

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Front Cover: Pileated Woodpecker (*Dryocopus pileatus*) digging grubs at Cardiff Golf and Country Club near Morinville, Alberta, August 2023. Photo Credit: G. Ash

Back Cover: Top Photo: Columbian Ground Squirrel (*Citellus columbianus*) in Sunshine Meadows, Banff National Park, August 2023. Photo Credit: P. Wells.
Bottom Left: Mushrooms observed on the trail alongside Castle Mountain, Banff National Park, August 2023. Photo Credit: P. Wells.
Bottom Right: Bear Statue at St. Albert, Alberta, City Hall, August 2023. Photo Credit: P. Wells.

CSEB BULLETIN

Vol. 80, Number 3, Fall 2023

The Canadian Society of Environmental Biologists Bulletin is a quarterly publication. The Bulletin keeps members informed of the Society's activities and updates members on the current affairs and advances in the field of environmental biology. This publication draws together the widely diverse group of Canadian environmental biologists through a national exchange of ideas. Members are invited to contribute papers, photos or announcements that are of a national biological and environmental interest. Letters to the editor are welcome. This is a volunteer non-profit organization, and we rely on your participation to make the Bulletin a productive forum for ideas and discussion.

All business correspondence, changes of address, undeliverable copies and membership applications should be sent to: CSEB National Office, P.O. Box 962, Station F, Toronto, ON., M4Y 2N9. **Editorial correspondence: Gary Ash, Editor, e-mail:** garyash@shaw.ca.
Editor: Gary Ash
Layout: Gary Ash

LE BULLETIN de la SCBE

Vol. 80 , Numéro 3, Automme 2023

Le Bulletin de la SCBE est une publication trimestrielle de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activités de la Société sur événements courant ainsi que les progrès qui font en sciences de l'environnement. Par un échange d'idées au niveau national, cette publication intéresse un groupe très 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

As I gaze out my office window in Regina, I see a gloomy, hazy day sky. Normally I can see the horizon, but today I can only see the parking lot beside the building. This is has been the case for the past week. Combine this with higher than normal temperatures (30°C - August 30) and it's an unpleasant day. I usually cycle to work, but the weather the last days kept me off my bike, just in case.

I complain of smoke, but right now residents in the Shuswap Lake region in BC and Hay River in the NWT are facing the actual wildfires and have much more to be concerned about than smoke.

Much of Canada has been covered with wildfire smoke this summer. This is so evident when visiting a website called FireSmoke Canada (FireSmoke.ca) that forecasts when and where wildfire smoke events may occur over the next two days across Canada. The website is supported by several provinces and the federal government and operated by UBC, and they have been publishing operational daily smoke forecasts since 2010.

I am fascinated by the animated smoke map of Canada. I've never seen the data presented so graphically. The intense smoke density in BC and NWT today is clearly evident and it's coming my way.

Looks like I won't be cycling for another few days, at least.

CSEB BULLETIN CONTRIBUTIONS NEEDED

Contributions of articles or news items are needed for the Winter 2023 edition of the CSEB Bulletin. Deadline for submission is 15 November 2023. Please send your submission to Gary Ash, CSEB Bulletin Editor, at garyash@shaw.ca.

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

EARTH

Did you feel like you woke up early on June 30, 2022? Was it Daylight Savings Time déjà vu?

The International Earth Rotation and Reference Systems Service, IERS, formerly the International Earth Rotation Service, measured Wednesday June 29, 2022, as the shortest earth day on record. On that day, the earth's rotation slowed by a whopping 159 milliseconds.

Umm, No!

From a post that popped up on my Facebook feed in early 2023:

"Given that the International Space Station orbits roughly 400 km above the earth's surface, it is relatively easy to find places where you are closer to the astronauts than humanity. Almost anywhere in any of the oceans, the Australian outback, the Canadian far north, etc."

"Almost anywhere in any of the oceans…" Actually, no!

If you have a few minutes to spare have a look at two sites that track positions of ocean-going vessels — vesselfinder.com or marinetraffic.com.

The extreme northern and southern oceans are certainly relatively free of ocean traffic, but the central latitudes are choked with vessels. As you zoom in you will find that cargo vessels, tankers, and fishing vessels dominate the waves…and even more than a few yachts owned by people who have decided to leave the rat race behind.

In the central Pacific Ocean, especially from the equatorial latitudes through 25° South, large fishing vessels tend to dominate the oceanscape, almost always with AIS turned off. With very little land to get in the way and an impossibly large area to properly oversee, it is easy to see why pelagic fish species, like tuna, are at risk.

Or have a look at the Arafura Sea between New Guinea and the northern coast of Australia. When I looked on *Marine Traffic* in late December 2022, several hundred fishing boats occupied an area of about 5000 square kilometres, often separated by little more than one kilometre.

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

CSEB 2022 AGM

Minutes of the 2022 Annual General Meeting (Draft)

19 June 2023 at 10:00 pm MDT (online meeting)

1. **Welcome** - CSEB President Curt Schroeder (Quorum) The AGM was convened at 11:05 (MST) by Curt. Attendance: Loys Maingon, Curt Schroeder, Anne Wilson, Brian Free, Gary Ash, Sean Mitchell, Peter Wells, Robert Stedwill, Pat Stewart, Regrets: Barbara Hard
2. **Assigned duties:** Moderator (Curt), Recording Secretary (Anne), Time Keeper (Robert), Parliamentarian (Gary)
3. **Approval of Agenda** - Motion to approve by Loys; seconded by Brian, carried.
4. **Approval of Minutes** from previous AGM (11 January 2021). Minutes were reviewed, and a motion to accept made by Loys, seconded by Robert, carried.
5. **President's Report** - Curt Schroeder
   - There were seven meetings in 2022, including the AGM
   - Bulletin submissions and reviews done for President's report as well as reports for SK
   - Letter sent to BC Environment Minister
   - Discussed issues related to other professional associations
   - Bylaw review/update recommended
   - Last term as President going forward.
6. **1st Vice President's Report** - Patrick Stewart has not had to act for Curt or address issues; has participated in meetings and discussions.
7. **2nd Vice President's Report** - Robert Stedwill – has reported for Manitoba for the Bulletin; need a Manitoba member.
8. **Secretary-Treasurer's Report** - Anne Wilson
   The draft 2022 budget (attached) was presented with comparisons to 2021, and commentary on each line item. Motion to accept the draft budget for 2022 was made by Anne; seconded by Loys, carried. The 2021 finances were presented with summaries for 2021 on Accrual Basis and Cash Basis balance sheets showing costs and financial position (attached).
9. **Membership Report** - Gary Ash provided his report with numbers for 2022 and a graph over time. Membership has dropped – we need to further recruit students and take advantage of exposure at other organizations' functions. Getting the chapters active would bring in new membership. Now there is competition with other biological organizations/ professional accreditation and lower volunteer participation. We used to get members from conferences. Brian will ensure the membership brochure is on the website (with updating). A membership committee was struck of Brian, Gary, Curt and Peter. We need to be really clear what the CSEB offers. Networking, mentorship, and access to job opportunities were mentioned.
10. **Bulletin Editor's Report** - Gary Ash provided his report (attached below). Gary raised the idea of going to an electronic-only version of the Bulletin. We may lose a few members if we do this, but costs will drop $1800 per year and production would be simplified. Idea raised of circulating copies of the Bulletin in places where exposure to potential members. Not cost-effective to circulate copies. It would be good to get opinions on this from young professionals that we would target. Discussed access through the web site, and formatting to read on small screens. This can be worked on by the membership committee.
11. **Webinar Chair Report** - Loys Maingon.- Can be found on the website; will be a hiatus during this fall/winter. Held about 10 in the past 6 months. Not getting input from eastern Canada.
12. **CSEB Website Report** - Brian Free
    Brian presented his report. Website functioning well. He updates as changes occur. About 50 job ads added to jobs page; Brian is actively looking for these ads on provincial and territorial sites. BC government departments are the main contributors. New webinar announcements and adding recorded webinars to archive pages. Various opportunities have also been posted. Gary has been posting the 2022 Bulletins on the web site, as well as handling online membership subscriptions. Design and maintenance is using WordPress. We have a contract for hosting services and redesign with Aurooba Ahmed, but we have been unable to contact Aurooba. We need to transfer to another host service. Need to know how she has registered the domain re: contact. Brian will look into arranging a new service provider. Patrick to provide a contact for a quote. Domain name expires Sept. 30. Brian shared the updated web site page in development Brian provided monthly website visits, noting that peak traffic coincided with webinars. Year over year, we have increased slightly from 2019 to 2020 and 2021 but then decreased in 2022. Monthly visits in 2022 averaged 463. The top pages are home page; biology careers & employment; scholarships, education and training; and membership. We may have to abandon the update work done so far if Aurooba can't be contacted. We could add links to social media, but that would have to be maintained. Need a strategy for content and maintenance, e.g. hiring someone to post regularly.
13. **Directors' Reports (Regional)**
    Alberta report: There were 27 members in AB at the end of 2022. The AB chapter is not currently active, but would like suggestions from members regarding potential activities for AB CSEB members. Joseph Hnatiuk and Brian Free are the AB directors and chapter contacts. Several AB members continue to be active at the national level, and John Retallack contributes regularly to the Bulletin.
    Atlantic report: Quiet the past year. Lots of activity; Peter is very active with the Bulletin. There is a demand for biologists in the region.
    BC report: Loys noted the lack of BC legislation on endangered species.
    Saskatchewan Report: no activity to report.

14. Loys moved that we accept all reports as presented; Robert seconded, Carried.
15. **Elections**
    Discussion of terms; should we amend bylaws to reflect the need for longer terms? We will strike a committee to review and propose updates; suggest Curt, Brian and Gary. Call for nominations from the floor - no nominations – Robert moved that nominations cease and current board be elected; Loys seconded, carried. Board is re-elected by acclamation.
16. **Other Business** – Peter raised the issue of the forest fire situation. A webinar on impacts would be useful and could include the example of flooding in Waterton following fire. It is agreed that this is an issue the CSEB should speak to, sooner rather than later. We need to bring in a wide range of experts on effects. Urgent need to act soon on this. What is the role of people in our professions?
17. **Resolutions/advocacy** – Curt sent out a draft letter for improved forest management in response to wildfires. He will rework a bit and send out for comments.
    Brian raised the just transition to a low carbon economy, noting implications of moving to electric vehicles and the resources and extraction costs associated with this.
18. **Adjournment** at 12:04 p.m. MDT: Loys moved to adjourn, carried.
19. **Next Board meeting** is July 17th, 2023 at 7:00 a.m. PDT

Recorded by Anne Wilson June 19, 2023.

Treasurer's Report

2023 Proposed Budget

Category	Draft 2023 Budget	2022 Budget	2022 Actual to Dec. 31	2022 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	$950.00	$1,000.00	$1,195.90	$195.90
Membership fees	$2,800.00	$3,000.00	$3,309.56	$309.56
Other Income - Misc	$0.00	$0.00	$0.00	$0.00
Newsletter Subscription	$120.00	$115.00	$115.64	$0.64
Publication Sales	$0.00	$0.00	$0.00	$0.00
Donations	$0.00	$0.00	$0.00	$0.00
TOTAL INCOME	**$4,245.00**	**$4,490.00**	**$4,996.10**	**$506.10**
EXPENSES				
Admin and office (eg copying)	$20.00	$20.00	$0.00	$20.00
Banking	$0.00	$0.00	$0.00	$0.00
Chapter Rebates	$0.00	$0.00	$0.00	$0.00
Contingency	$0.00	$0.00	$0.00	$0.00
Corporate Registration	$12.00	$15.00	$12.00	$3.00
Journal Order Payments	$900.00	$1,300.00	$1,100.25	$199.75
Membership Renewal costs	$0.00	$0.00	$0.00	$0.00
Miscellaneous	$0.00	$0.00	$0.00	$0.00
Newsletter Production	$1,500.00	$1,500.00	$1,467.22	$32.78
Newsletter Mailing	$300.00	$290.00	$291.71	-$1.71
Postal box rental	$280.00	$280.00	$276.85	$3.15
Postal box redirect mail	$400.00	$350.00	$383.92	-$33.92
Sponsorship	$0.00	$0.00	$0.00	$0.00
Web site	$1,955.00	$1,955.00	$63.10	$1,891.90
Webinar Platform	$0.00	$0.00	$0.00	$0.00
TOTAL Expenses	**$5,367.00**	**$5,710.00**	**$3,595.05**	**2114.95**
Difference:	-$1,122.00		$1,401.05	

2022 Balance Sheet			
	Jan. 1, 2022	Dec. 31, 2022	Difference:
Assets:			
Opening Account Balance (Jan. 1, 2022)	$15,470.59	$17,161.02	$1,690.43
GIC Value	$1,695.72	$1,695.72	$0.00
Total:	$17,166.31	$18,856.74	$1,690.43
2022 Income:			
2022 income collected and banked in 2021:	$1,414.20		
Total income deposited in 2022:	**$4,641.72**		
Less 2023 Income Banked in 2022	$1,059.82		
Total 2022 Income:	$4,996.10		
2022 Expenses			
2022 Expenses paid in 2021	$308.85		
2022 Expenses paid in 2023	$334.91		
Expenses paid through bank account in 2022:	**$2,951.29**		
Less 2023 Expense paid in 2022	$0.00		
Total 2022 Expenses:	$3,595.05		
Total Assets:			
Cash in hand at Dec. 31, 2022	***$17,161.02***		
2023 Membership payments received in 2022	-$1,003.50		
2023 Journal payments received in 2022	-$56.32		
2022 Expenses paid in 2023	-$334.91		
GIC	$1,691.49		
Assets as at Dec. 31, 2022	**$17,457.78**		
Assets as at Dec. 31, 2021	**$16,056.73**		
	$1,401.05		

2022 Balance Sheet (Cash Accounting Basis)		
Opening Checking Account Balance (Jan. 1, 2022)	$15,470.59	
GIC Value (Jan 12, 2022)	$1,695.72	
Total (Jan 1, 2022):		**$17,166.31**
2022 Receipts Deposited		
Total income deposited in 2022[a]	$4,641.72	
2022 Expenses Paid		
Expenses paid through bank account in 2022[b]	$2,951.29	
2022 Net Income (Loss)		**$1,690.43**
Closing Checking Account Balance (Dec 31, 2022)	$17,161.02	
GIC Value (Dec 31, 2022)	$1,695.72	
Total (Dec. 31, 2022):		**$18,856.74**
Notes:		

[a] Does not include $927.88 in prepaid 2022 membership dues, newsletter subscription of $73.64 and $412.68 in journal Includes $1414.20 membership dues and journal orders for 2023 collected in 2022

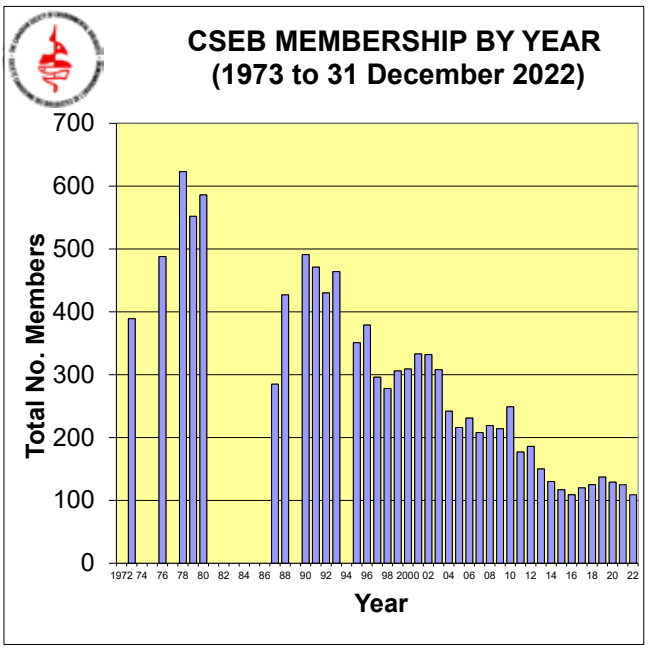
[b] Does not include 2022 newsletter expenses of $334.91 paid in 2023, nor post box rental for 2022 paid in 2021 of $276.85 nor web site cost of $32.

2022 CSEB Membership

by Region and Membership Category

as of 31 December 2022

Region	Complimentry	Honourary	Associate	Library	Regular	Student	Total	Change
1 Atlantic		1	1		5		**7**	-3
2 Quebec					0		**0**	-4
3 Ontario	1			1	19	7	**28**	-3
4 Manitoba					5	3	**8**	2
5 Sask.					11	2	**13**	0
6 Alberta		1		1	24	1	**27**	-4
7 BC			1		16	4	**21**	-4
8 Territories					3		**3**	1
9 USA				1			**1**	0
O Foreign					1		**1**	-1
Totals	**1**	**2**	**2**	**3**	**84**	**17**	**109**	-16
Change	0	0	-1	-2	0	-13	-16	



Bulletin Editor's Report

- 2022 – Four issues published
- Looking for guest editors for 2023
- Bulletin distribution format:
  - Electronic = 77
  - Hard copy = 33 (includes two copies to National Library)
- Need contributions from membership & Directors
- Looking for photos of Biologists -in-Action for upcoming Bulletin covers
- 2023 Deadlines: 15 Feb, 15 May, 15 Aug, 15 Nov
- Thanks to everyone who submitted content during 2022

Are You Doing Interesting Biological Work?

Submit a summary of your research or an article for the Winter 2023 edition of the CSEB Bulletin. Deadline is November 15, 2023.If interested, please send to Gary Ash, CSEB Bulletin Editor at garyash@shaw.ca.

Three Bat Species At Risk of Becoming Endangered as Wind Turbines Take Heavy Toll on Wildlife

By Ivan Semeniuk (Science Reporter) and Wendy Stueck (Environmental Reporter), The Globe and Mail.

Reprinted form The Globe and Mail, May 12, 2023

Wind turbines – towering emblems of the shift toward renewable energy – have been cited as a primary reason why three of Canada's native bats species are in existential peril.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body that reports to the federal government, recommended on Wednesday that the three species be listed as endangered.

Such a designation would represent the highest level of risk under Canadian law – a fact made all the more striking because it is the first time any of those species have been assessed by the committee.

"There's lots of indication that all three have been precipitously declining," said Stephen Petersen, director of conservation and research at Winnipeg's Assiniboine Park Zoo, who co-chairs the committee's work on terrestrial mammals.

Among the causes that the committee identified as contributors to the bats' decreasing numbers, "the mortality at wind farms seems to be the top threat," he said. The recommendation for listing the species was issued following the committee's semi-annual meeting, which concluded last week in Regina.

Included in the recommendation are the hoary bat, the silver-haired bat, and the eastern red bat. All are high-flying migratory species that spend their winters in the southern United States or Mexico. The first two range across Canada during the summer, except in the Arctic, while the third mainly occurs in the central and eastern parts of the country.

During their migration, the bats encounter an array of human-made structures along their flight paths, both in the USA and Canada, including the swiftly whirling blades of wind turbines.

Studies based on counts of bat carcasses near wind turbines have shown that the toll can be heavy when multiplied across all the units that are currently operating. With each turbine killing on the order of 10 bats per year, the impact works out to tens of thousands of individual animals removed from the population annually in Canada alone.

In 2019, an Ontario government-led study used the trend in bat deaths at wind turbines in that province to demonstrate that populations of all three species, as well as the big brown bat, have declined significantly.

The study, which was part of the supporting evidence for the committee's recommendation, ruled out the possibility that bats are learning to avoid the structures.

"We're unintentionally harvesting them out of the air space every year," said Christina Davy, a conservation scientist who was lead author on the study and who is now based at Carleton University in Ottawa.

The effect is compounded by habitat loss, pesticides in the food chain, and other threats that bats must cope with.

(Continued on Page 23)

REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

The Summer of Reckoning with "K"

"…the physics tells us that humanity is in the process of driving an acceleration of global warming."

Dr. James Hansen (July 2023)[1]

In the past few months, Canada, which is normally ignored south of the border, made the headlines across the United States as ash from record forest fires of unprecedented severity blanketed New York, and even made its way across the Atlantic to Europe. Extreme weather, which is a long-predicted new normal for humanity, became a reality in the summer of 2023. Potentially, these extreme fires are expected not only to become a new normal creating, as in California, "fire years" that will not only replace the "fire season', but also change forest ecosystems forever.

In British Columbia, fires came with an unprecedented drought that triggered Level 5 drought conditions in most watersheds of Vancouver Island and the coast. Rivers literally dried up endangering this year's salmon returns and future generations, exacerbating an already precarious situation for salmon stocks. After decades of hearing DFO staff and ministers intone the ministerial mantra of a colonial commitment to return stocks to historic highs, without ever really changing the exploitive extractive ethos of modern industrial society, it is almost surreal to hear ripples of shameless honesty percolate from DFO officialdom: "*we do not anticipate that long-term salmon survival patterns will return to what we have seen historically. Pacific salmon are already responding to environmental changes driven by climate change and other human activities*."[2]

This is the reality. It is not a new reality, notwithstanding what politicians may say. It is, as James Hansen eloquently put it in a recent article "a new frontier." As most frontiers, it is a border into unknowns that we are crossing after a 50-year journey during which we were repeatedly warned that a delay in changing course would inevitably be costly and calamitous. Yet, in spite of the evidence before us, the lure of facile denial continues. In part, that is human nature, which prefers not to take responsibility, in part, it is simple political and bureaucratic ineptitude. In keeping with the latter, the BC Wildlife Federation has released a noteworthy report. It points out that in spite of the 2003 Film on "Firestorm Review" that was written 20 years ago after an unprecedented fire season that now seems paltry; BC never followed its key recommendation. Over the past 30 years, spending on natural resources management has steadily declined by 70%. Spending on the environmental restoration of natural resources and watersheds, which would have limited current impacts of fires and floods, has steadily declined while adding millions of people.[3] There has been no compensation for the urban and infrastructure development needed to meet the population needs of a province that has gone from 3,322,896 in 1990 to 5,368,266 in 2022.[4] The impact on nature has not been compensated.

While the Wildlife Federation may think that this is simple political ineptitude, Naomi Klein and Kapua'ala Sproat's recent account of the politics of water management may provide a better insight.[5] While the city of Lahaina, Maui burned, the golf courses and swimming pools of Maui resorts remained green and full thanks to the colonial system of allocation of water licenses. This is the power politics of water at work, governed by "disaster capitalism." This is consistent with the inequities inherent in BC's much touted *Water Sustainability Act*, drafted by the neo-liberal governments of Gordon Campbell and Christy Clark, which came into effect and was fully endorsed by the NDP's John Horgan and David Eby in 2015. A 2016 report by the Council of Canadians, *Water Rush: Why BC's Water Sustainability Act fails to Protect Water,* rightly notes that the act is iniquitous and intent on concentrating water rights in the hands of a privileged few. As has been the case in Hawaii and Australia, these neo-liberal water management acts override the fundamental human right to water, and dispossess aboriginal rights as well as cultural and ecological perceptions of water and land.

These acts are touted as "landscape-level integrated water management." They are enthusiastically endorsed by industry and so-called environmental organizations alike. These acts articulate and protect a colonial view of the land as just precious resources. They protect corporate interests, and at their most progressive, barely protect the human right to water. What these acts never encompass is the right of the living land to its waters. In fact, these "sustainability acts" are not about environmental sustainability and social justice, which are essential to addressing climate change. They are about the economic sustainability of status quo, and rest squarely on a colonial and industrial view of the land that runs counter to the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). They are legislative products facilitating "disaster capitalism," intent on preying on misery they create in order to dispossess both the public and aboriginal societies of their rights, and further despoil nature. A truly "sustainable water act" means putting the environment first, which would be in keeping with the intent of UNDRIP.

In this respect, there is much to learn from the Australian aboriginal and colonial experience in water management and climate change, particularly with problems arising from the Murray-Basin Plan. Australia has been in an increasingly severe drought cycle since 1994. The drought cycles have brought the Murray-Darling ecosystem, which covers one-seventh of the Australian continent and is home to 34 Indigenous nations, to the brink of collapse. Throughout Australia, the original owners of these waters and lands, the aboriginal nations, hold only 0.2% of water licenses. The other 99.8% of the licenses are held by

large land holders and agricultural corporations. The agricultural over-exploitation of water by irrigation is largely responsible for the drying of the Murray-Darling. Decades of irrigation have dried up lakes that have held water for over 40,000 years. Under the Murray-Darling Plan, the Australian government is trying to buy back irrigation licenses at about $13 billion, with varying success. The recent announcement that the state of Victoria has set aside 1.36 gigalitres for first nations, which represents one-tenth of what local aborigine are currently allotted (10% of 0.2%), or just enough to fill one small wetland, is precedent setting, but has been vigorously opposed by the agricultural community, which is loathe to lose its "entitlements."

Climate justice is water justice. It begins with water justice because the land and its ecosystems cannot live without water. While these colonial "water sustainability acts" are presented as an adaptation to climate change, they are in fact what climate change is all about. They are about continued extractivism, which drives "the economy." A world of shrinking water is an endgame world of shrinking food production and growing social disparities and power politics. There are two interpretations of "climate adaptation" at play in social discourse. The first is the one taught in universities and in government departments: it is adapting an exploitive economy to shrinking resources in an unpredictable world. The other is the one sensed from our essential humanity and entrenched in our cultural wisdom traditions: it is our adaptation to the primal needs of the living land.

The unexpected, accelerated rate at which climate change is proceeding is making the iniquities of these acts more self-evident than they might have been otherwise. Climate change that can no longer be escaped may yet instill honesty that comes from its brutal realism. Although the mirage of boundless growth and technological escapism lingers, burning towns like Lytton BC in 2021 and now Lahaina on Maui, as well as West Kelowna and Yellowknife threatened, become brutal reminders of the implications of the world we have ushered in for future generations. Over the last three decades, lake freshwater storage has shrunk in over 50% of lakes.[6] Mountain glaciers that have thus far provided water to agricultural communities in the July to September water-deficit period, have also shrunk, and their ecosystems are now changing.[7] Similarly, it has brought to memory that not so long ago, Lahaina was home to a network of streams that fed a 15-acre fish-pond maintained by aboriginal Hawaiians. All of this has now been filled and drained for golf-courses, and replaced by hotels and Mac-mansions, leaving the aboriginal communities in third-world conditions and dispossessed of their water rights. All around the world we are witnessing freshwater shortages and a crisis in agriculture that is driving a growing food crisis and global human migrations, while we remain mesmerized by endless development and the mythical prosperity that spawns a growing homeless crisis at odds with the lives of I.T. billionaires.

This is no longer a faraway third world problem. In British Columbia, although some rivers could be supplemented this summer by trickles from reservoirs that hardly met the Department of Fisheries and Ocean's legal obligations, the real impact was on agriculture. Ranchers and farmers whose operations have traditionally accounted for between 75 to 80% of water consumption within a watershed, have seen their productivity decline to 25% of expected yields as a consequence of water shortages.

Ironically, thus far the drought has not really affected urban populations whose reservoirs were less immediately affected. (If the drought persists, as it has in parts of California, that may change.) Vancouver and the Lower Mainland only declared a Stage 2 water restriction, which meant that residents could no longer water lawns, after August 2nd. That observation is important both ecologically and socially. While rivers and creeks in rural BC dried up, creeks in urban centres benefited from a higher water table artificially sustained by lawn watering and run-off before August 2. About 62% of the population of BC is urban, and, therefore, is largely sheltered from the immediate impacts of this year's drought. While 62% of the population could turn on the tap at will, the other 38% had to practice "water conservation" and truck in water. This means that, demographically, there are two very different experiences of what a drought means to the environment and nature. That affects how the urgency posed by the acceleration of climate change in BC is interpreted.

These observations are important because politics are by definition, and in practice, urban-centred. What is urgent in a rural context is less so for the city state. That has an impact when government representation and paradigm are primarily urban.

Eight years ago in Paris (2015), governments around the world proclaimed the "transformational" success of COP 21. For the past eight years, politicians have re-assured the public that they were taking steps to tackle climate change by setting carbon-limiting targets that are to be met by 2025 and 2030. Notwithstanding promises and "commitments" made at Paris and Glasgow, G20 countries have poured $1Ttillion in fossil fuel subsidies.[8] This summer's succession of droughts, floods, and forest fires that have hit every corner of the planet are part of a trend, which has seen previous temperature records for global averages broken.[9] It is not an independent impact of El Niño. It is El Niño operating in a background state of global warming, which is making already extreme weather even more extreme. In the context of climate change, these extremes are no longer an indication of things to come, but processes that are unfolding as they should be expected to.

For most earth scientists and biologists, the problem posed by growing heat is not the phenomenon itself, but what it entails for human economies and the ecosystems that economies depend on. In a more abstract sense, as the detection of organic aromatics on Mars seems to confirm,[10] primitive life itself may well persist in a planet rendered uninhabitable. Human civilization is a much less robust phenomenon dependent on the maintenance of an intricately complex web of life whose survival is threatened by our overconsumption of its products. The real question is what climate change means for humankind's ability to flourish on this planet.

Architects of international climate change and biodiversity policies have pointed out that governments around the world have been misleading the public. Both Bob Watson (IPCC Chair 1997-2002) and Nicholas Stern (Chair of the Grantham Institute since 2008) have recently publicly admitted that there is very little possibility that we will keep the planet below 1.5°C, but that the greater danger is that we will give up any hope of doing so:

> *"I think most people fear that if we give up on the 1.5°[Celsius limit], which I do not believe we will achieve, in fact I'm very pessimistic about achieving even 2°C, that if we allow the target to become looser and looser, higher and higher, governments will do even less in the future."*[11]

The environmental reality is at odds with the demands of the economic and social reality, and politics focus on the latter.

The realistic proposition is that, increasingly, governments that have done very little since the problem of climate change was first brought to political and public attention around 1965, when it was the subject of a presidential report, may yet do even less while at the same time proclaiming to be taking giant steps. Or worse yet, they may, as proposed by the republican followers of Donald Trump, pretend that climate change is a hoax, notwithstanding the climate shifts we are witnessing all around the world, even across the USA. Indeed, as Washington and New York air filled with smoke, Florida waters reached hot tub temperatures, and corals appear to have hit a tipping point off Florida and in Australia, the republican intelligentsia of the Heartland Institute released Project 2025, an environmental road map for the first hundred days of a republican presidency. This is a climate denialist's wish list that begins with a declaration that, contrary to what science may suggest, climate change does not endanger civilization. A republican president would be committed to: "*...shredding regulations to curb greenhouse gas pollution from cars, oil and gas wells, and power plants, dismantling almost every clean energy program in the federal government and boosting the production of fossil fuels*."[12]

The politics of economics and ecological and environmental sustainability are two irreconcilable spheres of reality. It is pointless to think that they can somehow merge and complement each other. That is an illusion, largely based on the Brundtland Report of 1987, that governments and economists have been feeding the public since the Earth Summit of Rio in 1992. The outcome of that logic is what we experience today: a world of vast economic inequities, climate extremes, declining agricultural productivity, wars and mass migrations. The world is unfolding much as the "business-as-usual" scenario did in 1972's *Limits to Growth* (Club of Rome). We have changed the window-dressing, but both government and mainstream environmental organizations have remained committed to a colonial model of economic mal-distribution. Eventually, something had to give.

As Canada enters its worst fire season with 5542 fires since January, many of which are of unprecedented size and ferocity, and record floods, it should be obvious that the environmental implications of economic priorities have not been well thought out by our political leaders. It is not just a matter of forest management within an economic paradigm. It is the paradigm itself that is unsustainable and incompatible with environmental sustainability and climate justice. At all scales, regional, provincial, national, and global, endless growth and the energy and natural resources it requires exceed "K" (carrying capacity) for the growing demands of an ever-expanding human population that has displaced much of the natural world's other species. As the work of ecologist, Dr. Bernie Krause reveals, 70% of the natural habitats recorded since 1968 have disappeared.[13]

For life on earth, the central limiting factor for "K" is, and always has been, freshwater. It is no coincidence that every "culture" or civilization was built around the confluence of freshwater. "Culture" is the difference between a fertile crescent and an inhospitable desert. Just as the great cultures came out of the deltas and estuaries that witnessed and nursed the wealth of salmon and Australian aboriginal culture came out of the cultivation of landscapes built around "song lines" that mapped water nodes, western civilization grew out of the cultivation of Mesopotamian wetlands.

To understand what we face today, we only need to look at the ecological and human disaster that is unfolding in the Tigris and Euphrates rivers, which was long touted as "the cradle of civilization." The cradle is rocked by drought. After five decades of geopolitical strife, this once extremely fertile area, which was home to the largest wetlands in Western Eurasia a few decades ago, is now turning into a desert in which families are limited to a delivery of 160 gallons of water per month.[14] Notwithstanding war, increasing disease, and illness, during this period of strife, the population of Iraq went from 11.6 million in 1975 to 44 million today. Neighbouring Turkey and Iran embraced "progress" and following "modern" western colonial models, engineered dams to the detriment of local ecosystems in order to supply the needs their own growing populations faced by equally collapsing aquifers. Climate change has exacerbated an already precarious situation and precipitated a human and ecological tragedy. Once the breadbasket of the Middle East, Iraq can no longer provide enough freshwater or agricultural products for its own population. This situation is being repeated in the Mekong and the Nile river systems, and is driving growing waves of climate refugees.

Either we need to acknowledge that we are part of this planet and depend on its biodiversity and make difficult social and economic changes in order to save the ecosystems we have inherited from the last Ice Age, or we can continue business-as-usual and take the hopeful risk of "adapting," to an increasingly degraded environment. The latter is the course that politicians have been taking and continue to take. As the track record shows, climate modelling constantly underestimates the rate of change. We are constantly "surprised" to find predictions outstripped by the pace of reality. Climate change is unlikely to be slow and progressive. To choose to believe that mainstream politics mired in economic conflicts of interest can provide an avenue to addressing climate change can result in bizarre logic.

A recent interview by David Suzuki illustrates the self-contradictory logic that pervades both environmental and anti-environmental thinking in Canada. After proclaiming the need not to despair, Suzuki launched into a defence of the Minister of Environment, Steven Guilbeault because of his Greenpeace credentials, only to declare that the best thing Guilbeault could do would be to resign in protest:

> *"He's got to resign and tell the world why, in the way that [UK international environment journalist] Zac Goldsmith in Britain now has resigned and said, 'look our government isn't serious about it'. This is what we need – the ministers to get up and say, 'look, politics is killing us, we can't do anything because we're held hostage by politics'."*[15]

It might be more honest to say: *"we can't do anything because we are politicians, urbanization, and neither the environment nor*

nature, is our concern." As Aristotle observed when he invented the concept, "politics" is the corporate defence of the interests of the "polis" — or "city-state"— by a few select citizens. It is a very limited application of democracy. It is the defence of the city-state by a select few who live in cities. The interest of folks outside who exist to supply the city are a lesser concern. Historically, politics is not about the interests of the environment. It never has been. The environment exists only as resources to be exploited in order to sustain the prosperity of the polis, and a largely urban "countryside" around the city. The environment only becomes of interest to the polis when its state endangers the survival of the polis' status quo.

"Politics" therefore have to be re-framed to answer different and new questions that climate change poses. It requires a broader social engagement, not of the select urban few, but of the many who associate daily with nature and environmental impacts generated by the economic demands of the city. That engagement has long been part of the conservation movement. The limits of "politics" was recently well articulated by the board of Transition Salt Spring, a local organization formed to tackle climate challenges lived by residents that governments have repeatedly failed to plan for:

> *"Within BC's current political matrix, climate change response has been limited. At a local level, there is no one organization clearly responsible for responding to increasing risk from fire, reduced water quality and availability, and other threats to ecological integrity. Governments were designed for periods of stability, not instability. Despite declaring climate emergencies, local governance agencies have yet to develop tools to address the complexity and intersectionality of climate change. The only way forward is collaboration among a diverse collection of experts and local knowledge holders. The Maxwell Creek Watershed Project is designed to do just this: demonstrate how experts including ecologists, foresters, conservationists, and those with legislated responsibilities, can work together to address wicked climate problems in real time."*[16]

While hope is always a good thing, and it is pointless and paralysing to despair, one should bear in mind that Greenpeace is not a scientific organization. It is a political organization organized as a lobbying corporation. It lobbies politicians for policies aiming to protect the environment, not in itself, but for the well-being of the polis. That ethical relation has not substantially changed since Aristotle. To wit, the United Nation's concern for climate change is not so much about the well-being of the planet, as it is about the implications of its demise for food security and the displacement of humans. Climate change is of interest as a "threat to civilization", as David Attenborough and Antonio Guterres have eloquently and repeatedly stated.

Mr. Guilbeault is first and foremost a politician. Asking a politician to quit is like asking a fish not to swim. Politicians do not change paradigms. Voters do, because the polis is ultimately the community, not the politicians and the corporate interests they represent. Quitting is not what the community asks of politicians. By quitting, politicians do not to tell the community anything new. The public already knows that government is not serious about the environment. It is not "the politics that is killing us." It is the failure of individual politicians to be consistent with the representations they made to the public in order to get elected. They are at odds with expectations largely because they follow mainstream party or corporate lines, which are, as they have always been, the interests of the few who govern the polis. Politicians are not "held hostage by politics," as Suzuki contends. They are just an ineffective distraction in a structural conflict of interest, and it is wise to keep our expectations very low.

Few outside of members of the scientific community really seem to have a handle on the urgency of the situation in which we find ourselves. In British Columbia, as rivers run dry, and farmers lack water for crops and livestock, the Ministry of Agriculture claims to offer relief in the form of programmes for new irrigation systems, notwithstanding the absence of water.

The real problem is the historic destruction of water-storing and producing ecosystems and the resultant mal-distribution inherent in the licensing enabled by *The Water Sustainability Act*. And that is also where the long-term solutions lie, in restoration, as the work of the Ktunaxa Nation (Lower Kootenay Band) in the restoration of the great Creston wetlands shows.[17] More efficient irrigation systems might be nice, but the problem here as in Australia and Hawaii is the impact of colonial "water sustainability" Acts that perpetuate social iniquity and facilitate the destruction of pre-colonial ecosystems and biodiversity, without obligations to restore. The Ministry of Forests increases manpower, forest fire-fighting equipment, and resources for firefighting to address the over 400 forest fires burning out of control, but tacitly avoids discussion of the impacts of clearcutting on regional vapour pressure deficit caused by deforestation, which is a recognized driver of forest fires. We are changing everything in the name of "resilience" except status quo, and therefore, our progress is no progress.

Freshwater is not just a product of passive condensation, it is also an evolutionary organic product of photosynthesis produced by forests, which release aerosols and water vapour and cycle water inland.[18] The regional year-to-year abundance of freshwater depends largely on the capacity of ecosystems to produce and store freshwater. Deforestation at the scale we have seen since colonization could only result in the climate extremes, fires, and floods that we are witnessing today. Over the past 200 years, we have watched a colonial system of developers, agriculture, mines and forestry destroy native ecosystems that have provided these ecosystem benefits for millennia. While our economies and the agricultural revolution that gave rise to them have enabled a flourishing of human populations, this has come at great cost to other species and to the ecosystems. This economy is increasingly making this planet uninhabitable. Between the impacts of coastal flooding, heatwaves over 48°C and the loss of freshwater, climate change is set to make large areas of the planet inhospitable to human life and unproductive for agriculture.[19]

Canada does not escape the contradictory twin impacts of climate change. On the one hand, as we witness the melting of arctic and antarctic ice masses and glaciers, we cannot escape the implications of rising sea temperatures and sea levels. We are successively hit by a loss of water storage on land and higher temperatures at sea driving ecological changes in coastal ecosystems and their distribution. One of the growing concerns for British Columbia is the loss of estuaries essential for fish production.[20] It is becoming increasingly difficult to restore or plan habitat for future climatically-driven changes. It is not as reporters spin it "sea levels" that squeeze young salmon out of

places to live. It is human encroachment on essential natural habitat and human obliviousness to the needs of a living nature.

Coastal development, which has always been and continues to be insensitive to climate change, has created a situation in which potential replacement habitat that could compensate for sea-rise has been usurped by sea walls, housing and paving, which is now no longer available as natural habitat. Information that this problem was in the making has been commonplace since at least Rio in 1992—that is for at least 30 years. This is simply poor planning by city planners who have a professional obligation to know about climate change and a civic responsibility to preserve nature for future generations. Extreme summer heat and drought, and extreme winter floods are expected to further reduce salmon productivity on both the west and east coasts of Canada.

On the other hand, we expect to face increasing summer droughts that will negatively affect our agricultural productivity, only to be followed by winter and spring floods that will also affect agriculture and infrastructure. Combined, the decline in freshwater availability and the projected overall decline in agricultural productivity suggests that there is a problem of over-development for an excessively large population. Under these conditions, the honest questions that any serious politician needs to reckon with are "What is our carrying capacity (i.e., K)? What is the carrying capacity of the habitable and agriculturally productive parts of British Columbia?" Thus far, these questions have been avoided because we have relied on the import of Californian and Mexican produce. There is growing concern in California about the state's ability to continue its high productivity given a deteriorating water and climate situation.[21]

The unpopular "K" question is rarely, if ever asked. However, it is becoming brutally inescapable as the reality of drought conditions hits even cities.

Perhaps for the first time in political history, politicians are beginning to ask relevant questions about unlimited development. The city of Cambridge, England was set to build a further 50,000 houses in 2023. Cambridge MP Tony Browne took everybody aback by publicly pointing out that "the government needed to explain how 50,000 homes could be built in the city without enough water."[22] Similarly, Arizona has realized that there is not enough water in the state to support already approved developments and is moving to stop developers.[23] The "puzzle" now for economists who believe in "endless growth" is how to keep growing without water.[24] Remarkably, water is no longer taken to be an infinite resource, but a limiting factor in the carrying capacity of an environment. After this cycle of extreme drought and fires, it is to be hoped that BC will see the light, if the public asks the embarrassing questions.

The global water crisis together with the climate crisis are both products of the colonial assumptions that underly the global economy. These assumptions are that resources are infinite, that the economy can and must grow infinitely, that ecosystems are inherently resilient, and that somehow technology can bypass their limits to make them infinitely productive. This economic calculus assumes that the amount of freshwater available to mankind will at least invariably remain the same, even as the ecosystems that make it possible are destroyed. Water, like nature and "the original owners," is simply an externality taken for granted. As we watch ecosystems collapse in quasi-apocalyptic fires and floods, these assumptions are being reset by the limits imposed by water.

As we are witnessing this year, without water, agricultural productivity shrinks by 75%. If climate scientists and pundits are right, this is what the future holds The ability to feed and house 8 billion people is premised on "endless growth" at the cost of the environment that is assumed to be endless. Colonialism is the belief in endless bounty in an endless land, there for the taking. That logic is sustained by the legal concepts of "terra nullius" — an infinite land with no previous occupants, and "aqua nullius" —endless water with no previous owners. But with UNDRIP, we have discovered that there were and continue to be legitimate owners with rights over lands and waters. Restitution is now owed. It is somebody's land and somebody's water, and it is all quite finite. If aboriginal rights, not just to clean water in a country that for over a century has made access to clean water on reservations a source of international shame, but to all water, are finally recognized, then care and restoration of the land from whence water comes, becomes an obligation.

These unprecedented fires, floods, and droughts, which are becoming more common, are not an anomaly. They are a trend. They are not a surprise to science. They have long been foreseen. The urgency of the situation is particularly obvious in the Antarctic where, as nations signatory to the "Antarctic Treaty" have stated in June of this year: *"Changes in Antarctic and Southern Sea environments are linked to and influence, climate impact drivers globally."*[25] The growing consensus in the scientific community is that the window of opportunity to be able to contain and possibly reverse climate change is very narrow.[26] As James Hansen has explained in a recent article with his customary blunt eloquence, political spouting about 1.5°C targets is simply "hogwash" to anybody with a minimal understanding of the data: *"Political leaders at the United Nations COP (Conference of the Parties) meetings give the impression that progress is being made and it is still feasible to limit global warming to as little as 1.5°C. That is pure, unadulterated, hogwash, as exposed for anybody with a minimal understanding of Figure 6."*[27]

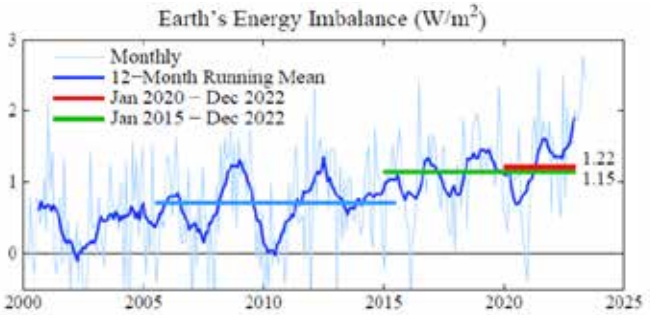


Fig. 6. 12-month running-mean of Earth's energy imbalance from CERES satellite data[8] normalized to 0.71 W/m² mean for July 2005 to June 2015 (blue bar) from in situ data.[9]

This is essentially information that has been available to politicians for decades. The real solution does not lie in politicians. It lies, as Hansen concludes in the same article, in the public: *"Perhaps, if the public finds the taste of the new climate frontier to be sufficiently disagreeable, we can begin to consider the actions needed to restore a propitious climate."*

It is, as previously suggested, to our essential humanity that we must call in order to adapt not to our narrow needs but to the needs of our only home, the land that calls to us every day. The window of opportunity to shift may be narrow, but broad avenues of opportunity are opened by younger generations such as the Montana complainants who successively took their government to court, by Transition Saltspring, which has opted to no longer wait for government leadership that never comes, and First Nations that are re-affirming the priority of the land. In all cases, the solutions lie in moving beyond the paralysing constraints of politics and addressing the problem of equitable distribution within "K" to restore the land.

The new emerging frontier that we and future generations will have to reckon with, as this summer's experience indicates, will be governed by limits imposed by freshwater and its relationship to the land.

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Two New Endangered Lichen Species In Strathcona Provincial Park Raise Concerns about BC Parks Management of Conservation Areas

Submitted by Loys Maingon, CSEB BC Director

Figure 1:* Euopsis granatina. *Red-listed species new to Vancouver Island, found in Strathcona Provincial Park in 2023.

This summer, in spite of adverse conditions created by the challenges of a year of climate extremes, the Strathcona Wilderness Institute (SWI) was able to add to the record of new species documented in Strathcona Provincial Park. The first, *Euopsis granatina* is a red-listed species new to Vancouver Island, and the other tentatively appears to be a new species to science: "*Euopsis X*". This seems to be a new undescribed North American species in the genus *Euopsis*. This genus was first described in 1987 by the late Finnish lichenologist Aino Henssen (1925-2011).[1] This would be the third of the two species currently belonging to the genus *Euopsis.*

Two years ago, I observed and reported three separate occurrences of *Euopsis pulvinata* (Figure 2**)** in three separate locations of the park. While infrequently found, it has no conservation status and is considered widespread. It is found on volcanic rock in open exposed higher subalpine to alpine areas. Like all the *Euopsis,* it is reddish brown and forms lecanorine (cup-like with a border) apothecia with thalline exciple (border made of the thallus). The thallus is usually no more that about 1 cm. The apothecia are about 1 mm. The thalline exciple photobiont contains the cyanobacteria *Gloeocapsa,* and, importantly, it does not contain green algae. It has a widespread geographic distribution and is found on non-calcareous rock and alpine sod as well as other lichens or mosses.

The second species, which is new to Strathcona Park and to Vancouver Island, is *Euopsis granatina,* which is a red-listed species (Figure 1). The thalline exciple contains both cyanobacteria (*Gloeocapsa*) and green algae (*Trebouxia*). It is found on volcanic rock in exposed (cliff) conditions. The individual thallus is about 0.5 cm. The apothecia are about 0.3 mm in diameter. The green algae give the thalline edges of the apothecia a white or cream colour that makes the thallus appear to be mottled. This species has an arctic and alpine distribution. Its known distribution appears to be from the arctic to Colorado and the Cascades to Oregon.

[1] Henssen A, B.Budel and A. Titze (1987) *Euopsis* and *Harpidium* genera of Lichinaceae (Lichens) with rostrate asci. Botanica Acta 101: 49-55.

Figure 2: Euopsis pulvinata. Infrequent species with thalline apothecia documented in Strathcona Provincial Park in 2021.

The third and new species (Figure 3**)** is temporarily named, for the purposes of this discussion, "*Euopsis X*." It appears to have never been observed or described, and the consensus so far is that it seems to be a new species. It is found on non-calcareous rock above ~1200 metres. The thallus of this new species resembles closely the striated rows formed by some members of the genus *Pyrenopsis,* another reddish-brown species found on rock. Prior to Aino Henssen's work, *Euopsis* was lumped with *Pyrenopsis.* The distinction between the two genera comes largely from differences in their apothecia. *Euopsis* form bordered thalline apothecia, such as we see in Figure 3 and Figure 1. *Pyrenopsis* form sunken perithecia (vase-like) apothecia. In this new species, the apothecia have, as in *Euopsis pulvinata,* knobby thalline edges. The individual thalli, which are only obvious because they form a 2–3 cm colony, appear to be about 0.25 cm and the apothecia are about 2 mm, visible only with high lens magnification. It looks like a fine-grained version of *Euopsis pulvinata.* Algal constituents have yet to be analysed and determined.

Figure 3: *"Euopsis X"* ***an undescribed species of Euopsis new to science found in Strathcona Provincial Park in 2023.***

While these finds are important in themselves, they also have important implications with regards to BC Park's attitude to the management of the park as a conservation area. Currently, BC Parks is allowing four sets of fires associated with the Wolf River fire to merge with the Mount Con Reid fire and burn out of control.[1] BC Parks invokes a policy of letting natural fires burn in natural areas. Notwithstanding the good intentions of that policy, few scientists would consider our current fire situation to be "a natural process." By all accounts outside of BC Parks and purveyors of conspiracy theories, these fires, as the hundreds that are burning across the province, cannot be construed to be "natural." These fires are a product of climate change, which is driven by human agency.

The issue with these fires is that while the public may assume that we know what is burning, just as we assume that we know what we are losing in a clearcut — that is not the case. We have at best only a cursory sense of the species we are incinerating. As I have argued elsewhere, we do not conduct biological surveys to determine what species are present, unless they have a commercial value. To put things politely: we manage without data, we fly blind, we don't know what we are doing.

Although SWI has only been able to carry out shoestring surveys over the last two years, the Wolf River drainage has thus far proven to be a gold mine of rare species. Cursory surveys done on a shoestring have documented important populations of endangered species: "Old-growth specklebelly" (*Pseudocyphellaria rainierensis)* and "Wahlenberg's Goblin Lights" (*Catolechia wahlenbergii*). There have also been reports of relict fish populations in streams and lakes above waterfalls.

The discovery of previously unrecorded species, and species previously undescribed in science, does not only tell us about rare species that may be unique to Strathcona Park or Vancouver Island. These discoveries are a reminder of how little we know, even as governments profess to be protecting our ecosystems' hydrological processes, and managing our conservation areas wisely for the benefit of future generations. Surveys done in the alpine ecosystems of the park that turn up previously undescribed species new to science bear witness to the presence of endemics. These are species that were isolated by the retreat of the last Ice Age, or that survived the Ice Age in refugia, and have now evolved to be unique to this place. While these endemics are less easily observable than the popular "Vancouver Island marmot" (*Marmota vancouverensis*), they are equally of note, because their presence reminds us of the complex evolution of the unique ecosystems we depend on for everything from the water we drink to the homes we live in. Biodivesity is not ornamental, it is the nuts, bolts, and rivets that make an ecosystem function and make it unique.

Over the past five years, the research work of the Strathcona Wilderness Institute (SWI), which continues to be unsupported, if not obstructed, by BC Parks, has been able to greatly increase the number of species documented in Strathcona Provincial Park. This summer, important work on endangered American Black Swift (*Cypseloides niger*) was scuttled by BC Parks, seemingly, if inadvertently, to protect the interests of the private resort on Moat Lake. Research students were prevented from staying overnight near the lake to record nesting habitat, as per the Bird Studies protocol that requires that three sets of observations be made a half hour before dawn and half an hour after dusk, and therefore requires that in remote locations observers be on site overnight.

1 https://www.vicnews.com/local-news/mount-con-reid-fire-grows-to-1577-hectares-in-strathcona-provincial-park-2335412

This survey work is important, not just to help entities such as Birds Canada protect endangered species such as American Black Swifts. SWI's work provides an account of the biodiversity of the park and its distribution for future management planning as well as a record of climate change and its impacts. With the exceptions of the blight of the mine and the damming of Upper Campbell and Buttle Lakes, most of the park's terrestrial and aquatic systems have been minimally disturbed since the last Ice Age. It is a living lab of old-growth and relict species, biodiversity, and processes untouched by industry. It also provides an insight into the number of species per square kilometre that would have been expected in pre-contact environments in coastal British Columbia, and therefore of the number of species that are permanently unaccounted for and have been lost to the destructive practices of the Ministry of Forests across the entire province.

The facilitation of the same destruction that brought Peter Larkin to declare that *"the park is a mess,"* now returns and finds new life in new avatars of commercialization and bureaucratic respectability. We vaguely catalogue important species with "Key Biodiversity Areas" that will remain remote entities managed in a far corner of a government office and whose fate will still be subject to ministerial "fiat," notwithstanding glossy mesmerizing publicity that gives the illusion of conservation, while we will promote commercial interests, be they those of settlers or First Nations. We set up a "Strathcona Park Advisory Committee, chaired by a retired mine employee favourable to the mine's interests. We promote "inclusivity" by setting up a reservation system that, as research shows, excludes a significant segment of the public. We exclude research that may not conform or subscribe to the objectives of the government of the day.

The current park management policies appear to inadvertently protect commercial interests and neglect conservation and biodiversity priorities to which Canada is a signatory and to which British Columbia, claims to pay lip service. This simply perpetuates the same calamitous mindset that led to the condemnation of BC Parks by Peter Larkin in 1989. We pretend to "reconcile" industry and conservation, as though oil and water can co-exist outside of an Exxon slick. Commerce has no place in parks and conservation areas that generations have fought for, for the public good. A mine in the centre of BC's oldest provincial park had no place in 1988, and it has even less now as we enter a new age of biodiversity crisis. Fire policies that treat the unprecedented fires we now face as "natural" are as out-of-step with the realities of today. Three decades of government policies aiming to perpetuate the "business-as-usual" of the 1960s, without really facing and confronting a climate crisis we were well aware of, has now brought us to the brink. That has equally no place in today's reality. That this mindset should continue to guide conservation policy is no longer acceptable nor tenable.

It is time for the winds of change to return like fresh air. Strathcona Provincial Park is not just home to a generic forest miraculously set aside from BC Forests' "scientific management" by chainsaw and skidder. It is one of BC's last great arks of biodiversity that can still yield up, with minimal effort, new species, unrecorded by science. Their presence is a measure of the government-sanctioned destructivity that takes place daily in this province. To know these species and appreciate their value anchors us into the life of this place. That is "reconciliation," because there is no reconciliation where we do not reconcile with the land. These rare species are a measure of the uniqueness and fragility of these ecosystems that are taken for granted and abused in the name of "recreation," which is often plain destruction where there is no respect for place. Strathcona Park is our Amazon in our back yard, if it is not mined, logged, or incinerated in the name of government, or industry management, or tourism, or death in government care. It is time to look back to 1988 and stand up for Strathcona Provincial Park, once again.

ALBERTA News

Submitted by Brian Free, CSEB Alberta Regional Director

Alberta Election Results

Following the May election in Alberta, the United Conservative Party has formed the new government, led by Premier Danielle Smith. She appears to see fighting with the federal Liberal government as a good strategy, especially with respect to environmental responsibilities.

Each Alberta Cabinet Minister is issued a "Mandate Letter" that spells out the government's priorities for their department. I was interested in the Mandate Letters for the two Ministers with significant environmental responsibilities; Environment & Protected Areas and Forestry & Parks. To see all of the Mandate Letters, go to https://open.alberta.ca/publications/mandate-letters-to-ministers-2023.

1. The new Minister of Environment & Protected Areas is Rebecca Schulz from Calgary. There are 13 priorities in her Mandate Letter. Here are a few with my comments in *italics*…..
   - Working collaboratively with the federal government, First Nations and industry to develop and implement an accelerated strategy for oil sands mine water management and tailings pond reclamation. *This sounds positive!*
   - Reviewing Alberta's water management strategy to increase the availability of water and water licences to Alberta municipalities, businesses and agricultural producers while maintaining the highest standards of water conservation and treatment. *Any changes to Alberta's water management strategy need to be carefully scrutinized. Water is too important.*
   - As lead, and working with relevant and impacted ministries, establish new land-use plans and review existing land-use plans to ensure alignment with government environmental and economic policy. *Alberta's regional land use planning system is supposed to set direction for each of seven regions across the province. Only a few regional plans have been completed. Again, any changes to Alberta's strategy for land management should be carefully scrutinized.*
   - Conducting an analysis into Alberta's carbon sink capacity (i.e., forest, fescue, soil, etc.) to establish a true understanding of Alberta's position in relation to carbon neutrality. *With lots of muskeg, who needs to cut industrial emissions!*

- In cooperation with the Minister of Intergovernmental Relations, defending Alberta's energy interests against federal overreach and developing strategic alliances with other provinces to deal with environment-related issues. *Stormy weather for federal-Alberta relations.*

2. Todd Loewen from the Peace River area is the Minister of Forestry & Parks. There are nine priorities in his Mandate Letter. Here are a few with my comments in italics…..

- Bringing stakeholders together to develop a Crown lands recreation and conservation strategy to expand public access while protecting natural spaces. *Should CSEB be a stakeholder in this?*
- Enabling the expansion of trails, campsites, and other public land use opportunities by Alberta entrepreneurs and other organizations. *Private sector development of recreation facilities need to be carefully regulated. And this should be guided by the regional plans prepared by Alberta Environment & Protected Areas.*
- Developing a plan with industry to use active forestry and grasslands management techniques to maintain the health and biodiversity of provincial lease lands and provide nature-based solutions for carbon sequestration. *Industry needs to be involved in this planning, but what about other stakeholders?*

Temporary Moratorium on Renewable Energy Projects

In August, the Alberta Government announced a "pause" in approvals for new power plants and hydro developments that produce renewable electricity over one megawatt. This applies to new solar, wind, geothermal, biomass and hydro power operations and extends until February 29, 2024. Members of the renewable energy industry were blindsided by this announcement, which has been reported in the press as a response to rural and environmental concerns. The Alberta Utilities Commission has been directed to inquire into and report on the following:

- Considerations on development of power plants on specific types or classes of agricultural or environmental land.
- Considerations of the impact of power plant development on Alberta's pristine viewscapes.
- Considerations of implementing mandatory reclamation security requirements for power plants.
- Considerations for development of power plants on lands held by the Crown in Right of Alberta.
- Considerations of the impact the increasing growth of renewables has to both generation supply mix and electricity system reliability.

It's ironic that this very pro-economic-development government has chosen to temporarily stop issuing permits to this fast-growing industrial sector. These projects do warrant careful evaluation of their environmental and aesthetic impacts, but I am suspicious that the Alberta government, so heavily invested in the fossil fuel industry, may not give these renewable energy operations a fair shake.

MANITOBA News

Submitted by Robert Stedwill, CSEB Vice-President

Aquatic Invasive Species (AIS)

Recent developments in the province see the government creating a new aquatic invasive species (AIS) program, whereby control zones are identified to enhance the effort to control AIS. Bodies of water already invaded are identified as "control zones"

Bodies of water which have now been newly designated as control zones are: Lake Manitoba/Fairford River/Lake St. Martin control zone to control the spread of zebra mussels; and Shoal Lake control zone to control the spread of the spiny water flea. Other previously designated control zones have had their boundaries redefined, and names updated to more accurately reflect their size and area of the province.

Newly implemented, float planes landing or taking off from control zones are required to have anti-fouling paint applied to the underside of the plane's floats.

Further, as part of its comprehensive strategy to stop the spread of aquatic invasive species (AIS), the Manitoba government has established an Aquatic Invasive Species Advisory Forum. This will ensure a regionally diverse range of perspectives on prevention and containment activities,

The forum will facilitate collaborative discussions and information sharing between stakeholders and the Manitoba government's AIS program unit, as well as provide feedback and recommendations on preventing the introduction and spread of AIS.

The forum held its inaugural meeting on June 22, and is comprised of volunteer members recommended by over 20 stakeholders for their demonstrated interest in maintaining healthy aquatic ecosystems.

Lithium Refinery Development

One didn't have to think terribly long to know that following the opening of lithium concentrate operations at Sinomine's Tanco lithium mine at Bernic Lake, that a lithium hydroxide refinery would follow.

This is understandable, recognizing the federal government's concern about national security issues. Currently, lithium refined concentrate from the mine is shipped to China for use in that country's electric vehicle industry. Partnerships are currently being explored, with a proposal for the lithium hydroxide refinery being made to the provincial government later in the year.

Chronic Wasting Disease (CWD)

Additional monies are being dedicated to prevent the spread of CWD in the province. The investment of almost one million dollars will increase testing capacity with the goal of reducing processing times for the 2023 hunting season. Testing more animals more often is critical to the detection of the disease, and the development of strategies to effectively manage healthy wildlife populations.

Further, support for the mandatory sampling program, which most hunters support, will mitigate human and animal health risks, as well as increase staff capacity, including another wildlife biologist position.

In total, 22 positive cases have been identified since CWD was first detected in Manitoba in 2021. Cases were identified from mandatory biological sampling submissions of hunter-harvested animals as well as animals harvested by Manitoba Natural Resources and Northern Development (MNRND) staff as part of ongoing CWD management efforts. MNRD anticipates the number of cases will rise as further testing is completed.

Last year's hunting season saw a significant increase in biological samples (6000) from all sources being submitted for testing. This is an increase from an average of 1000 prior to CWD first being detected in 2021. As the surveillance program evolves, efforts are being made to simplify sample and data submission, streamline sample processing, and provide opportunities for hunters to embrace the program.

If you have any research or Manitoba news that would be of interest to other CSEB members, and would like to report it in the CSEB Bulletin, please contact Robert Stedwill at rjstedwill@live.ca.

ATLANTIC News

By Peter Wells, CSEB Atlantic Member

The last few months have seen a number of key environmental issues covered in the Nova Scotia press and discussed across the media in general. Most are not unique to the Atlantic Provinces and all are of interest to environmental biologists, as species and ecosystems face challenges on many fronts.

Climate Change

The dominant environmental issue in NS continues to be climate change. The IPCC (Intergovernmental Panel on Climate Change) released its sixth assessment report (AR6) and a synthesis, pointing out the dire consequences of not limiting global temperature rise to 1.5°C; the UN Secretary General stressed that "the world needs climate action on all fronts" (Stanway 2023). Guderley (2023), a frequent writer on the environment, pointed out the connection of climate change to how we manage forests in Nova Scotia. The recommendations of the Lahey report of 2018 were largely being ignored, as shown by continued massive clear cutting in eastern parts of NS, and the continued use of biomass for power generation, all of which contribute to climate change and biodiversity decline. Campbell

(2023 a) was a bit more positive, describing the announcement of a provincial government fund to support a youth climate council; this will encourage youth's voice to be heard in discussions of climate policy, and assist in their quest to have jobs and careers in a so-called green economy.

The sea level rise threat in the upper Bay of Fundy is frequently in the news, due to the many man-made dykes that protect farm land and coastal infrastructure (roads, railroads) that will need to be rebuilt to hold back rising waters, especially during extreme weather events; a new project at UNB is focussed on the Memramcook dyke system near Sackville, NB (Hodd 2023). The spring and summer weather this year has been one of extremes —a very dry early spring with devastating wildfires, followed by a very wet June; according to the meteorologists, such extremes may be linked to climate change and warming ocean temperatures (Hebert 2023).

There has also been news coverage of climate change in southern Europe (Abnett 2023), suffering from extreme heat, water shortages, and wildfires, as well as in many other areas of North America. Both the land and the sea are warming, and the objective of limiting global warming to 1.5°C above pre-industrial levels may not be met and indeed may soon be exceeded. In this context, the recent article in the journal Nature is of interest (Khojasteh 2023).

Forest Health (Forestry, Fire Resilience, Wildfires)

Climate change also has been linked to the early and devastating wildfire situation that Nova Scotia experienced in late May and early June, and the health of our forests. Callaghan (2023) clearly stated that the NS wildfires were a reminder to curb CO_2 emissions or expect more extreme weather in the future. In NS, the spring was very dry up to early June, hence the large wildfires, then it was very wet for the rest of the month. The two huge fires in NS led to the loss of 200 homes and associated infrastructure, and in the Shelburne fire, huge forest loss.

Hence, there was much coverage of this catastrophe in the press and discussion of the link to climate change. Mid-winter, in a side story (Hoekstra 2023), there was discussion of how to address wildfire resilience of forests in BC, given the loss of most of the old growth forest cover, and ongoing climate change. Then the NS wildfires occurred in late spring (May into June), leading to much public discussion and concern. Lethbridge (2023) ruminated about the link to climate change, stating that the forests were exceptionally dry and the weather was unusually hot early in the year, though the fire near Halifax was caused by a careless human!

Demont (2023) had a more insightful viewpoint of the wildfires experienced by Nova Scotians this spring — that it was a wake-up call to the reality of climate change and global warming, and that each person can change their behaviour and contribute to reducing their individual impact on the environment. Beswick (2023e) reported on a federal modelling effort that predicts an above average risk of fire for parts of NS this season; it will be "interesting" to see if this holds true. As the fire burned on the outskirts of Halifax, there was a plethora of articles, about the science and tactics of fighting fires (Beswick (2023d) and the methods of evacuating people from their communities (Mathias and Rushton 2023); it was such a novel experience for NS to have two large fires in the Springtime, and ones leading to people being evacuated from their homes.

Some of the discussion was of the current composition of our forests (virtually all second or third generation since colonization), the buildup of unburned forest debris increasing the risk, and the proximity of peoples homes to the forests as the city and its suburbia expand. Surprisingly little was said in the news about the effects of wildfires on wildlife, especially on birds in the middle of their spring nesting season! One assumes that this is being monitored by wildlife specialists.

Water Issues

Water science is alive and well in Nova Scotia. The Covid pandemic has led to new methods of monitoring the COVID-19 virus in its various forms and other pathogens (e.g., bacteria), especially for monitoring municipal wastewater from treatments plants and university residences (McPhee 2023). There is expanded lab testing and the distribution of home testing kits. With new funding, this work is continuing to expand and consider applications in lake monitoring for micro-algal (Cyanobacteria) blooms.

So far this year, "16 lakes have been identified as having algal blooms" (Fairclough 2023) and more recently (June), several lakes have been closed for swimming and any contact whatsoever. Both people and pets are at risk. The NS government does not routinely monitor its lakes for blue-green algae, despite the risks to people, pets and wildlife.

On the bright side, a recent paper by local researchers (Doucet et al. 2023) provides four decades of local lake water quality data, covering the wide range of variables (major ions, nutrients, pH, organic matter and trace elements), highlighting emerging concerns such as aluminum, chloride, nutrients, and arsenic.

Lastly, it is noteworthy that in March, the United Nations opened its first conference on water security in almost 50 years (Binnie 2023), prompted by a growing lack of safe water for drinking and agricultural use in many countries. We in the Maritimes should consider ourselves lucky in this regard, despite the problem with blue-greens and some trace elements noted here.

Pollution

Mining continues in the news. Besides the problems with the many old gold mines and leachates from discarded spoils, public concerns have been expressed about the continued mining of coal in Cape Breton; the issues are greenhouse gas emissions, noise, and general destruction of nearby watersheds (Nathanson 2023). There is also the possibility, as mentioned in previous articles, of gold mining returning to Nova Scotia with its metal contamination risks to local rivers. However, recently, the proposed Beaver Dam gold mine, northwest of Sheet Harbor on the eastern shore of NS, has been cancelled in the middle of the environmental assessment process, hence alleviating concerns about habitat loss on a nearby river (Beswick 2023g).

Lastly, the pulp mill near Pictou is not operating and plans are being discussed for the cleanup of the treatment pond, i.e., Boat

Harbour (Beswick 2023c). The fate of this controversial mill is still undecided in the long term.

Marine – Aquaculture

Development of aquaculture sites for both finfish and molluscs continues around the coastline of NS, with much work remaining for suitable sites under a proposed coastal classification system and workable regulatory environment (Dean-Simmons 2023a). Considerable work for land-based aquaculture of salmon continues, in the face of the impacts of open-pen farming (Dean-Simmons 2023b). Oyster farming, common in PEI, is being considered for a harbour in NS, under considerable public opposition due to concerns about fish habitat and general ecosystem health (Beswick 2023f). Finally, seaweed aquaculture may create new concerns for whales, given the extensive use of underwater ropes (Dickie 2023).

Marine – Coastal Erosion and Development

Tensions continue along the NS coastline between property owners, developers, and the general public. A controversy erupted around a large sea wall that is being built above a beach in Lunenburg county; behind it is an ecologically important wetland dependent upon unobstructed water flow (Lambie 2023). This is not an uncommon situation in the province, as more people seek waterfront property immune to sea level rise and storm surges. The new provincial *Coastal Protection Act* of 2019 with accompanying regulations has been very slow to take effect; hence, inappropriate development can still occur.

Marine – Tidal Power Development

Tidal power development in the upper Bay of Fundy is stalled by "government red tape" according to one experienced and concerned marine biologist (Hurley 2023). Improvements have been made to the technology, surface units are active in the lower bay, and monitoring has shown little evidence of marine life being harmed. Governmental concerns about potential impacts on fish and fish habitat are slowing up approvals. Hurley suggests that there should be a separate agency for coastal and ocean management in Canada, perhaps leading to more informed decision making.

Marine – Oil Developments

Two oil platforms off the Newfoundland and Labrador (NL) coast are actively pumping up oil, but one exploratory well has been abandoned recently (Dean-Simmons 2023). The NL offshore is still a very active oil site, with billions of barrels of subsurface oil left to be recovered, despite the concerns about emissions and climate change.

Species at Risk

A range of species have been in the news. Two rare and at-risk lichens have led to forest harvesting being suspended in a small old growth area of SW Nova Scotia (Campbell 2023b). American eels are being raised experimentally with the plan to have on-land eel farms to counteract the impact of the capture of wild eel elvers, a fishery subject to extensive poaching due to their high value on the Asian market (Beswick 2023b). Great white sharks continue to inhabit NS waters, with their life history now well-known due to an extensive tagging program (Connors 2023). Much endangered in the Atlantic Provinces, bats are being studied worldwide for their possible linkage to deadly disease outbreaks (McNeil 2023). The famed Hope for Wildlife facility outside of metro Halifax also continues its excellent work rescuing wildlife, the latest story being on the care of a tiny infant bobcat found abandoned but now in good health; it will be eventually be released to the wild (Sullivan 2023).

Conservation – Protected/Natural Areas

Work continues on the St. Mary's River and its watershed, a system on the NS Eastern Shore famed for its historic salmon runs but much diminished due to fishing, deforestation, and acid rain. Recently, land along the river has been donated to the NS Nature Trust (Beswick 2023a), a positive development that will help the rivers recovery. The NS Nature Trust has also acquired more land next to the controversial Owls Head Provincial Park, helping to protect its unique coastal barrens and associated wetlands (The Chronicle Herald 2023). And a highlight for those of us living in Halifax — the Blue Mountain-Birch Cove Lakes area on the SW side of the city — is moving successfully towards its designation as a national urban park (Taplin 2023); this is a landscape filled with forests, lakes, and wildlife, a conservation area for recreation and environmental education.

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Notes of Interest

Wildfires and Forest Ecology:

CSEB should continue the discussion about wildfires, forest ecology, and wildlife impacts, perhaps engaging the two specialists mentioned here (see Elassar, A., July 2, 2023, CNN/CTV News: Climate and Environment/New: Smoke will keep pouring into the U.S. as long as fires are burning in Canada. Here's why they aren't being put out. 7p. Quotes from Robert Gray, wildland fire ecologist (BC), and Daniel Perrakis, fire scientist, Canadian Forest Service.). This issue is with us to stay and it behoves members of the CSEB to contribute to understanding the implications of continued wildfires to the state of Canadian wildlife, and determine appropriate wildlife conservation measures.

New Biological Test Method (ECCC):

The Biological Assessment and Standardization Section of ECCC, Ottawa, ON, has produced a revised biological test method for testing contaminants in soils, the 38th report in their truly excellent series of test methods and guidance documents published since 1990 under the auspices of their Section and the Canadian Inter-Governmental Ecotoxicological Testing Group (IGETG). This one is entitled Biological Test Method: Tests for Measuring Avoidance Behaviour or Reproduction of Earthworms (*Eisenia andrei* or *Dendrodrilus rubidus*) Exposed to Contaminants in Soil. STB 1/RM/43. Second Edition. August 2022. The tests are a 56 day reproduction test and a 48 hour sub-lethal avoidance test, "adding to their suite of soil testing methods which now include a variety of agronomic and boreal species of terrestrial plants, springtails, earthworms and mites for assessing the effects of contaminants in soils" (Rick Scroggins, ECCC, pers. comm., March 14th, 2023). All of the reports are available on line at: https://www.canada.ca/en/environment-climate-change/services/wildlife-research-landscape-science/biological-test-method-publications.html

TERRITORIES News

By Anne Wilson, CSEB Territories Director

The current focus in the NWT is the fire activity that has been going on since May; currently the wildfire situation is extreme, with most South Slave communities evacuated, one destroyed, and other communities in the Beaufort-Delta, South and North Slave regions on evacuation alert. Road closures and extreme risks have necessitated airlifting people out of communities. Fire damage to the fibre optic line has taken out communications in at least 10 communities, making information sharing difficult. Power supply and municipal infrastructure losses have also affected first responders' ability to fight the fires. Thick smoke and ash are moving through the region, with particulate matter ($PM_{2.5}$) in excess of 250 ug/m^3 in many areas. There does not appear to be any relief in sight; seasonal temperature forecasts indicate that the North will continue to experience above-normal temperatures coupled with below-normal precipitation for the rest of the fire season and into October.

Canada as a whole is experiencing an unprecedented fire season. According to the Copernicus Atmosphere Monitoring Service (https://atmosphere.copernicus.eu/record-breaking-boreal-wildfire-season) "From 1 January to 31 July, accumulated carbon emissions from wildfires across Canada total 290 megatonnes. This is already more than double the previous record for the year as a whole and represents over 25% of the global total for 2023 to date…. On 25 June, the Canadian Interagency Forest Fire Centre declared that the 2023 wildfire season had seen the largest burned area in Canada's recorded history. By the end of July,

over 120,000 km^2 had been burned; nearly twice as much as the previous record of 71,060 km^2 burned during the entire of 1995."

It will be interesting to see what can be learned from the massive areas burned; there will be impacts to be studied on water quality, terrestrial ecosystems, and wildlife populations. Some of these will be devastating to the most-impacted sites, and may not be fully grasped for years to come.

Below is a map of the fire activity in the NWT as of August 16th, 2023, with 236 active fires affecting an estimated 2,126,254 hectares.

News Bits:

Lockhart Lake Road

An all-season, two-lane gravel infrastructure corridor 413 km long is proposed to connect the Slave Geological Province with road access, power lines and communications infrastructure. The current focus is the 179 km Lockhart All-Season Road which would run from just north of Yellowknife from Tibbitt Lake to Lockhart Lake. This is part of the current winter road route, which is used for diamond mine re-supply. https://www.inf.gov.nt.ca/en/SGP

Slave River Water Quality

Following the spill incidents from the Kearl Oil Sands Mine, public concern led to the GNWT doing enhanced water monitoring on the Slave River at Fort Smith in collaboration with the Fort Smith Metis Council, the Town of Fort Smith, and Smith's Landing First Nation. No signs of contamination have been detected, but monitoring will continue.

Canada Water Agency

The new Canada Water Agency has been created within Environment and Climate Change Canada, and legislation to create the agency will be introduced later in 2023 to move it to a stand-alone agency. The Agency is tasked with delivering on the Freshwater Action Plan in partnership with Indigenous Peoples, provinces, territories, and stakeholders to strengthen collaboration on fresh water to

- improve freshwater outcomes
- restore, protect, and manage waterbodies of national significance, and
- improve freshwater quality.

Notes on NWT and NU Development and Activities:

Development activity and projects in the North continue, and include the following:

- Agnico Eagle's Meliadine Gold Mine Extension project is still under assessment by the Nunavut Impact Review Board, with public hearings scheduled for September 12-20, 2023 in Rankin Inlet. These will be followed by technical meetings Oct. 12-13, 2023 for the Water Licence process. Disposal of tailings into mined-out pits has been the subject of considerable discussion, along with potential effects of the proposed wind farm on wildlife, notably caribou.
- Baffinland's Sustainable Operations Proposal is going into the decision phase by the Nunavut Impact Review Board (NIRB). The company has applied for permission to continue mining and shipping up to 6 million tons of iron in 2023 and 2024, after the NIRB and federal Minister denied the proposed expansion to 12 million tons. The company is pursuing financing to construct a 100 km railway so that ore can be shipped from Steensby Inlet, which was permitted as part of the original project approvals.
- De Beers is seeking to build a diamond mine at the Chidliak exploration site on the Hall Peninsula of Baffin Island incorporating a FutureSmart Mining approach which is to minimize environmental impacts and enable relatively small kimberlites diamond bearing rock formations to be mined. The project is in the early planning stages and will be reviewed by the Nunavut Impact Review Board. https://www.nirb.ca/portal/pdash.php?appid=125714
- Sabina has proposed to install the Back River Energy Center at their gold project. This includes a wind generation facility, solar panel array, and Battery Energy Storage System BESS capable of generating approximately 59 megawatts of renewable energy with battery storage capacities of approximately 50 megawatt-hours. This is undergoing review by the NIRB.

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 newsletter, or running some seminars or other training opportunities, please let us know. The CSEB provides a valuable networking and communication forum, and a voice for biologists 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 agilewilson@shaw.ca. There is also an opening for another Territories Director — please contact Curt Schroeder or me if you would like to take on this role!

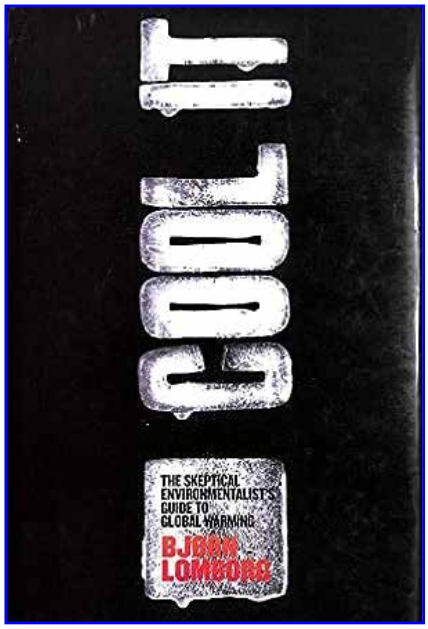
BOOK Review

Submitted by Bob Gainer, CSEB Alberta Member

Cool It

by Bjorn Lomborg. 2007. Random House of Canada, Toronto.

Available from Amazon.ca: $10.99 Kindle Ed.; $13.82 Hardcover.



In my spring book review of "*How to be a Climate Optimist*" by local writer Chris Turner, I outlined the optimistic progress that has been slowly developing over the last 75 years. With myself it started in the 1970s when I did course work and then a population biology MSc at UBC's Institute of Resource Ecology. Paul Ehrlich had just written "*The Population Bomb*" and Greenpeace had acquired some nearby abandoned WWII naval wharfs at Spanish Banks for their headquarters. For about 30 years, the movement was ingrained in me and then I read about an Economist, Julian Simon, challenging Ehrlich on his predictions and winning. Ehrlich based his predictions on the planet having a carrying capacity for 2 billion humans and when Simon challenged him, it was almost 5 billion. Not only had the world not come to an end, it was relatively better off. Simon attributed this to free enterprise economies that had the ability to adapt, innovate, develop, and create to changing circumstances. In fact, in 2020 just before we hit 8 billion people, the percentage in extreme poverty had gone from 30% in Simon's time to 7%.

In 1997, Vice President of the United States Al Gore had orchestrated the Kyoto Protocol that made the USA, Europe, and Canada the most "virtuous" contributors to saving the planet using net zero emissions, carbon trading, offsets, taxes, and credits plus various other measures to achieve this. The next American administration immediately withdrew from Kyoto. I just read a recent statistic about the state of coal fired power plants in the world. They have more than doubled in the last 10 years with China now accounting for more than 60% built or in the process, India almost 20%, and Russia about 10%; together totaling about 90%. The USA, Europe, UK, and Canada are about 1% of the coal fired plants. And Canada is shipping all the coal it can to China to power them. So much for virtue signalling. All those credits, offsets, trading, etc. helped pay for these new power plants (coal fired power is not the only source of CO_2, just one of the cheapest and one of the biggest man-made source). China's new electric "Silk Road" rail line has benefited from China now being the biggest supplier of solar panels and wind tower components. And people like Al Gore, who along with Ehrlich has predicted the end of the world several times over before today, are some of the richest people in the world. In 25 years, Kyoto seemed to have achieved the opposite. Judith Curry (who has contributed letters to the CSEB Bulletin) and several other credible climatologists think that up to 95% of the CO_2 released into the oceans and atmosphere is natural. For instance the 40,000 km long "Pacific Ring of Fire" along the tectonic plates at the bottom of the Pacific Ocean has an average of 1,6000 underwater earthquakes and volcanoes a year emitting CO_2. The IPCC acknowledged this work but not with their models.

The economist Julian Simon explained things better than Ehrlich, and in 2007 Bjorn Lomborg seems to explain things better than Al Gore. First of all, he agrees with Al Gore that CO_2 production is a big problem, but Lomborg thinks it is one that can be adapted to and is certainly not the end of the world. Besides reducing fossil fuels burned for human cooking and heating, he thinks humans can also reduce natural sources such as forest fires that can be controlled by managment. Lomborg wants to make his generation's "40-year goal" to help the planet by reducing CO_2 released by humans but not at the expense of helping humanity. My "population biology" generation's enemy was that the number of people on the earth was too many for its carrying capacity and reducingpeople numbers was our goal. I was a biologist—Simon and Lomborg are economists and realists. Since Lomborg wrote this book in 2007, about the end of my generation's "40 year goal", the number of coal fired power plants and CO_2 production by man in general has risen significantly because the leaders of China and India feel their people deserve to have electricity and the improved standards of living that goes along with it, what the Western World has enjoyed for 100 years. Lomborg thinks that it is futile to try and reduce CO_2 in the Kyoto fashion by depriving third world countries of electricity and instead more money would be better spent on such things as carbon capture research and development. Research and development is a much better investment, or adaptation, than just annual outlays. In addition, he thinks the money spent on the Kyoto scheme should be spent on other issues that further benefits third world humanity the most.

About 2004, he started a process that he called the "Copenhagen Consensus" that involved prioritizing where the most good extra resources would accomplish. This involved several economists from all over the world. They came up with a list that, at the top, was communicable diseases, clean drinking water, minimal nutrition, and a reduction of third world country trade barriers that would require very little cost. At the bottom of their priorities were the extremely expensive, Kyoto style economic approaches to climate change. In between were better flood mitigations practices, rising sea level measures, forest management practices, agriculture improvements, freshwater programs, small business start up assistance, removal of protectionist trade barriers, scaled up third world health services. Right next to the bottom were the Kyoto Protocol, carbon taxes, and other measures that compounds negative impacts on economies. Most important was compassion for the most vulnerable souls to climate change policies. Lomborg then expanded his survey to Nobel Laureates, world leaders, UN experts and Ambassadors, and even most politicians. Its results were almost universally the same. The money that has been spent on Kyoto would have been better spent in so many other ways. This book is basically the result of these findings.

"Cool It" was published in 2007, 10 years after Kyoto and yet 25 years after Kyoto, the Kyoto style recommendations are still being enforced even though they have been proven not to reduce CO_2 production, in fact, many times they have increased it, and very few recommendations from Lomborg's book have been recognized. We are slow to learn the lesson Julian Simon taught us about Paul Ehrlich. Ann Wilson's review of the latest, 2023 five-year IPCC report reflects the view of their 2018 report that "embraced the growth in population for its infinite possibilities for people and the planet" even though the world's population will soon be 10 billion souls. My generation's 40-year goal and "every right-minded person, especially in the UN", was that we deplored the fact that there were more than 2 billion souls. This of course means that the CO_2 generated by humans breathing and their utilization of the earth's resources has increased atmospheric CO_2 as a result of their thriving and flourishing.

The IPCC has admitted that the economists have a point and should be considered. All of our politicians know that the Kyoto ideas of net zero, carbon taxes, carbon credits, offsets, and trading only look good. Unfortunately, it works well for virtue signaling electioneering. It does not actually do well for this generation's contribution to the planet and third world humanity. I feel that my 40-year generation contribution, from my CUSO volunteer and population biology days 1970 to 2010, was a disaster. The complete opposite of what we wanted to do. The compassion I had for third world people and the world population in general was completely betrayed by opportunists with no compassion piling on a band wagon. "Cool It", now 16 years old, recognized this and is completely ignored.

The last 10 years is even worse. Al Gore who created Kyoto as vice president of the United States is insanely rich benefiting from all his green-washing investments he sells and trading credits in general. Politicians are now competing to be the most Kyoto complying. Michael Moore's "Planet of the Humans" (on YouTube) is completely ignored. Moore points out that the most successful capitalists and politicians are the ones who have benefited the most from Kyoto based projects and if anything at the expense of the environment. Moderate, compassionate economists like Lomborg are never acknowledged despite Julian Simon having demonstrated the need 30 years ago.

It is inhumane to lay the burden of Kyoto and all its costs and taxes on the ordinary people. The people who should pay for these types of questionable plans are the super rich; the so called charitable foundations that don't pay taxes, the Al Gore Foundation, Clinton Foundation, Obama, Tides, Trudeau, Chretien, Martin, Suzuki, etc. Foundations. Lots of Canadian Foundations, the Royal Family, Hollywood celebrities; the super-rich in general. Merle Streep did a movie "Laundromat" about the offshore banking industry and the rich not paying their taxes. It would be far more humane for these people to pay for their "planet saving" and Kyoto-type protocols and let the ordinary lot have the freedom to adapt. The elite's ideas are inhumane and Lomborg's not. These policies are driving the non-western countries away from the western countries to the Bric block dominated by Russia and China.

Look at the state of affairs in Canada at the moment, with carbon taxes and deficit spending, runaway inflation. The deficit we are creating for Kyoto efforts on climate change is at the expense of the money available for health care and education. The ordinary person's standard of living is dropping. There is unemployment, a mental health pandemic (not just the homeless but also with the rest of the relatively well-off members of society), hopelessness, and homelessness. Lawlessness is taking over our cities.

I drove through Northern Alberta earlier this summer and the clearing of land and the crop growing is expanding and increasing at a fast pace. Especially the "North Peace" where the large Mennonite community is clearing vast tracts of land, the otherwise less productive, acid, grey wooded soil that is producing abundant crops with new farming techniques, especially with canola. This is approximately 200 km from the NWT border as the raven flies. When I was there in the 1980s, environmentalists were saying the Boreal Forest should be kept native. What contribution were vast areas of native Boreal Forest to the world? Esthetics? Forest fires? But the magnificent crops of today are feeding hundreds of thousands of people, the canola is going by train to Prince Rupert, then on boats to China for cooking oil (to a lesser extent it is used as a natural diesel oil substitute). The net zero solution will shut down the use of nitrogen fertilizer and billions of the less fortunate will suffer for it. We export our products, having paid all the carbon and other forms of clean energy taxes to other countries like the USA and China, and in return we get their products that don't have these added taxes. The Nobel Laureate who got his Peace Price for his work on carbon taxes stated emphatically that it would only work if everybody paid the taxes equally. Our leadership is cruel and immoral to both our people and the people in China and us by harming such exports as canola, which requires nitrogen fertilizer.

During the dirty '30s, Canadian leadership just turned a blind eye to the less fortunate in society. This is what is happening now when the global elite, disconnected from the ordinary people, make the ordinary people and not themselves pay for their pipe-dreams. Shutting down our oil and gas production and making us dependent on other countries sources reduces our economic strength and handcuffs us when standing up to global bullying. The global elite will be safe somewhere else in the world. The elite are not interested in saving the planet for humans, they are interested in saving their planet from ordinary humans. We need to open our minds about climate CHange and at least listen to the economists have to say.

BOOK Review

by Dorothy Fabijan

Vascular Plants of Alberta: An Illustrated Guide

by Linda Kershaw and Lorna Allen, 2020, 510 p. .Available from Amazon.ca: $31.66 Kindle Edition; $34.15 Paperback.

A lot has happened in botanical rcsearch and exploration since the publication of the *Flora of Alberta* (E.H. Moss, edited by J.G. Packer) in 1983. With the application of DNA analysis, our understanding of the relationships beteen species, genera, families, and even orders of plants have been greatly enhanced. The massive Flora of North America (FNA) project has also prompted a taxonomic review of all plants north of Mexico, resulting in many name changes. Along with these scientific

advances, many organizations have been very busy building accessible online databases of herbarium collections and scientific nomenclature. In Alberta, industry and government have been scouring the province for biodiversity data, resulting in an increase of over 100 species recognized to exist in our province. Who can keep track of all of these goings-on?

Kershaw and Allen have done us the favour of distilling the Alberta species list and FNA treatments down into a useable guide to the vascular flora. This has been a years-long project, which has included online publication (Alberta Native Plant Council website, www.anpc.ab.ca), test-driving selected keys in plant study group meetings, and incorporating the feedback. Their publication in book form provides the user with keys in non-technical language, illustrations within the keys, and illustrated terms.

The initial keys include the usual key to families but also separate keys for aquatic and woody plants. Keys to general and species within those families follow in phylogenetic order. All scientific names are as up to date as possible. with many synonyms or previous names included. Where applicable, names are also appended by superscripts indicating rarity or introduced status within Alberta. Unfortunately, subspecific taxa are mostly excluded, except in such obvious cases as *Petasites*, where what were well-known species are now ranked as varieties. Common names are only given for genera.

Many people will appreciate the effort to reduce technical terminology, though it does make for some awkward phrasing, such as "branched flower cluster" rather than specific inflorescence type, "panicle." This term, and some others, are illustrated and defined in the glossary but not used in the text without the definition. The main body of the keys include illustrations of family-specific flower parts, which is very helpful, especially where technical terms are unavoidable, such as the flower parts of Poaceae (grass family). It's a fine balance.

I've used these keys exclusively over the past several months and found them to be very workable, especially with the illustrations on the sidebar of every page. A line drawing is worth a thousand words! Illustrations are understandably small, and unfortunately slightly pixelated, reducing their clarity. Ease of use could be improved by using family and/or genus names as headers at the top of each page. I have only a few minor complaints about couplets with only one character, such as mature fruit, to go on. This is a common issue in writing keys and not one that is easily overcome.

I applaud the authors in accomplishing a much needed new key to the flora of Alberta. The effort to make it more user-friendly by including illustrations and reducing technical terminology will be appreciated by many, I am sure. I recommend this volume as the most up-to-date, for nomenclature, flora for Alberta and one that is quite easy for non-specialist to use. Don't get rid of your 1983 *Flora of Alberta* just yet, though, the species descriptions and the distribution maps remain invaluable.

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[1] *Dorothy Fabigan has an M.Sc. in plant taxonomy and has been the Assistant Curator of the Vascular Plant Herbarium, Department of Biological Sciences, for the past 23 years of her 38 years with the University of Alberta. Article reprinted, with permission, from Nature Alberta Magazine, Fall 2020).*

BATS AND WIND TURBINES *(Continued from Page 6)*

"The good news is that we have tools to reduce the mortality from wind turbines," Dr. Davy added. "They're not ones the industry loves, but they work."

Those tools include shutting turbines down during periods of low wind when bats are likely to be flying but the energy return is low, as well as during the peak of the fall migration season.

Brandy Giannetta, vice-president of the Canadian Renewable Energy Association, said the domestic wind industry is aware of the issue and has been taking steps to reduce the impact on bat populations.

"We are not surprised by the recommendation for listing," she said.

She added that turbine operators, using sound-based devices, can also detect when bats are near and, in some cases, can emit sounds that are intended to ward bats away. But others say the measures deployed to date are not sufficient, as is made apparent by the three species now recommended for listing.

The toll of wind turbines on bats is "one of the best-kept secrets – in a bad way," said Cori Lausen, director of bat conservation with Wildlife Conservation Society Canada.

WCSC and other groups have been warning of the danger posed to bats by wind turbines for years, but the warnings seemed to have little impact, she said.

Because bats can live for decades and tend to have only one pup per year, high losses due to wind turbines have an enduring effect that is difficult to reverse.

"They have no way to bounce back from that kind of mortality rate," Dr. Lausen said.

The measured pace of Canada's species law means that the COSEWIC committee's recommendation will not be formally submitted until later this year. If Ottawa agrees with the recommendation and lists the three species as endangered, the designation will apply only on federal land. Such an outcome is unlikely to have a meaningful impact on bats unless it is supported by provincial regulators who oversee the wind industry.

"The provinces need to step up and recognize that these three species have a very dire outlook if something isn't done soon," Dr. Lausen said.

Dr. Petersen said that the committee's recommendation can serve as a wake-up call that draws more attention to the issue."I'm hoping that even though this is not great news, it'll spur some action," he said.

CSEB Regional Directors Needed

CSEB is seeking Regional Directors for Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and the Territories. Duties involve promoting CSEB in the region, attendance of monthly teleconference Board meetings, contributions of regional reports/news for the quarterly CSEB Bulletin, and promoting membership in the region. If interested, please contact Curt Schroeder at schroederc@saskpolytech.ca

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