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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS • SOCIÉTÉ CANADIENNE DES BIOLOGISTES DE L'ENVIRONNEMENT

THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Bulletin

In this Issue:

CSEB Bulletin SCBE

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In this issue

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Front Cover: Red-breasted Nuthatch (*Sitta canadensis*) on feeder in Edmonton AB, 3 Nov. 2022. Photo credit: Gary Ash, CSEB Member

Back Cover: Top Photo: Plains Bison (Bison bison bison) at Elk Island National Park, January 2022. Photo credit: Emily Pollock, CSEB Member.
Bottom Left: Downy Woodpecker (*Picoides pubescens*) on feeder, Edmonton, AB, November 2022
Bottom Right: Ruffed Grouse (*Bonasa umbellus*) on friend's hat, Prichard BC, October 2022. Photo credits: Gary Ash, CSEB member.

CSEB BULLETIN

Vol. 79, Number 4, Winter 2022

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

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

Vol. 79, Numéro 4, Hiver 2022

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

For the last 25 years, my wife and I have made an annual ritual to enjoy the Fall bird migration in the Central Flyway here in Saskatchewan. As part of this tour in late September or early October, we try to visit reliable hot spots to catch a glimpse of Whooping Cranes feeding in harvested grain fields, in shallow water or flying low. Each year we have been successful with spotting Whooping Cranes. Only four this year, but in other years we've observed over 50 Whooping Cranes on one Fall trip.

Whooping Cranes are the rarest species of crane worldwide and North America's most endangered native bird. It just happens that Saskatchewan is one of the better places in western Canada for the public to see this species in the wild.

In December 2022, Montreal will host the United Nations Convention on Biological Diversity to map out new goals and propose action plans for conservation for the next decade. Biological diversity loss continues in many countries, and survival risk has risen with recent agricultural development of parts of the Amazon rainforest, especially in Brazil. Canada has set a goal of protecting 30 percent of lands and waters by 2030 by investing in a network of protected areas. Partnerships with Indigenous communities in particular will play a key role in reversing biodiversity loss. Maintaining the ongoing partnership between Canada and the United States will continue to contribute to long term survival of Whooping Cranes in North America and to birding enthusiasts like myself.

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

FISH AND OCEANS

Some Goldfish Are Better Drivers Than Others!

Who knew fish could drive…but some of them are not very good at it!

Led by Ronan Segev, a biology professor and neuroscientist at Ben-Gurion University of the Negev, the research team tested the ability of aquarium-bound goldfish to navigate in terrestrial space and time (Behavioural Brain Research, Volume 419, 15 February 2022, 113711).

The research team constructed robotic terrestrial vehicles (FOVs —fish-operated vehicles) with small top-mounted aquariums. A computer, camera, electric motors and omni-wheels allowed the fish total control of the FOV. Whenever a fish swam to any of the walls of the aquarium, the vehicle headed in that direction. The vehicles were fitted with LIDAR to collect data on the fish's location in the aquarium and the vehicle's ground location.

Six goldfish received several 30-minute 'driving lessons' using conventional food-reward systems. Rewards were given when they successfully reached target destinations set by the researchers, pink boards at various locations on the wall of the room.

Researcher Shachar Givon noted, "Surprisingly, it doesn't take the fish a long time to learn how to drive the vehicle. They're confused at first. They don't know what's going on but they're very quick to realize that there is a correlation between their movement and the movement of the machine that they're in."

The team even allowed one fish to choose its own destination and it proceeded to explore down a hallway away from the research location.

However, as with humans, some fish were very good at navigating with the vehicle while others were not.

Regarding the question of whether male or female fish were better drivers…sorry, I'm not even going there!

Assisting Coral

For the past five years, researchers at the Coral Resilience Lab in Hawaii have been working to understand the resilience of corals in the face of a changing climate and assessing mechanisms to improve the prognosis for coral populations in the future.

Essentially, they are trying to identify naturally resistant corals and speed up coral's evolutionary clock to breed "super corals" that can better withstand the impacts of global warming.

As part of the University of Hawaii's, Institute of Marine Biology lab network, the Coral Resilience Lab staff work within several research areas to:

- Demonstrate that human intervention can accelerate naturally occurring processes, such as adaptive change, for the benefit of coral reefs.
- Monitor and analyze corals with naturally improved thermal tolerance via acclimatization and/or adaptation and examine the mechanisms that influence these traits via forward and reverse genetics and a range of molecular assays.
- Explore the molecular characteristics of thermally tolerant and sensitive corals in Kāneʻohe Bay to better understand how temperature stress and natural tolerance are exhibited.
- Investigate the plausibility that corals may be 'pre-adapted' to climate change with the first large-scale restoration project in the world which focuses on thermally tolerant corals.

- Explore technology for the husbandry of corals to help increase production of thermally tolerant specimens for research and restoration.

Massive Breeding Colony of Fish With 60 Million Active Nests Found in Antarctica

Using results from towed camera surveys, researchers from the Alfred Wegener Institute, Helmholz Centre for Polar and Marine Research in Bremerhaven, Germany (A. Purser, et al, Current Biology, January 13, 2022), have discovered a massive breeding colony of Jonah's icefish (*Neopagetopsis ionah*) in the Weddell Sea off the northwest coast of Antarctica.

N. ionah is a benthopelagic species in the family Channichthyidae, also known as crocodile icefishes.

The colony covers an area of about 240 square kilometres. At the time of the discovery, the fish biomass of the colony was estimated at 60,000 tonnes spread over about 60 million active nests. Only one adult fish, mostly the male, occupied each nest, guarding an average of about 1700 eggs.

Many of the nests at the outer edges contained degraded fish carcasses suggesting these breeding fish are providing significant input for local food webs. The location of the colony corresponds with an area of thermal upwelling that raises the water temperature by about 2°C. A large colony of Weddell seals in the vicinity are thought to prey on these breeding fish. Various invertebrates, including octopus and sea stars, were observed in nests eating unguarded eggs.

TECHNICAL WRITING SERIES

Submitted by Sean Mitchell, CSEB BC Director

The Problem of Excessive Capitalization: How to Properly Capitalize Your Text For Effective (and Grammatically Correct) Communication

Canada Nickel Company Inc. (Canada Nickel) is a junior exploration company advancing its 100% owned flagship Crawford Nickel Project (Crawford Project or the Project) as a next generation operation aimed at delivering the nickel required to feed the high growth electric vehicle battery and stainless-steel markets.

Capital Letters. These are possibly the most abused text in modern technical writing. As with every piece of our writing, the use of these have purpose; when used carelessly, without strategy, they cause the reader to stumble instead of providing a smooth path. All of us have had proper use of capitalization drilled into us, but for some reason in our professional realm we then choose to ignore the fundamentals of basic grammar. Let us in this article take a stroll down memory lane, back to elementary school.

Grammatically, capital letters are used to begin the first word of a sentence and also as the first letter of a proper noun. To remind you, nouns come in two forms, common nouns and proper nouns – the former are not capitalized while the latter are. Given that a noun is 'a person, place, animal, or thing,' we must now discriminate the difference between a common and proper noun: a proper noun is a specific case of a common noun. Examples are best to move from that abstract to the concrete. Consider three examples:

- "The captain of the regiment…" versus "Captain James of the regiment…"
- "The Skeena River and Stikine River both contain coho salmon." Versus "The Skeena and Stikine rivers both contain coho salmon."
- "The Project required extensive earthworks." Versus "The project required extensive earthworks."

When speaking of the generic (unnamed) captain of the regiment, this is a common noun as we are not being specific to a given individual person. As soon as we identify an individual captain though, now we must capitalize because it is a proper noun—Captain James (proper noun) is a specific case of the generic captain (common noun). The same applies to the rivers; if we name each river explicitly, those are specific and so proper nouns. When we collectively refer to these rivers though, their specific name (Skeena, Stikine) gets capitalized because they are names, but "rivers" is not capitalized because it is plural. That 'rivers' refers to two rivers and so cannot be a proper noun as it is not specific. In a similar way we do not capitalize the "towns of Telkwa and Quick". The final example is a case of arbitrary capitalization where the writer, for reasons known only to themselves and not accepted by grammarians, capriciously decides upper case is appropriate (it is not). The word project is a common noun unless it is part of a title or project name such as the "Crawford Nickel Project". This distinction between common and proper nouns is our guide on whether a word should be capitalized, not some arbitrary rule in a company style guide.

Is this stuff important? It is very much so. Have you considered why we capitalize at all? What is the purpose of upper-case letters? Well, they are used to draw our attention to them. They are meant to be distracting, to cause us to pause. That is precisely why they are used to start a sentence (emphasizing the end of the previous sentence and start of a new sentence) and for proper nouns (highlighting the specific case). The key point here is that they are distracting to our eyes. They interfere with the flow of reading and that is their raison d'être. So, when we litter our writing with inappropriate capitals, our gentle reader, whom we care very much about, is now high-stepping and stumbling over these intrusive letters.

When used inappropriately, apart from being grammatically incorrect, capitals can be condescending. Consider, "Canada Nickel Company Inc. (Canada Nickel)". Wow. Really? You as the writer thinks so little of me, the reader, that you have to explain to me that Canada Nickel will be called Canada Nickel? I personally find this extremely offensive that the writer thinks so little of me. Insulting your reader's intelligence in the first line of text is never a good strategy for effective writing.

To return to the issue that capital letters are distracting, I present to you the following sentence(s):

- "The field crew recorded Deer Mice, Mule Deer, and Least Weasel; Brewer's Blackbird, Townsend's Sparrow, and Sharp-Tailed Grouse."

- "The field crew recorded deer mice, mule deer, and least weasel; Brewer's blackbird, Townsend's sparrow, and sharp-tailed grouse."

Which do you find easier to read? If you are like me, it is the second sentence (by far simpler to read). I am fully aware of the species name capitalization conventions in our disciplines. I do, however, ignore them. My goal is effective and clear writing for my reader, not slavish adherence to arbitrary convention. Note in the second sentence Brewer's and Townsend's are capitalized —there are proper nouns (names of ornithologists for whom the bird is named).

I have a caveat I give with any of my writing advice: If you like your job, you should write as your employer wants you to. I ask, though, that you be aware of how poor that is and how badly it interferes with clear, effective, and engaging writing. Our inappropriate and unquestioned use of capitals is one of the iron chains shackling us in the dungeon of dreary and alienating writing that modern technical writing has descended into.

If you would like further guidance on appropriate use of capitals, consult a good professional style guide. More importantly, read books (fiction, non-fiction, poetry… anything but technical writing) and notice the use of capitalization by professionally edited books. Use these as your guides.

Next column: Linking your ideas: The Ladder of Abstraction and Chekhov's Gun.

COSEWIC NEWS

Submitted by Dr. David Richardson, Saint Mary's University, Halifax, NS.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is holding its Species Assessment Meeting (SAM) from November 28th to December 3rd in Ottawa. Two meetings of the SAM are held each year. This is the first in-person meeting since the COVID pandemic affected Canada. Those attending look forward to open and detailed discussions, much easier than when the meetings were held online.

At the SAM, members will decide on the status of endangered wildlife that have not been assessed before, or those species or populations that were previously assessed ten or more years ago, and now require review.

For each of the 30 species or populations being considered at this meeting, a report has been written and previously circulated to those attending the SAM. They include the co-chairs of the specialist committees, non-government scientists and members of organizations such as Parks Canada, the Canadian Wildlife Service (ECCC), etc. Those reading the reports send in straw ballots to the appropriate co-chair, indicating whether or not they agree with a proposed status. At the meeting, each report is presented by a co-chair and then voted upon anonymously. If the proposed status is agreed upon, the species is given a status than can be Endangered, Threatened, Special Concern, Not at Risk, Extirpated or Extinct. If not agreed upon, then a new status is proposed, discussed and voted upon. After the meeting, the results are released, often along with a press release.

At the forthcoming meeting, the organisms being considered include birds, plants, fish, mammals, turtles and slugs, as well as a moss and a lichen. There are downstream consequences when a species is given a particular status; this is explained in detail on the COSEWIC website: www.cosewic.ca.

COSEWIC Annual Report 2021to 2022 Cover Letter to Minister of Environment and Climate Change

The Honourable Steven Guilbeault November 16, 2022
Minister of Environment and Climate Change
200 Sacré-Coeur Boulevard, Gatineau, Québec K1A 0H3

Dear Minister Guilbeault,

Please find enclosed the 2021-2022 Annual Report of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), which I respectfully submit to you and to the Canadian Endangered Species Conservation Council (CESCC). The submission of this report fulfils COSEWIC's obligations under Section 26 of the *Species at Risk Act* (SARA), which requires that COSEWIC submit a report on its activities to the Minister of the Environment and Climate Change and members of CESCC annually. This Annual Report will also be available online through the SARA Public Registry.

As you know, COSEWIC's role is to assess the conservation status of wildlife species in Canada. Under Item III, Wildlife Species Status Assessments, of the Annual Report, you will find information on how to obtain a copy of the status assignments for the wildlife species assessed in 2021/2022, the applicable criteria and the reasons for the status designation. The Status Reports containing the information used in the assessments are provided in the accompanying email. The reports will also be provided to CESCC members and will be available on the Public Registry.

Over the past year COSEWIC assessed a total of 46 wildlife species, of which one was assigned a status of Not at Risk. Of these 46, COSEWIC re-examined the status of 28 wildlife species; of these, 82% were reassessed at the same or lower level of risk. To date and with the submission of this report, COSEWIC's assessments now include 841 wildlife species in various risk categories including 371 Endangered, 196 Threatened, 253 Special Concern, and 21 Extirpated (i.e. no longer found in the wild in Canada). In addition, 23 wildlife species have been assessed as Extinct, 62 wildlife species have been designated as Data Deficient, and 203 have been assessed as Not at Risk.

The submission of this information fulfills COSEWIC's obligations under Section 25 of SARA, which requires that COSEWIC provide the Minister of the Environment and the CESCC with a copy of the status assessments and the reasons for the assessments. It also fulfills our obligations under Section 24, which requires that COSEWIC review the classification of wildlife species at risk at least once every 10 years.

On behalf of the committee, I would again like to thank you for your continuing support for our work and the commitment of your ministry to the conservation and protection of Canada's biodiversity.

Yours sincerely,

John D. Reynolds, Past Chair, COSEWIC
Department of Biological Sciences
Simon Fraser University
Burnaby, BC V5A 1S6

To view the annual report, go to the following URL:
https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-annual-reports/2021-2022.html.

REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

A Drought and $1.6 Billion (over 5 years) for an 8 Billion Reality

"...climate change is merely one important symptom of overshoot." – Bill Rees

Drought levels of Upper Campbell Lake (November 25, 2022)

Quietly, somewhere around November 15 of this year (2022), the human population of this planet passed the eight billion mark without causing much concern in a world that believes in endless growth. The estimated carrying capacity of this planet is about two billion humans. We need four planets to sustain our globalized culture of consumption. This simple fact notwithstanding, 33,449 delegates, most of whom flew to Egypt, attended COP27, and contributed to global climate deregulation.[1]

At about the same time, Bill McGuire, Emeritus professor of Geophysical and Climate Hazards at University College, London, gave an objective assessment of COP27 that is undoubtedly shared by most scientists not in hock to what has become a very lucrative government and business-funded climate change industry:

> *"No serious observers are of the opinion that the world is any nearer tackling the climate emergency. Indeed, the legacy of COP27 could well be exposing the climate summit for what it has become, a bloated travelling circus that sets up once a year, and from which little but words ever emerge."* [2]

As he pointedly notes, annual meetings since 1995 have never produced an agreement implementing a reduction in fossil fuel production or consumption, necessary to meeting climate targets.

Atmospheric CO_2 concentrations have continued to rise unabated for the last three decades. Any suggestion that we might somehow limit temperature increases by 2100 to 1.5°C, or even take the necessary radical steps to get there collectively, is either delusional or just plain dishonest. The United Nations Environment Programme *Emissions Gap Report 2022* published a month before COP27comes to the same conclusion, there is *"no credible pathway to 1.5°C in place. Only an urgent system-wide transformation can avoid climate disaster."* [3] A system like COP 27 is designed to bridge political and economic interests and maintain status quo. It is not designed to implement substantive change. It is attended by industry lobbyists, politicians, and their staff bent on defending national economic interests, and well-heeled mainstream environmentalists who are comfortable to perpetuate a system built on the illusion of 1.5°C. This "bloated global talking shop" [4] is hardly going to produce the much-needed "system wide transformation" called for by the scientists in the United Nations Environment Programme and the Intergovernmental Panel on Climate Change (IPCC).

That is particularly clear when we stop to consider the population question. Conservative estimates suggest that we will reach nine billion somewhere around 2035 and 10.5 billion somewhere around 2050. Apparently, that is not a problem. The same estimators were until recently confident that by 2030 Canada and other countries would implement climate change measures to limit climate change to 1.5°C. The difference between the two estimates is that the population estimate is a reality driven by science, while 1.5°C target is a political fantasy, largely driven by economists.

At COP meetings, participants do not talk about possible links between the earth's carrying capacity and climate change. It isn't fashionable to talk about population growth for both political and economic reasons. It infringes on the privileges of religious and cultural obstinacy that some believe are rights. In the worldview of most economists, the planet has no carrying capacity, because developing technology and consequent economic planning make the carrying capacity of the earth infinite. The caveat in that reasoning is that the mass extinction, which growing human populations have driven for thousands of years, and continue to drive to this day, is just an externality that will not endanger human beings, a point which is at odds with the findings of both the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and IPCC.

It is difficult to understand how otherwise well-intentioned people can meet annually for three decades and discuss the symptoms of an ailing planet, not just without acknowledging the elephant in the room, but deliberately avoiding it. The carbon footprint never goes way. The data show that the carbon output of global economies, be they developed or developing, has grown apace with the growth of the planet's human population and the decline of faunal and floral populations. The number of people on this planet has an impact and the demands that these people make within a globalized culture of consumption, has a demonstrable

correlated impact. As Bill Rees has long argued "*We cannot solve climate change or other major symptoms of overshoot – biodiversity loss, tropical deforestation, overfishing, land and soil degradation, pollution of everything, the possibility of pandemics, etc. in isolation from the others. However, if we reverse overshoot, all its symptoms would be alleviated simultaneously."* [5]

The economists' line of reasoning presupposes that biodiversity has nothing to do with climate change. That had been a stumbling block for the past three decades until the IPCC and the IPBES released a joint report in December 2021 noting that the climate change crisis could not be addressed without tackling the biodiversity crisis.[6] That was complemented by a briefing of the Royal Society on the linkages between biodiversity and climate change.[7] Of course, biodiversity will be the concern of a whole other separate COP in Montreal from December 1-7, which it seems, unlike COP27, is unlikely to be attended by many politicians. Biodiversity continues to be considered a minor sideshow by politicians who in comparison with COP27 will be largely missing in action. As lead participants of COP15 have pointed out, ministries of the environment are really minor ministries: *"While climate issues attract the attention of many government agencies—finance, health, labour, and others— biodiversity is still confined to environment ministries, which are among the least influential departments with most governments."*[8]

Unlike finance, commerce, transportation, mining, and forestry, what happens in the environment is really not very important, and finding out how it actually works seems to be even less so. The Montreal summit will assess progress made over the past 12 years. That assessment might best be left to Andrew Terry, the director of conservation at the Zoological Society of London:

> *"It will be an easy assessment to make. Absolutely no progress has been made. Populations have continued to decline at a rate of 2.5% per year. We have not slowed destruction in the slightest. Our planet's biodiversity is now in desperate peril as a result."*[9]

Dr. Terry forgets to note the impolite problem of population growth by the one animal whose "successful" populations have continued to rise exponentially, while other species populations have declined inexorably; that will probably not be discussed at the Montreal COP15. The host, Canada, for all of the repeated good will of successive ministries of the environment, has never been able to meet its conservation targets, any more than other countries around the world. COP15 is unlikely to produce more results than all the other Climate COPs, while it watches the elephant in the room trample the planet.

Even more silently, BC has experienced an unprecedented drought that few people really want to discuss. We are a province of immigrants, most of whom live in the city, or suburban environments, whose closest connection to the land is the safe distant view of the mountains or the ocean from a latte bar. And that proves to be an important consideration for both biologists and environmental scientists in general. *The New York Times* recently carried an interesting report "*Extreme Heat will Change Us"* about the impacts of heat extremes in Kuwait City and Basra where temperatures now regularly reach 50^0C, a situation which is expected to be matched in southern United States cities from Los Angeles to Miami by 2060. It isn't the physiological, societal, and economic toll that should interest us most, it is the psychological and social reaction that may be most noteworthy. Professor Abdullah Hussain, who teaches environmental studies at Kuwait University, points out that his fellow Kuwaitis have largely retreated to indoor life and have increasingly less contact with nature. They are acutely aware of climate change; however, they "don't think about the relationship between fossil fuels and the heat." [10] In other words, contrary to what logic might suggest, the more acute a problem and its evidence becomes, the deeper the state of denial and resistance to transformative change.

That has been science's conundrum for the past five decades with climate change. There is no lack of evidence. There never has been a lack of evidence about the drivers of climate change. The problem is, and will remain, that people become increasingly resistant to evidence that calls for a shift in status quo. There are always people who refuse to get on lifeboats and prefer to stay with a sinking ship. The problem is accepting that status quo is no longer sustainable, no matter how much you label it as such.

2022 brought some unusual but not entirely unexpected consequences of our unsustainability to BC. Not only was winter prolonged with coastal snows well into March, June flipped to cold and ruined crops, knocking out normal pollination cycles. Many orchardists were left without a crop. British Columbians were then surprised to find that the California drought, which extended well into the heart of Turtle Island and reduced the Mississippi river to a trickle, reached deep into the Northwest Coast. [11] The legendary Rain Coast of gyppo loggers and small fishermen, which real estate agents found unattractive in the 1970s to potential buyers and renamed "The Sunshine Coast," got its full measure of hubris sun that dried sub-alpine lakes and water sources. Dwindling water supplies turned off the taps of craft beer outfits, hockey rinks, and any other local industry reliant on freshwater. There was none of the usual fall rain to make up for the annual July-August deficit. Rain did not come to fill rivers in mid-October to let the salmon migrate. November, the month that can annually be relied on every year to be the wettest month of the year saw very little rain, and the water table remained at least two metres below saturation levels, only to be followed by frost that prevents infiltration, heralding flashy rivers for 2023 that will scour out fish eggs and fry when temperatures rise again.

BC gauges much of its environmental well-being by the state of salmon and salmon fisheries. This year began with contradictory news that found echoes throughout the year. What promised to be a bounty one week turned out to be a bust the next. In the spring, fishermen took heart in news of abundant returns to be expected given a bountiful fishery in Bristol Bay, Alaska. True to fishermen lore, the collapse of salmon in the adjacent river, the Yukon River, down to an unprecedented 28 salmon, was dutifully ignored. DFO numbers changed from week to week and varied from place to place. There were two unexpected novelties in this year's fish habitat. First, the greater snowfall in the spring guaranteed a greater snowpack, and therefore good water levels. As every aquatic biologist knows, high water levels normally guarantee good cold well-oxygenated salmon habitat and good spawning returns. However, this year, due to the heat, the benefits of high water levels were offset by high water temperatures running around 28^0C from July to September, causing in-stream mortality of juvenile coho, sockeye, and Chinook salmon, and affecting

early returns. Second, in September and October, returning pink and coho salmon were met by low stream water levels and elevated freshwater temperatures that resulted in mass mortality events at the mouth of many rivers. Some of these mass die-offs received international attention.[12]

While the numbers of returning salmon may have been encouraging in many places, the long-term implication of in-stream juvenile mortalities and returning adult pre-spawning mortalities due to the impact of the drought, should be cause for concern. For the most part, the public remains unaware, happy to remember the good news and overlook the negative news. That concern should not be directed exclusively to salmon numbers. It should be framed holistically within what a drought, which is largely acknowledged to be driven by climate change, means for the future of BC's ecosystems. Thus far, we have tried to sidestep the impacts of our destructive industries and developments through technological compensatory strategies such as habitat restoration and hatchery nursing, or even aquaculture. If we continue to face water shortages and unseasonal water temperatures, then "habitat restoration," is no longer commensurate with the kind of habitat and species to be expected within novel thermal regimes, and hatchery production is out of place. As the IPCC and the UN Environmental Programme have indicated, we need to re-frame the problem and make trans-formative changes at all levels.

That BC is nowhere near to taking the necessary steps to rise to the challenges of climate change and biodiversity is obvious in the response to three concerns.

First, water productivity and quality are intimately tied to the state of BC's forests. Notably, in light of the growing concern over annual in-stream water temperatures, old-growth forests are known to regulate groundwater storage and outputs, and affect stream temperatures. In October, both the CBC's "*Fifth Estate*" in Canada and the BBC in Britain, brought to international attention the scandal of Drax, the British company that buys cheap pelleted wood from BC to burn as biomass energy in Britain. While some may wish to spin this as the burning of waste wood, it is in fact yet another case of governments buying into business fantasies and not dealing with real environmental problems entailed by the liquidation of old-growth. While the idea of converting forestry waste into energy might sound appealing to some, it becomes a whole different issue when the "waste" stock is in fact found not to be waste, but to come directly from primary forests, and clearcutting of old-growth forest.[13]

The Drax scandal opens the Pandora box of successive BC governments' (Liberal and NDP) mismanagement of BC's forests, which has resulted in the destruction of what little remains of BC's old-growth forests by putting economic interests first. In early November, a year after the scientific panel recommended that 2.6 million hectares of old-growth be deferred, only 1.4 million are theoretically deferred for another year, and logging continues unabated throughout the province.[14] That concern took on a whole new complexion in mid-November with the public release of Herb Hammond's letter of resignation from the Association of BC Forest Professionals (ABCFP), which is well-worth the read.[15]

Herb Hammond is a well-known forester and conservation planner, the author of several books, and the recipient of the Canadian Geographic Gold Medal Sustainable Living award. The letter is a full-blown condemnation of the professional college system and the hypocrisy and duplicity that sustain it. The title of his letter spells out the gist of the letter: "*The forests are in trouble. Earth's climate is collapsing. The Association of BC Forest Professionals and many of its members are complicit in this trouble.*" His itemized sweeping condemnation of the ABCFP's failure to live up to its mandates to the public, forest health, and protection of clean water resources, reserves a particular sting for the ABCFP's role in the Drax scandal. He points out the close links and overt conflicts of interest between the ABCFP and Diane Nicholls who was BC's Chief Forester for over a decade and shaped much of the ABCFP and province's forestry policy, before she retired and became a vice-president at Drax.

If half of what Herb Hammond's letter of resignation puts forward is correct, the Drax scandal is not an isolated incident. It is a manifestation of the systemic corruption of forestry and forest practices in BC that have contributed to, and continue to contribute to, climate change and biodiversity destruction. These revelations come at a time when "*we must get a grip on forest science – before it is too late*."[16] Scientists are increasingly concerned about increased tree mortality around the world and about the poorly understood impacts of climate change on forests. It is unclear what the response of forests will be to climate change and what this means for carbon storage and modeling.

As the editors of *Nature* point out "*Forests are our life-support system and we should be more serious about taking their pulse*." That, unfortunately does not seem to concern the ABCFP or BC politicians who already claim to have solved the problem:

> [the] *"CleanBC Roadmap to 2030 plan accelerates measures in B.C.'s continent-leading climate plan that has been proven effective and introduces new ideas to help B.C. achieve the Paris emissions reduction targets for 2030 and reach net-zero by 2050."* [17]

This is just more of the customary self-satisfied "world-class BC" hot air. The United Nations need to talk to these people: BC apparently has a pathway that strangely nobody knew about except BC's political fan club!

When listening to government ministry pronouncements, it is often difficult to get a fix on what is real and what is illusory. Nothing quite gives one that same feeling as the fish farm politics. BC's government, which always states that it is very concerned about wild salmon, is also very concerned, perhaps even more so, about the protection of jobs and revenues associated with aquaculture. At $556 million per year, it is after all, the biggest source of agricultural revenue in the province. That seems not to be entirely lost on Joyce Murray, the federal minister of Fisheries and Oceans, who just took a step back and authorized two–year extensions to licenses that were supposed to expire. Just like the provincial government before it, the federal government promised to abolish fish farms in BC, before an election.

Having initially tried to end licenses, after a judge ruled that the aquaculture industry was being unfairly treated, and the BC premier complained about the loss of jobs, the federal government is re-negotiating. The new wording talks about transitioning to find ways to *"progressively minimize or eliminate interactions between salmon open net-pens and wild salmon.*" This suggests that salmon in open net-pens will be remaining wherever local communities allow it. Two-year extensions buy enough time

to another election and another probable extension in an ever-shifting political landscape. The provincial government initially promised to remove fish farms, but then negotiated renewals with First Nations, and it would be churlish not to realize that the federal government is following suit. Fish farms are far from gone, once again even if that is at odds with science.

There is a lot of talk about moving aquaculture on land in recirculating freshwater systems. There are several practical problems that do not get much discussion. If, as this year demonstrated, the new normal suggests that we are to be prone to droughts, where will this freshwater come from? Then, that water will need to be cooled to offset summer heat, adding another large energy cost to an already costly proposition involving water pumping and recirculation. Finally, there will be high waste disposal costs and high maintenance costs. The costs of land-based aquaculture would seem to negate any profit and the viability of aquaculture.

The question that people should ask is why we have, or even need, fish farms? We forget that fish farms were introduced because the rationale was that fish bulk up protein faster and more cheaply than mammals. When fish farms were introduced, the mantra was that they were a solution to feeding a growing global population cheaply. Asking that question returns to the initial premise of this essay. If we want to get rid of fish farms, the real solution is to deal with human overshoot and acknowledge that this planet has a carrying capacity.

Unfortunately, carrying capacity is only in the cards in BC when it comes to the transportation of goods traded with Asia that will help the already unmanageable city, that is, Vancouver grow even more. The Vancouver Port Authority's Roberts Bank Terminal 2 proposal, which has sat on the Minister of Environment and Climate Change's desk since 2019, after it was recommended against, is resurfacing once again.[18] The proponents are back with a proposal that includes truly outlandish propositions to invest billions of dollars into building, while monitoring bird and fish activity, and if any disturbance is noted, the proponents would cease construction, remove construction, and restore habitat. The proponents' outlandish proposals seem to be cast in such a way as to bolster the chances of a second proposal by what purports to be another party to simply massively expand existing facilities. The second proposal by Global Container Terminals Inc., which has been developed over the last three years while the minister sat on the effectively socially and scientifically rejected RBT2 proposal, is intended to seem more environmentally conscious; however, its impacts would still increase tanker traffic and the footprint of the terminal. The GCT proposal is really just another attempt to sell the same goods to the public. A whole new cycle of hearings and studies will be necessary.

Either way, it seems like Vancouver will see Roberts Bank terminal increase its footprint to meet the demands of an endlessly growing economy. The environment will pay the piper in order to increase commerce and consumption to satisfy the needs and desires of growing local and global populations. Since both proposals are based on the axiom that economic growth is infinite and can support an infinite population, we should anticipate that once built, Roberts Bank Terminal 2 will undoubtedly need to be expanded again shortly thereafter.

Now, that was all capped this week by the release of Canada's National Adaptation Strategy at $1.6 billion over 5 years.[19] That is $320 million a year, which experts agree is just a very small drop in a big bucket. The actual cost of addressing climate change in Canada is estimated by the Insurance Bureau of Canada to be at about $5.3 billion per year for decades to come. That annual $5.3 billion is really the cost of building or rebuilding adaptation infrastructure. It does not include the cost of environmental restoration, nor the incalculable cost of lost biodiversity and the quality of life that comes with it. If we recall that climate change is really a symptom of an overpopulated planet, that $1.6 billion, or the more realistic $5.3 billion per year, is not really the cost of overpopulation. It is the material cost of refusing to acknowledge that there are limits to growth and that population growth needs to be considered if we are ever to address its symptoms: climate change and the biodiversity crisis.

References

1 https://www.carbonbrief.org/analysis-which-countries-have-sent-the-most-delegates-to-cop27/

2 https://www.theguardian.com/commentisfree/2022/nov/20/big-takeaway-cop27-climate-conferences-arent-working

3 https://www.unep.org/resources/emissions-gap-report-2022

4 https://www.theguardian.com/commentisfree/2022/nov/20/big-takeaway-cop27-climate-conferences-arent-working

5 https://populationmatters.org/news/2021/11/bill-rees-a-note-on-climate-change-and-cultural-denial/

6 https://www.un.org/sustainabledevelopment/blog/2021/06/tackling-biodiversity-climate-crises-together-and-their-combined-social-impacts/

7 https://royalsociety.org/-/media/policy/projects/bio-climate-interlinkages/interlinkages-between-climate-change-and-biodiversity.pdf?la=en-GB&hash=CC94CD3B519E94D5E12883667B24AF6D

8 https://www.theguardian.com/environment/2022/nov/27/biodiversity-montreal-summit-nature-earth-wildlife-canada

9 https://www.theguardian.com/environment/2022/nov/27/biodiversity-montreal-summit-nature-earth-wildlife-canada

10 https://www.nytimes.com/interactive/2022/11/18/world/middleeast/extreme-heat.html

11 https://www.nytimes.com/2022/11/27/opinion/environment/mississippi-river-drought-colorado.html

12 https://www.cbc.ca/news/canada/british-columbia/salmon-dead-drought-bella-bella-1.6606418

13 https://thenarwhal.ca/bc-wood-pellets-drax-pinnacle-renewable-energy/; https://thenarwhal.ca/drax-bc-old-growth-logging/

14 https://www.endangeredecosystemsalliance.org/news/2022/11/3/media-release-spin-filled-announcement-reveals-bc-governments-failure-to-ensure-net-gains-in-old-growth-logging-deferrals

15 https://www.focusonvictoria.ca/forests/122/

16 *Nature* vol.608, 18 August 2022, 449.

17 https://news.gov.bc.ca/releases/2021ENV0065-002025

18 https://thetyee.ca/News/2022/11/11/Intensifying-Push-Build-Fraser-Delta-Superport/

19 https://www.cbc.ca/news/politics/climate-adaptation-canada-1.6661533

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

ALBERTA News

Submitted by Brian Free, CSEB Alberta Regional Director

Bison Hold Their Own in Banff National Park

In 2017, 16 plains bison were transferred from Elk Island National Park, east of Edmonton, to an enclosure in Banff National Park. In 2018, they were released from the enclosure and allowed to roam freely in the park. One goal of the project was to have the herd remain within the park. Drift fences were established to prevent the eastward and northern migration of these animals and hazing was used to move them back into the intended area. Four males that did not "respond" to these methods were either moved to another national park or put down if they had wandered too far out of the park.

The Banff herd has grown to 80 animals over the past five years. A recent report on this pilot project concludes that the bison have adapted well to their mountain habitat, and the translocation was successful. The Stoney–Nakota First Nation to the east of the park has confirmed many cultural benefits experienced by their community from the presence of the bison.

The report also describes how this re-introduction of bison affected park visitors, neighbouring cattle ranchers, recreationists, First Nations, and others. Parks Canada is seeking public input regarding this "Report on the Plains Bison Reintroduction Pilot, 2017-2022". Input will be accepted until December 14. For more information, go to: https://www.pc.gc.ca/en/pn-np/ab/banff/info/gestion-management/bison/engagement.

New Study of Mountain Coal Mines

A recent Alberta government study has indicated that wind-blown dust from coal mines in B.C. has contaminated an alpine lake in Alberta. The levels of contamination are comparable to waterbodies downwind of Alberta's oil sands mining operations.

The study centred on Window Mountain Lake, a small remote lake in Alberta's Rocky Mountains. It is just across the Great Divide from B.C.'s Elk Valley, where there is a long history of coal mining. The lake has no connections with that valley and has no coal deposits.

In this study, core samples were taken from the lake bottom extending from the depth corresponding to the year1850 to the present at the surface of the lake bottom. The researchers analyzed the core layers for chemicals associated with coal, such as polycyclic aromatic compounds and selenium. The former are known carcinogens and the latter is toxic to fish.

They found the carcinogens were stable in the core sample until the industrial era. The pace of contamination quickened after 1970, when aboveground mining in the Elk Valley began. Polycyclic aromatic compounds doubled in concentration in Window Mountain Lake sediments every 10 to 15 years after that. A pattern of increasing concentrations was also found for selenium.

This study comes at a time when the Alberta government is contemplating a shift in policy to allow new coal mining activity in the Rocky Mountains.

Alberta Represented at the COP27 Climate Conference in Egypt

Alberta's Environment and Protected Areas Minister Sonya Savage led an Alberta government delegation to the November COP27 conference in Egypt. Before her recent appointment to the Environment and Protected Areas ministry, Savage spent several years as Minister of Energy so she is familiar with the climate file, albeit from a different perspective. The government's main message was about the prospects for carbon capture and storage to reduce the greenhouse gas emissions from Alberta's energy industry; carbon dioxide is separated and collected from the emissions produced by industrial activity, then compressed and transported to a storage site and injected into underground geological formations that can store the gas. Alberta has two commercial-scale projects underway, both linked to oil sands production.

More information about carbon capture and storage can be found at https://www.alberta.ca/carbon-capture-utilization-and-storage-overview.aspx.

SASKATCHEWAN News

Submitted by Curt Schroeder, CSEB President and Saskatchewan Member

Saskatchewan has the oldest bird sanctuary in North America, with the Last Mountain Lake Migratory Bird Sanctuary established in 1887 located about 165 km southeast of Saskatoon. The sanctuary is located within the Last Mountain Lake National Wildlife Area and managed by the Canadian Wildlife Service. In 2019, the government removed the old interpretive centre next to the park headquarters and built a new pavilion, just as the COVID-19 pandemic hit. The building currently still stands empty and presumably will be open to the public soon, with new exhibits, as COVID-19 subsides.

New visitor pavilion, Last Mountain Lake Migratory Bird Sanctuary, September 2022. Photo Credit: Curt Schroeder

The building architecture blends into the prairie landscape in both shape and colour, with a large wall of windows facing south with an excellent view overlooking the bird sanctuary. Nearby is a trailhead that takes visitors through native prairie and views of the lake, shoreline, and adjacent lands.

New trailhead next to the new visitor pavilion, September 2022. Photo Credit: Curt Schroeder.

The spring and fall seasons are particularly ideal opportunities to view many residents including double-crested cormorants, common terns, Forester's terns, American white pelicans, Baird's sparrows as well as migratory ducks, geese, grebes, swans, and cranes, including whooping cranes. Unfortunately, plains bison are no longer part of this ecosystem, having been hunted to local extinction in the 1880s.

Once the new visitors pavilion is open, the visitor experience will offer more information and enhanced opportunity to appreciate the prairie ecosystem and its inhabitants.

MANITOBA News

Submitted by Robert Stedwill, CSEB Vice-President

Water Management in Manitoba

The Manitoba government is unveiling a new water management strategy—the first of its kind in nearly 20 years—to guide future actions, decisions, and investments to protect the province's water resources and ecosystems while sustainably growing the economy and communities.

Granted, following the negative impact (which continues) that the COVID-19 pandemic has had on the economy, there is a need to minimize the impact, or at least restore it to prepandemic levels—but to grow it? Why is there this constant underlying need to grow the economy, which invariably puts a stress on the environment?

Government leadership has indicated that collective water needs are changing. Growing communities, a vibrant agriculture sector, and expanding industries all depend on continued access to water. At the same time, climate change and extreme weather, such as floods and droughts, have a significant impact on water availability and security.

Manitoba's new water management strategy balances environmental, social, and economic needs, and creates opportunities to partner with industry, communities, and all Manitobans, while ensuring the province remains a leader in sustainable water management. Invariably, the province will be looking to unlock future growth opportunities.

The premier noted that "as Manitoba's first whole-of-government water strategy since 2003, the new water management strategy provides a comprehensive framework to conserve and protect the environment, enhance resiliency, improve water quality and availability, and ***foster economic development opportunities***`` (emphasis is mine). The water management strategy will help support innovative solutions, best practices, and new technologies to help address the shared water needs of Manitobans.

A water action plan for fulfilling the vision and objectives of the strategy will be developed this winter through further engagement with the public and interested stakeholders."

Focus areas within the development of the water management strategy include the following:

- maximizing water resource potential through conservation and efficient water use;
- addressing water infrastructure challenges and opportunities meeting water supply needs of current and future generations sustainably;
- protecting biodiversity and aquatic ecosystem health;
- building Manitoba's preparedness and resilience to a variable and changing climate;
- protecting the quality and quantity of groundwater;
- protecting and improving surface water quality;
- improving coordination of water management and governance across watersheds, basins, and aquifers;
- improving data information and knowledge available on water;
- advancing Indigenous inclusion in water management; and
- enhancing engagement and participation of Manitobans in water stewardship.

The development of the Manitoba government's new water management strategy will build on key stakeholders, advisory panels, and the general public.

Amendment to the *Manitoba Environment Act*

It appears that the negative feedback the government received concerning the cosmetic use of pesticides has caused the *Environment Act* to be amended to allow Manitobans the choice of using Health Canada approved pesticides on their domestic lawns. While this has been made possible, the list of sensitive areas that would be protected from the application of these products has been expanded "out of an abundance of caution."

During a public consultation process following the 2015 cosmetic pesticides restrictions implementation, 60% of respondents felt that sale and use of these products were too restrictive, and over 70% wanted restrictions reduced or rescinded.

No doubt a case of "the squeaky wheel gets the grease!"

ATLANTIC News

By Peter Wells, CSEB Atlantic Member

Climate change was in the regional news a lot in late summer, largely due to the Atlantic provinces being hit very hard by post-tropical storm Fiona (Reuters 2022; Spurr 2022). Huge damage to forests and community infrastructure was incurred in northeast Nova Scotia, on PEI, and especially in southwest Newfoundland. Many trees fell and there was a lot of coastal erosion around PEI. Some areas experienced storm surges and flooding. It was a very costly storm (Spurr 2022) and it brought focus to the current (now over) COP 27 talks on climate change in Egypt (Reuters 2022). The impacts of such major storms on wildlife, especially migrating birds, requires continued study. The news also covered topics such as the transition to green renewable energy (The Chronicle Herald 2022) and the impacts of climate change globally on coral reefs and their biodiversity (Dickie 2022).

The status of legal protection of Nova Scotia's provincial parks continues to be in the news, due in large part to the appalling situation that none of the parks are truly protected under provincial legislation. Despite the Owls Head coastal area (home of two species at risk—piping plovers and barn swallows) being given provincial park status in June, and one portion of it to be managed as a natural park, a local NGO is demanding greater transparency by the government in their designation and management of provincial parks and has taken them to court (Campbell 2022a). The hope is that the provincial Department of Natural Resources and Renewables will officially designate all of its parks under the *Provincial Parks Act*, finally giving them proper protection.

Overlapping the Owls Head controversy is yet another park story, the recent bid to develop a golf course in West Mabou Beach Provincial Park on western Cape Breton Island (Campbell 2022b,c,d; Hunt 2022; MacDonald 2022; Trider 2022; and many letters to The Chronicle Herald). This has been in the news for months, due to the conflict between community support for coastal development and more employment, and that of support for protection of a unique coastal area (sand dunes habitat) and beaches beloved by local residents. The park is already under a provincial park designation, but as with Owls Head, this is not yet true protection.

Both controversies point to the need to implement the *Provincial Parks Act* and plan and bring real protection to the lands designated as provincial parks. The role of NGOs and enlightened citizens to ensure that this happens, with meaningful oversight, is crucial.

The *Coastal Protection Act* is planned to go into effect in 2023. This will provide guidelines as to where to build coastal infrastructure that is "more resilient to sea-level rise, storm surge, and coastal erosion" (Halman 2022). Hopefully, it will also help to reduce the impact of coastal barriers such as highway causeways, such as the one at Windsor, NS. This causeway has an important fish passage (aboiteau) for a lot of different species (salmon,

shad, gaspereau, eels, bass, sturgeon, tom cod, etc); it requires a completely new structure as the main highway is being twinned and the old fish passageway is redundant (Beswick 2022a). Causeways continue to affect fish passage in and out of estuaries throughout the Bay of Fundy, an ongoing challenge that is very slowly being resolved.

The Blue Mountain Birch Cove Lakes is an urban wilderness area on the outskirts of Halifax, pieced together over several years and funded by citizens and NGOs (Peddle 2022; Demont 2022). However, this special area is under constant threat of developers who own adjacent land, land also needed for access to the wilderness park. A recent court case sided with the developer, another loss for the proposed green belt surrounding metro Halifax (Peddle 2022). In Halifax, development over-rules protection most of the time. As well, in the few big urban parks that we have, overuse and losses due to storms are taking a toll of the forest ecosystem, especially threatening the big old trees (Demont 2022) and inevitably the wildlife that they support.

Open pen salmon aquaculture and mining remain in the news (Dean-Simmons 2022; Beswick 2022b). Cooke Sea-foods is proposing to expand its open pen salmon farms in Liverpool Bay, on the southwest coast of Nova Scotia, despite concerns about potential impacts of escapes on wild salmon populations and the pollution (uneaten food, faeces, pharmaceuticals) on the local lobster fishery. The application to expand is in the review phase within DFO and the provincial Department of Fisheries and Aquaculture (Dean-Simmons 2022), with other consultations planned. Despite the evidence that open-pen aquaculture has many impacts to coastal environments, and noting that it is being phased out in the coasts of British Columbia and Washington state, it is still being promoted in the Atlantic region.

A proposed open-pit gold mine along the eastern shore of Nova Scotia, which would have threatened the St. Mary's River watershed, had its environmental assessment terminated, due to insufficient information. There has been considerable opposition from a local river association and concerned citizens, with concerns for the river and a desire to create a wilderness area close by. The issue of renewed gold mining in Nova Scotia warrants watching, due to the associated short and long-term pollution problems.

There are several good news stories associated with ecological research and wildlife protection in Nova Scotia (Cameron 2022; Cooke 2022; The Conversation 2022; Nathanson 2022). Cameron has penned a marvellous overview of ecological research in Nova Scotia, covering topics such as ecological system planning, long term monitoring, species of conservation concern, and human use of protected areas. The internationally-known Hope for Wildlife Rehabilitation Centre, located down the east coast from Halifax, held its first open house since COVID hit us. It attracted many people and showed off its animals and improved facilities, such as its Motus wildlife tracking station that "tracks small flying animals like birds, bats, and insects that have been fitted with a radio transmitter" (Cooke 2022). Much attention has been made to the monarch butterfly, which visits the region annually (The Conversation 2022). An Atlantic salmon restoration program continues on Cape Breton Island, with releases of previously captured juvenile salmon back into their home stream in Cape Breton National Park (Nathanson 2022).

Finally, there was a spectacular rescue of stranded white sided dolphins from the mudflats at Digby in early November. The 16 animals were caught by a receding tide and left on the mud flats facing desiccation. Community volunteers and local officials managed to protect the animals with mud barriers and blankets and eventually moved them into the water of the next incoming tide. None were lost.

To conclude, this column covers new and ongoing environmental and conservation issues in Nova Scotia. It is hoped that CSEB members in other parts of the Atlantic region will start to contribute news items from their provinces!

References

Beswick, A. 2022a. Delays, debate mark highway project. The Chronicle Herald, Wed. Aug. 24th, P. A4.

Beswick, A. 2022b. Cochrane Hill Project. Gold mine's enviro-evaluation canned. The Chronicle Herald, Fri. Sept. 2nd, P. B1. (this story was repeated in the The Chronicle Herald on Sept. 3rd).

Cameron, R.P. 2022. Twenty years of ecological research in Nova Scotia wilderness areas and nature reserves: A review of studies, 2002-2022. Proceedings of the Nova Scotian Institute of Science 52(2): 257-302.

Campbell, F. 2022a. Owls Head. Park designation doesn't end legal wrangling. The Chronicle Herald, Sat. Oct. 22nd, P. A7.

Campbell, F. 2022b. Cabot revisits West Mabou golf course. The Chronicle Herald, Tues. Oct. 25th, P. A1.

Campbell, F. 2022c. Golf course. Premier urged to 'just say no'. Cabot Cape Breton renews proposal to build golf course on park land. The Chronicle Herald, Wed. Oct. 26th, P. A3.

Campbell, F. 2022d. West Mabou Beach. Ecologist: 17 rare species found in park. The Chronicle Herald, Wed. Nov. 2nd, P. A3.

Cooke, S. 2022. Animal support, Thousands flock to Hope for Wildlife. The Chronicle Herald, Mon. Sept. 12th, P. A1.

Dean-Simmons, B. 2022. Cooke wants to farm more salmon in Liverpool Bay. Decision-making process will include public hearings. The Chronicle Herald , Fri. Oct. 14th, P. B1.

Demont, J. 2022. When a great tree falls in the forest. The Chronicle Herald, Tues. Nov. 8th, P. A3.

Dickie, G. 2022. Climate tipping points of coral die=off, ice sheet collapse closer than thought. The Chronicle Herald, Fri. Sept. 9th, P. A11.

Halman, T. 2022. Storm surge. Coastal Protection Act will make us less vulnerable. The Chronicle Herald, Sat. Oct. 15th. P. D3.

Hunt, N. 2022. Special beach. Cabot's golf bid galling. The Chronicle Herald, Tues. Nov. 1st, P. A6.

MacDonald, R. 2022. Community input. Cabot is seeking a respectful dialogue on Mabou golf project. The Chronicle Herald, Sat. Nov. 5th, P. D2.

Nathanson, I. 2022. Environment. Restoration program continues. Second round of salmon released back into Clyburn Brook. The Chronicle Herald, Sat. Oct. 22nd, P. A2.

Peddle, S. 2022. N.S. Appeal Court ruling overturned. The Chronicle Herald, Sat. Oct. 22nd, P. A3.

Reuters. 2022. Environment. A field guide to climate jargon. The Chronicle Herald, Sat. Nov. 5th, P. A14.

Spurr, B. 2022. Climate change. For insurers, Fiona costliest storm ever. The Chronicle Herald, Fri. Oct. 21st , P. B1.

The Chronicle Herald. 2022. Legislation clears way for more hydrogen projects. The Chronicle Herald, Tues. Oct. 4th, P. A4.

The Conversation. 2022. Nature. The survival of the endangered monarch butterfly depends on conservation beyond borders. The Chronicle Herald, Sat. Aug. 27th, P. A7.

Trider, C. 2022. Keep West Mabou Beach off limits to developers. The Chronicle Herald , Sat. Nov. 12th, P. D2.

A Whale Tragedy in Nova Scotia Coastal Waters

A Sperm whale was found dead on a rocky beach in western Cape Breton Island on Nov. 4, 2022, after apparently coming ashore alive but emaciated, then dying of starvation, dehydration ,and exposure. According to Tonya Wimmer (Marine Animal Response Society), the 14 m (45 ft) male weighed more than 28 tonnes (Source: Facebook/MARS). A detailed necropsy was conducted by MARS, the Canadian Wildlife Health Cooperative of the Atlantic Veterinary College (PEI), and the Nova Scotia Department of Natural Resources and Renewables. They found that the animal had swallowed 150 kg of fishing gear (bait packaging, ropes, nets) that congealed and stuck in its stomach, leading to its death. This tragedy reinforces the known risks of discarded or lost fishing gear to marine mammals and other marine creatures and the constant need for fishers to reduce this source of deadly marine pollution to coastal waters.

Acknowledgements: The Canadian Press staff provided the core information for this note, Nov. 18th, 2022. Thanks also to the MARS for their dedicated work to protect marine animals in our coastal waters.

Bay of Fundy Ecosystem Partnership (BoFEP) – Update

In the wake of the successful Bay of Fundy Conference (*Advancing Estuarine Science and Ocean Literacy in Atlantic Canada*) in the spring, work by BoFEP members and partners has continued on several fronts. This was reported on at its October 21st Annual General Meeting (held on-line). Detailed reports are on the BoFEP website (www.bofep.org).

This is BoFEP's 25th anniversary! We continue with a steering committee and a small management team, representing many environmental partners and between 350-400 paid and non-paid members (support is voluntary) across multiple sectors and the two provinces surrounding the Bay of Fundy. We focus on science communication, filling an information niche for the Bay, and we continue under the over-arching theme of ocean and climate literacy for the people and communities in this region. This supports the ongoing UN Decade on Ocean Science and Sustainability, under SDG 14.

Our communications work continues with the Fundy Tidings newsletter (published four times a year), with 371 subscribers currently, an active website, and more connections using social media. The 2022 Conference Proceedings, the 12th in the series, will be completed shortly. We have initiated a video series on Bay of Fundy topics of interest, the first one by Dr. Ian Spooner of Acadia University on the geological formation of the Bay of Fundy. Several more are planned. The working group on ocean and climate literacy is active with a number of activities—supporting completion of a Fundy Activity Colouring Book, to be used in local schools; planning work with educators, and other ocean literacy groups; and participating in public events and conferences.

At the Annual General Meeting, Dr. Jeff Ollerhead of Mount Allison University gave an excellent talk "Expect the previously unexpected: shoreline change with accelerated climate change". Shoreline erosion and coastal flooding have become very serious problems in the Fundy region, accentuated by more severe storms during the hurricane season.

Also of special note is the passing at age 90 in September of one of BoFEP's outstanding members, the famed limnologist Dr. Joseph (Joe) Kerekes (Farago 2019, Figure 1). He was well known in recent years for leading conservation work on the Common Loon (*Gavia immer*) in Kejimkujik National Park, on which he published recently (Kerekes and Hope 2022, Figure 2). Joe was an inspiration to many regional environmental biologists and citizen scientists.

Figure 1. Joe Kerekes investigating aquatic vegetation in Kejimkujik National park, NS, 30-35 years ago (Picture by Eric Mullen, Parks Canada). Republished by permission of the NSIS.

Figure 2. The Common Loon, Gavia immer. Picture by J. Kerekes.

To conclude, the amazing Bay of Fundy is recognized globally with six UNESCO sites, including two biosphere reserves. It deserves continued research and new conservation and protection measures, such as marine protected areas. There is much work here for environmental biologists and ecologists, in this era of global climate change.

References

Farago, S. 2019. Celebrating the career of Dr. Joseph J. Kerekes – internationally renowned, Nova Scotia limnologist. Proceedings of the Nova Scotian Institute of Science 50(1): 55-60.

Kerekes, J.J. and Hope, P. 2022. Loon Watch – 25 years of successful volunteer citizen science at Kejimkujik National Park, Nova Scotia. Proceedings of the Nova Scotian Institute of Science 52(2): 197-202.

TERRITORIES News

Submitted by Anne Wilson, CSEB Territories Director

Winter seemed to land with an abruptness that shattered my denial that it was coming! It followed on exceptionally nice fall weather, and this was the case for a trip to Yellowknife and into the Nahanni National Park to do a site visit at the Prairie Creek Mine. The days were stellar with sunshine and warm temperatures. The updated 1-3 month forecast has indications that November to January may not be so kind—much of the NWT and Yukon are predicted to have lower than average temperatures and at the same time as parts of the High Arctic are likely to be above norms. I am looking forward to travel to Rankin Inlet, notwithstanding that they are already experiencing slightly below-normal temperatures!

News Bits:

Climate Change

A report commissioned by the Yukon regional chapter of the Canadian Parks and Wilderness Society identifies the risks associated with damaging peatlands, such as by placer mining. Carbon storage in peatlands is noted as potentially one of the biggest contributions the Yukon could make to controlling climate change. The report is available at the following URL: https://cpawsyukon.org/publications/.

A recent journal article provides an updated assessment of tipping points for the most important climate tipping elements and indicates that even global warming of 1°C (which has already been surpassed) puts the planet at risk by triggering some tipping points. Tipping points become self-perpetuating beyond a warming threshold, and can lead to impacts including sea level rise, collapsing ice sheets, loss of biodiverse biomes, and carbon release from thawing permafrost. See the full article at https://www.science.org/doi/10.1126/science.abn7950.

Remediation

The cost of clean-up at the Giant Mine site near Yellowknife, NT, has been estimated at $4.38 billion, more than four times the initial estimate. Remediation work includes containment of 237,000 tonnes of arsenic trioxide dust underground, remediation of tailings ponds, re-channeling Baker Creek and removal of contaminated creek sediments, filling of open pits, managing surface contamination, removal of infrastructure, and treatment of site water. Costs are substantially being covered by the federal government. Remediation is scheduled to be complete in 2038, but the site will need to be maintained and monitored in perpetuity.

Renewable Energy

The Northern Affairs Minister has announced funding for hydro projects in Nunavut, including the Kivalliq Hydro-Fibre Link and Iqaluit Nukkiksautiit Project. At this stage, the funding will be used for planning and feasibility, including technical, environmental, and community engagement aspects. The intent is to move away from dependence on diesel generators to renewable energy on a large scale.

Miscellaneous

And an odd-ball note from the Nov. 14, 2022 *News/North NWT* that makes me wonder if beaver pelt prices are at rock bottom (this is not the case, as there are markets for garments and hatters still):

> *"On Nov. 7, the Town of Hay River announced the start of a beaver relocation program.*
>
> *Nuisance beavers are being trapped and transported away from the Porritt Landing Marina and the Oxbow Trail by the 105 Street trailhead.*
>
> *The intention is "to safely trap and rehome local beavers," according to a news release from the town.*
>
> *"Recent beaver activity caused damage to greenspace infrastructure at both locations, as well as powerlines at Porritt Landing Marina," the municipality stated.*
>
> *ENR officers will be checking the traps multiple times per day."*

Perhaps an easier wildlife issue to address than invasive bison!

Notes on NWT and NU Development and Activities

Development activity and projects in the North are a bit quieter currently, and include the following:

- Alternative energy projects at two mining developments in Nunavut, including wind and solar.
- Technical review of the proposed expansion of mining at the Meliadine Gold Mine, with meetings held in Rankin Inlet in late November. The expansion includes extending the underground ore mining, addition of a windfarm for power supplementation, the option of building a full-sized airstrip, and potentially disposing of mine wastes in exhausted open pits.
- The Ekati Diamond Mine is looking at remote underwater mining of pits, which may extend the mine life. This is being reviewed in conjunction with their water licence renewal.
- De Beers has submitted their development project proposal for the Chidliak Diamond project in NU. It is located approximately 120 km northeast of Iqaluit, and intends to incorporate a FutureSmart Mining approach of low-carbon energy, small footprint, minimal water use, modular, automated infrastructure, and remote monitoring. The project anticipates completing the Pre-Feasibility Study in 2023, and moving to selection of options.
- Baffinland was granted permission to mine up to 6 million tons of iron ore this year, while it awaited the outcome of the Phase 2 expansion approval processes. The Nunavut Impact Review Board recommended against the expansion based on impacts associated with shipping primarily, and on November 16th, the federal Minister of Northern Affairs, Dan Vandal, agreed with the Nunavut Review Board, and turned down the application.

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 anne.wilson@ec.gc.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!

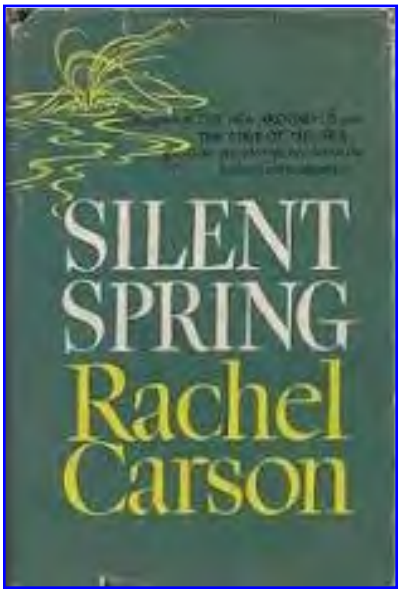
BOOK Review

Submitted by Peter Wells, CSEB Atlantic Member

Silent Spring

by Rachel Carson. 1962. Houghton Mifflin

Available from Amazon.ca $21.77 paperback; $1.29 Kindle Ed.



Sixty years ago in 1962, a highly influential book called Silent Spring was published. It was penned by the American writer Rachel Carson, already known for her three widely acclaimed books about the sea. This book is about the risks of persistent pesticides to the natural environment, especially wildlife. It captured the attention of the public and the politicians, even the US President John Kennedy, and was vigorously opposed by the chemical industry. But it prevailed. Response to the book's main message—we need to care deeply for nature and not poison it with toxic chemicals—helped fuel the nascent environment movement. In both the US and Canada, it led to the establishment of environmental departments, EPA, and Environment Canada, respectively, and environmental legislation. Published in many languages and still in print, Silent Spring was a great source of inspiration for many of us in our early careers. Take a moment to browse or re-read the book and reflect on its legacy in environmental science and management. Given the impending Xmas season, perhaps gift a copy to a younger person whom you may know is thinking of becoming an environmental biologist.

2023 Canadian Ecotoxicity Workshop (CEW)

CEW will take place at the Shaw Centre in Ottawa, ON in October 2023. For more information, please contact the 2023 Organizing Committee Co-chairs:

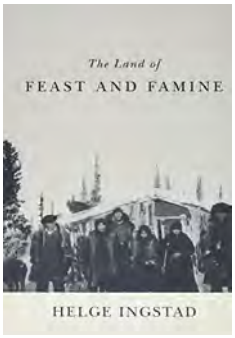
- Leana Van Der Vliet, Environment and Climate Change Canada
- Stacey Robinson, Environment and Climate Change Canada
- Rebecca Dalton, Environment and Climate Change Canada

Or check the CEW website at http://ecotoxcan.ca/

BOOK Review

Submitted by Bob Gainer, CSEB Alberta Member

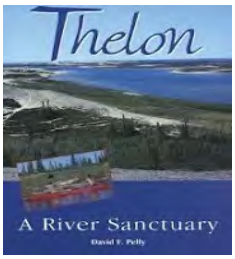
Three Book Reviews



The Land of Feast or Famine

by Helge Ingstad. 1992. McGill-Queens University Press, Montreal. 366 p.

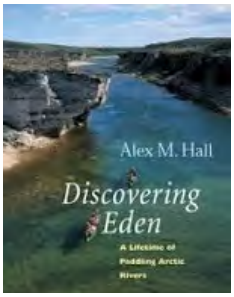
Available from Amazon.ca: $204.99 Hardcover; $43.95 Paperback.



Thelon, a River Sanctuary

by David F. Pelly. 1996. Distributed by Dundurn Press, Toronto. 232 p.

Available from Amazon.ca: $26.95 Paperback; $7.19 Kindle Edition.



Discovering Eden, a Lifetime of Paddling Arctic Rivers

by Alex M. Hall. 2003 Key Porter Books, Toronto. 224 p.

Available from Amazon.ca: $90.00 Paperback; $2.99 Kindle Edition.

This is a review of a trilogy of Canadian books by a part-time Canadian and two other Canadian authors on the Thelon river and wildlife sanctuary. Thelon is the English name for the Dene name "The-lew-dezeth", the river that runs through the "Central Barren Lands," a unique area of tundra that supports an exceptionally rich abundance of vegetation and animal life. So much so that a Wildlife Sanctuary was created around it in 1927, ostensibly to protect the few remaining muskox from the fate of North American bison, but also to protect northern animal and plant life in general. I spent parts of five tourist seasons at a lodge on the upper Thelon as an assistant guide, assistant pilot, and camp flunky (assistant manager) about 20 years ago. The only reason I justified the expense of these weeks away from my regular calling (operator of a small-town veterinary clinic, part time environmental biologist, and teacher) was because I was completely besotted with the place; it had stolen my heart and soul, my love of biology, my mid-life crisis, its remoteness and

adventure, the most exciting time of my life (yadda yadda yadda I hear shouted down the hall from my wife).

Ingstad's book originally came out in Norwegian in 1931. Ingstad was remarkable as are many of the characters associated with the Thelon. Many of them for whatever reason seemed to be otherwise regular, normal members of society. In 1926, he left his established law practice in Norway and travelled to this area to be a trapper, probably after reading a few books by Seton, Pike, Jones or Hanbury. His first year was spent with Hjalmar Dale, a fellow Norwegian, learning the tricks of the trade. Dale was probably the most capable human at surviving the Thelon as ever existed, almost as tough as a native with the added benefit of being well trained in the use of modern inventions like rifles, tents, stoves, axes, matches, and experienced with their use. Very little is known of him except that in the several years he was in the Thelon, he never needed assistance from anyone, and several people, especially federal government employees, needed assistance from him. After Dale left for the Thelon, Ingstad spent another year around the east arm of Great Slave Lake, spent a year by himself with the "Ethen-eldilli" (Dene caribou eaters), who made several forays into the barrens in search of white fox furs and caribou meat. It was a bad year for caribou and they barely survived their trips. His last year in the region he spent by himself and his dogs in a tent in a cove of trees out in the barrens on the upper headwaters of the Thelon River. It was a good year for caribou and he and his dogs ate well and he trapped lots of white fox furs. In the spring, he took his furs to Fort Resolution, paid for a flight south to Edmonton (one of four trappers, they were the first of their kind to hire an aircraft for such a flight) and was back in Norway four years after leaving. In 1960, he returned to Canada when he and his wife established that L'Anse aux Meadows was Leif Erickson's Vinland 1,000 years ago.

Ingstad's book, *Land of Feast and Famine*, is based on what the natives and trappers all said about the barrens. "When the caribou are there it is survivable, when the caribou are not there it is not". The English title probably came from the translators that helped write the English edition who knew Jack Hornby, who planned to write a book with that title after he spent a winter in the Thelon during Ingstad's stay, only that winter the caribou didn't come and well, he and his two companions didn't get to write the book, but Ingstad did. Hornby was the best example of someone who thought they were tough and tried to prove it by defying the dangers of the Thelon. Ingstad was lucky with his winter out on the Thelon and enjoyed himself immensely: "With a chill brilliancy all its own, the sun would sparkle through the snow-covered branches above my tent in the little cove" is what he remembered after leaving for Norway.

David Pelly's book further explains to me the mystery of why everybody that has ever experienced the Thelon has been like me, and most of the clients I guided—fascinated, smitten, besotted, and irrational about the place. In my CSEB 2020 book review of Ernest Thompson Seton's Arctic Prairies, Seton described his trip to the region differently but with the same idea: "I found what I went in search of, but also found abundant and better rewards that were not in mind, even as Saul son of Kush went seeking asses and found for himself a crown and a kingdom". Also, as cited in my CSEB 2022 book review of Tomson Highway's *Permanent Astonishment*, Highway says that he was able to make a success of his life as a writer and musician despite residential school and other societal hardships because he was born in a snowbank in January on the Northwest Territories, Nunavut, Manitoba, and Saskatchewan four corner intersection and was raised in the area, the greatest start in life he could possibly have had. It is true, people can think of the most God-forsaken place on earth to others as their "soul paradise".

Who are some of the "likewise smitten"? David Pelly devotes a comprehensive review of the much more smitten than myself, who really had to walk the walk not just talk the talk (like, ahem, moi), or portage and paddle or dog sled and brave the winters or live off the land and support a family. He starts with the original Ethen-eldilli, Dene "caribou eaters" who were based on the Thelon River for approximately 7,000 years. The last few hundred years, caribou Inuit from the Back River area (Hanningajurmuit) and the Baker Lake area (Qamanittuaq) made use of the lower Thelon drainage similar to Farley Mowat's "People of the Deer" on the Kazan River.

The first non-native to enter the region was William Stuart from the Hudson Bay Company at York Factory with the assistance of the Chipewyan (Dene) woman Thanadlethur in 1715 followed by Samuel Hearne and Matonabbee in 1772. In the late 1800s, Warburton Pike and Buffalo Jones entered the western edge in search of muskox. In 1899, David Hanbury traversed east to west followed by JB Tyrrell a year later. The distance, remoteness, and harshness made the traverse barely survivable for non-natives. A few more adventurers, including Seton, made expeditions to the western Thelon area and a few NWMP made patrols, but the next group attracted to the area were the white trappers.

White fox fur at the time was expensive and the tundra was full of them. The attraction of trappers to the Thelon was like gold fever, which led to the creation of the Thelon Sanctuary in 1927 to protect the few remaining musk ox. Of course, its creation was "Treaty Like", that is, there was no native consultation or contractual negotiations or obligations by the federal government. Now biologists and game wardens and archaeologists ran the scene, with the assistance of aircraft, until it was part of the most surveyed area in the Northwest Territories. Also surveyed were minerals and several proposals for mines, some of which have been developed in the Rankin Inlet and Baker Lake areas east of the "Central Barren Lands". Of course, diamonds and uranium are rumoured to be in the Central Barren Lands but there have been no developments yet.

In 1962, Eric and Pamela Morse canoed the west-to-east route at their own expense. They were pushing recreational canoe tripping to new frontiers. Today, hundreds of both guided and unguided canoeists dominate the human presence in the summertime. In the winter, there are occasional dog sledding or snowmobile expeditions for recreational purposes. There are one, sometimes two, tourist lodges (not the one I worked for) operating on the upper Thelon. The sole remaining lodge is Lynx Tundra operated by Dan Wettlaufer. The most successful guided operation by far was Canoe Arctic that started in 1975 and lasted to 2018; Alex Hall, the owner, operator, cook and bottle-washer, who guided hundreds of clients, died of cancer in March of 2019. (His guiding service is now operated by Dan Wong of Jackpine Paddle.) Alex and David Pelly were good friends and more than anyone, I can imagine were smitten with Thelon love.

Alex Hall: Anyone who lived in Fort Smith from the late 1970s until recently (he died of cancer in 2019) knew Alex Hall, a fine man. He was tall, probably 6'4", and strong (100+kg) even into his 70s. He kept in shape for his four months of summer paddling, and by doing 50 push-ups and 50 sit-ups a day in his winter offseason. Although well-educated and successfully making a living from a business he created completely on his own, something probably not one person in a million could do, he was a friendly, engaging, unassuming down-to-earth, easy-to-get-to-know, fellow human being. But to be on one of his trips, all of that had to be forgotten because it was very important, life and death, that he was in charge and made all decisions, or don't go with him.

No one knew the "Central Barren Lands" as Alex called them, and their dangers, like he did. He explored them from as far west as Yellowknife, south to the treeline, north to the Arctic Ocean and east to the Kazan drainage (basically Inuit territory) alone and with his clients or his friends by canoeing all the major rivers. Alex graduated with an M.Sc. under Doug Pimlott's tutelage at U of T, and was a "Pimlottifer", a lifelong lover of any and all things wolf. Upon graduation in 1970, he did the expected thing and worked for an environmental consulting company. For him, this was a sentence to a glorified desk jockey torture.

In 1971, on holiday, he and a friend canoed the Hanbury and Thelon rivers to Baker Lake. The summer of 1973, he and his friend canoed from the Saskatchewan treeline to Arctic tidewater at Kugluktuk (then known as Coppermine). On the return to Yellowknife, he got the Territories' first license to guide canoeists in the Barrens. In 1974, 1975, and 1976, he explored all the rivers in the Barrens alone that he thought had potential for tourism, and he advertised his services. In 1977, he had his first customers and from 1979 on, he was booked solid.

At first, he was based in Yellowknife but after 1979, he moved to Fort Smith. It was closest to the Thelon drainage where most of his clients seemed to be interested, although every year there were other rivers a few of his clients were also interested in. The Thelon had by far the richest and most abundant supply of wildlife, at that time, especially wolves (most people's favourite), and Alex was the world's expert on interacting with them and enjoying their company, almost to the point of them being his pets. In the end, he said that his personal favourite river was a little known one on the edge of the barrens that only he and a few clients knew about. Regardless, he became easily the single most knowledgeable person of the "Central Barren Lands".

After about 20 years of guiding, Alex got involved in some of the land-use legislation that would impact his means of livelihood. This was about when Nunavut was preparing to separate from the Northwest Territories and this issue was front and center. His work was predominantly in the NWT, but he was active in the discussion groups along with his friend, fellow canoeist, and author of the book on the Thelon, David Pelly. Gradually they got the idea of a greater ecological sanctuary than had been the basis of the Queen Maud and Thelon Sanctuaries. The distance between them was only 70 km. The larger species went back and forth between them, following the Beverley and Ahiak caribou herd movements, so why are they not protected in this corridor? And if you wanted to make the "Super" Great Canadian treeline to tidewater Central Barren Lands Ecological Reserve, add about 125 km to the south to include the headwaters of the Thelon. The whole area is virtually uninhabited.

This incredibly logical and brilliant idea caught the imagination of Monte Hummel, president of World Wildlife Fund Canada. If ever there was a chance for this organization to have a meaningful impact in this country, where this biome is uniquely Canadian, it was here. Unfortunately, this is where Alex' book ends in 2003. Alex lived and worked for another 15 years but without this Super Sanctuary actually being formed. What appears to have happened is that the new territory of Nunavut did not immediately have the necessary staff to handle the legislation and negotiations required to deal with such a topic and it has been put on hold. A valuable new Sanctuary has been formed by the Dene associated with the western side of the existing Thelon Sanctuary, the "Thai Dene Nene National Park Reserve". On the Nunavut side, the actual Hanningajurmuit people who lived on the Back River and in the Queen Maud Sanctuary are receptive to the joining of the two Sanctuaries but the hub of the Kitikmeot region in Cambridge Bay has withheld a decision as has the hub of the Kivalliq region, Rankin Inlet.

When people think about the really important pioneers of the Barren Lands, they think of the Tyrrell brothers, Warburton Pike, Ernest Thompson Seton, Hornby, Clarke, etc., but none of them, with the exception of a few trappers such as Gus D'Aoust, Lawrence Yanik, Roger Catlin, and Helge Ingstad were as devoted and close to the land and water for as many years (almost 50) as was this educated, professionally-trained biologist and canoeist, who was exceptionally physically adapted, Alex Hall. More than anyone else, he was the world's authority on the Central Barren Lands and if ever his vision of the Great Canadian Treeline to Tidewater Central Barren Land Ecological Reserve is realized, his place and his courage in its creation should be acknowledged.

The "Central Barren Lands," as Alex referred to them, is a uniquely Canadian area of tundra. The reason for its existence is that Hudson Bay, which is covered with cold ice well into July if not August, makes the land to the west colder. The farther you get away from its cold influence, the farther north the treeline/barrenland transition line is, until at Inuvik it is hundreds of kilometres farther north than next to the Bay. All the rest of the areas in the world where there is tundra, it is usually coastal, next to a cold arctic shore and more gravel based rather than the wetland esker base in the Central Barrens. In Russia, Norway, Alaska, Canada's Arctic Ocean, Greenland, and other areas that are near the cold ocean waters (including the eastern most [non central] Barrens next to the Hudson Bay), there is little vegetation, whereas Alex's "Central Barren Lands" is more like alpine meadows that are lower, just above the timberline.

The CSEB has often solicited ideas for the organization to support. In the latest previous Bulletin, Peter Wells advocated that we as a group should pick and rally behind Canadian environmental causes. Nowhere else in the world is there a biome like the Canadian Central Barren Lands. With the super sanctuary proposed by Alex Hall, David Pelly, and Monte Hummel, we will keep intact the complete functioning of the keystone elements of this biome. It would be a Great Canadian Central Barren Land Ecological Reserve from Treeline to Tidewater for the world, the country, the two territories, the Dene, the Inuit, and for all

Canadians and visitors that want to experience a mysterious relationship with one of the world's most unique terrestrial environments.

The draft NLUP (Nunavut Land Use Plan) is still in the process of being completed and several of Alex's compatriots, including Monte Hummel, David Pelly, Graham Hall (one of Alex's sons), and Kevin Antoniak are still advocating for this Super Sanctuary. Moral support from the CSEB would be greatly appreciated.

Computer links:

https://jackpinepaddle.com/the-alex-hall-legacy//.

https://www.youtube.com/watch?v=ElLG4A8-o70.

(A place where time stands still: the Thelon River).

Contacts:

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nivek@northwesttel.net;

dpelly@sympatico.ca; www.davidpelly.com;

mhummel2308@gmail.com;

graham.wr.hall@gmail.com.

CSEB VOLUNTEERS NEEDED

Website Assistant:

CSEB requires a volunteer to assist our Webmaster Brian Free with managing the CSEB Website. You should be familiar with using WordPress for website management, and able to gather relevant material for posting on the site. It would also be useful to have experience with MailChimp for sending out webinar and other notices, but training can be provided. For more information, please contact Brian Free at bfree@cseb-scbe.org.

For more information, contact President Curt Schroeder at schroederc@saskpolytech.ca.

Forest Fire Ecological Impacts

Call for Interest

With the large number of extensive forest fires over the last few years, it would be interesting to publish some research on the effects of forest fires (both negative and positive) on biological communities.

If you are doing any research in this area, or know any colleagues doing research on this topic, please consider submitting an article for publication in the CSEB Bulletin. Deadline for the Spring 2023 edition is February 15, 2023.

If interested, please contact Gary Ash, CSEB Bulletin Editor at garyash@shaw.ca.

CCFFR AND SCL MERGE TO FORM SCAS

Submitted by Gary Ash, CSEB Bulletin Editor

The Society of Canadian Aquatic Sciences (SCAS) has been created jointly by the Canadian Conference for Fisheries Research (CCFFR) and the Society of Canadian Limnologists (SCL), with the stated vision and mission:

The Mission of SCAS/SCSA

The role of the SCAS/SCSA is to offer an impartial, diverse, and inclusive forum to share, integrate, and advance knowledge of fisheries, limnology, and aquatic sciences in Canada.

The Society of Canadian Aquatic Sciences was created for the purpose of:

1. Promoting holistic and impactful research for the advancement of aquatic sciences in Canada;
2. Creating awareness of aquatic ecosystems and their science-based management and conservation in Canada;
3. Supporting the engagement and contributions of students and early-career researchers to advancing aquatic sciences;
4. Facilitating communication and networking among members of the Society in all sectors by coordinating at least one inclusive national conference each year;
5. Fostering a welcoming environment and strengthen the aquatic sciences community through greater equity, diversity and inclusion, and work to eliminate systemic barriers and mitigate biases that impedes career advancements and integration into Canada's aquatic sciences community;
6. Enabling and strengthening equitable relationships with rights holders and stakeholders that respect and value different ways of knowing, doing and being.

The next SCAS conference will be held in Montreal, February 22–25, 2023. For more information, check their website at https://www.scas-scsa.ca/

CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS
LA SOCIETE CANADIENNE DES BIOLOGISTES DE L'ENVIRONNEMENT

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Student Members: persons who are enrolled in an accredited college or university in a discipline of the biological sciences, and who are preparing themselves for professional work in teaching, management, or research related to natural resources and to the application of sound ecological principles to management of the environment.

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

Complete this form and return with cheque payable to:
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Membres Réguliers: les personnes ayant un degré ou diplôme d'un collège ou une université dans une discipline des sciences biologiques et qui sont ou qui ont déjà éte engagé professionnellement en aménagement, enseignement ou recherche tenant a l'environnement ainsi que ressources naturelles.

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Responsibilities/Interests/Responsabilités/Intérêts d'emploi: _____

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