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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Bulletin

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CSEB Bulletin SCBE

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Front Cover: Inukshuk near Rankin Inlet, 5 January, 2023. Photo Credit: Anne Wilson

Back Cover: Top Photo: Paddling with icebergs along the Antarctic Peninsula, 4 January 2023. Photo Credit: Anne Wilson.
Bottom Left: Canada Geese (Branta canadensis) swimming and gulls (Larus sp.) on the ice from North-West Arm, Halifax, NS. Photo Credit: P. Wells.
Bottom Right: Chinstrap penguins (Pygoscelis antarcticus) in Antarctica 5 January 2023. Photo Credit: Anne Wilson

CSEB BULLETIN

Vol. 80, Number 4, Winter 2023

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

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

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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
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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

A recent comment in Nature (2 November 2023, p. 28-31, Garbage in, garbage out: mitigating risks and maximizing benefits of AI in research) offered a realistic assessment of the use of artificial-intelligence tools especially in sciences driven by large data sets and calls for responsible standards and data management.

No doubt members of CSEB are already using artificial intelligence (AI) if they are studying Earth, space, and environmental science. The use of AI ranges from weather forecasting, climate modelling, wildfire management, energy and water management, and disaster response. For example, the annual conference of the American Geophysical Union (AGU) reflects a significant rise in abstracts mentioning AI or machine learning.

The article concludes by emphasizing the need for scholarly organizations (I include CSEB in this group) and others to play a role in promoting ethical AI practices, implementing checks in the peer-review process, and supporting suitable repositories for data storage and curation. With such checks, long term impacts of AI in science should be monitored to prevent wastage of research funds and erosion of trust in science.

I would be interested to learn how members of the CSEB are using AI in their field of employment.

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

BIRDS

Swan Behaviour Emphasizes Aggression!

Swans, at least mute and whooper swans in the UK (*Cygnus olor* and *Cygnus cygnus*, respectively), exhibit four key behaviours: rest, personal maintenance, foraging, and aggression. But research carried out by the University of Exeter and the Wildfowl & Wetlands Trust (WWT) indicates the latter dominates their time-activity budget choices, even to the point of choosing violence over rest. *[Wood KA, Lacey R, Rose PE (2022). Assessing trade-offs in avian behaviour using remotely collected data from a webcam. PLoS ONE 17(7): e0271257].*

They look so idyllic, calmly paddling along with their heads high and the occasional cignet riding on their back. But deep-down appearances can be deceiving. The research seems to suggest that swans, deep down, wake up cranky and are always prepared for a fight! The swans appeared to consciously trade-off behaviours and reduce resting time to get-it-on with anyone else who they felt needed a bit of a "tune-up'.

Mute swans tend to stay close to home. Whooper swans are more migratory, and their seasonal arrivals tend to increase the aggression by both species and the competition for food increases.

If food is at a premium, the level of aggression heightens somewhat. The WWT solution was to provide an overabundance of food and feeding areas to help calm the hormones.

Gee, I wonder if we can also apply this research to our resident cobra chickens that seem to relish interrupting everything else they are doing to hiss as we walk by and threaten us and our children with physical harm – 'One step closer, sir and I will bite you and break your arm!'

Bird Makes Record-Breaking Flight from Alaska to Tasmania Without Landing

A bar-tailed godwit (*Limosa lapponica*) has been recorded flying 13,560 kilometres (8,435 miles) between Alaska and Ansons Bay, Tasmania, the longest non-stop migratory flight ever measured for any bird. The tagged godwit, likely part of a large flock, completed the flight in 11 days, more than 1,200 km per day.

A satellite tracker was placed on the juvenile during the Alaskan spring, part of an ongoing effort by the Pukorokoro Miranda Naturalists' Trust to monitor the progress of birds to and from New Zealand.

The previous record was 13,050 km; the added distance this time was created when the bird headed to Tasmania rather than New Zealand.

The Trust will continue to monitor the bird if it makes the much slower return trip north in the spring.

The bird's decision to slag New Zealand in favour of Australia may scuttle its chances in the annual New Zealand Bird of the Year contest. At least we can hope a mammal doesn't win the contest again this year.

Tracker Dogs Used in Hawaii to Find Rare Nesting Birds

In September 2022, a detector dog sniffed out an 'ake'ake nest in a burrow on Mauna Loa on Hawaii Island. This is the first confirmed burrow identified in Hawaii Volcanoes National Park. 'Ake'ake, aka band-rumped storm petrel, Madeiran storm petrel, or Harcourt's storm petrel (*Hydrobates castro*) is an endangered nocturnal seabird, with only 240 pairs known in Hawaii.

The species breeds on islands in the warmer parts of the Atlantic and Pacific Oceans. The seabirds have been found elsewhere in Hawaii, but nesting sites had never been found. Recently, acoustic monitors detected calls of band-rumped storm-petrels on Mauna Loa but deep crevicing made location of nests extremely difficult.

Once burrows were detected, cameras were installed to monitor the area for parent birds returning to the nest or the young birds moving around the entry. Footage of immature petrels were captured about one month before the eruption on Mauna Loa in late 2022. The location of the nests was not affected by the recent eruption.

Turtles

Sea Turtle Nests Set Record, but Warming Still Poses a Threat

By Curt Anderson, Associated Press, Indian Rocks Beach, Fla.

(Reprinted from Honolulu Star Advertizer, Nov. 25, 2023)

Just as they have for millions of years, sea turtles by the thousands made their laboured crawl from the ocean to U.S. beaches to lay their eggs over the past several months. This year, record nesting was found in Florida and elsewhere despite growing concern about threats from climate change.

In Florida, preliminary state statistics show more than 133,840 loggerhead turtle nests, breaking a record set in 2016. Same for green turtles, where the estimate of at least 76,500 nests is well above the previous mark set in 2017.

High sea turtle nest numbers also have been reported in South Carolina, Alabama, North Carolina and Georgia, although not all set records like Florida, where Justin Perrault, vice president of research at Loggerhead Marinelife Center in Juno Beach, said the number of nests is remarkable this year.

"We had more nests than we had ever seen before on our local beaches," said Perrault, whose organization monitors Palm Beach County and broke a local record by 4,000 nests. "That's quite a bit of nesting."

There are seven species of sea turtles: loggerhead, green, leatherback, hawksbill, Kemp's ridley, olive ridley and flatback. All are considered either endangered or threatened.

They come ashore on summer nights, digging pits in the sand and depositing dozens of eggs before covering them up and returning to the sea.

Florida beaches are one of the most important hatcheries for loggerheads in the world. Only about one in 1,000 sea turtle hatchlings lives to adulthood. They face myriad natural threats, including predators on land and in the ocean, disruptions to nests and failure to make it to the water after hatching. This year, along one stretch of Florida's Gulf Coast where 75 nests had been counted, most were wiped out by the surge from Hurricane Idalia in August.

"Unfortunately, the nests pre-Idalia were almost all lost due to the high tides and flooding on our barrier islands," said Carly Oakley, senior turtle conservation biologist at Clearwater Marine Aquarium.

CLIMATE CHANGE has added to those challenges, reducing beaches as sea levels rise and causing more powerful tropical storms. Hotter air, water and sand and changes in the ocean currents turtles use to migrate also lower the odds of surviving, according to Oceana, an international conservation group.

Sand temperatures play a major role in determining sea turtle sex. In general, warmer temperatures produce more female turtles, and sand temperatures are projected to increase dramatically around the world by 2100, according to researchers at Florida State University.

"Additionally, hatchlings that come out of warmer nests are much smaller and often slower," Perrault said. A study

Sea turtle hatchlings making their way to the ocean.

led by FSU professor Mariana Fuentes that was published recently in the Global Change Biology journal found sea turtles will have to nest much later or much earlier than they currently do to cope with changing environmental conditions. Even that might not be enough for every species, said Fuentes, who works in FSU's Department of Earth, Ocean and Atmospheric Science.

Turtles have adapted to altered climates over millions of years, but today's rapid changes could happen too quickly for them to evolve, she said.

"We have found that even if they do change the timing of their nesting, that's not going to be sufficient to maintain the temperatures of current nesting grounds," Fuentes said.

Sea turtle mothers already have to lumber out of the water to find a good spot to nest, which can be difficult in areas where humans have built seawalls.

Racoons, coyotes, and other predators raid the nests, and hatchlings, once they dig their way out, have to crawl to the sea before being snatched up by birds and other animals. Electric lights can disorient them, causing turtles to head the wrong way on the beach instead of following light from the moon and stars. And when the lucky ones finally start swimming, hungry fish await.

Michelle Pate, biologist at the South Carolina Department of Natural Resources, said tens of thousands of hatchlings don't make it to the water, even as nest numbers trend higher across much of the Southeast.

"If we can't get hatchlings to emerge and make it to the ocean, then an increase in nest numbers doesn't help," she said.

Cocaine Hippos

Descendants of the hippopotamuses that drug kingpin Pablo Escobar imported into Colombia as pets during the 1980s are being sterilized to keep their numbers from growing to more than 1,000 by 2035. The government estimates that about 169 of the hippos have now spread across the landscape from Escobar's private zoo since his death in 1993. They live freely in rivers while breeding with wild abandon.

The hippos have no natural predators in Colombia and have been declared an invasive species that could disrupt the ecosystem.

The delicate and difficult process of sterilization means that only about 40 of the so-called "cocaine hippos" will undergo the procedure each year.

(reprinted from the Honolulu Star Advertizer, Nov. 19, 2023)

REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

Spotted Owls as Bio-indicators of Biodiversity Doublespeak In Canada

"The time to protect a species is while it is still common."
(Rosalie Edge, 1934)

No political decision over the last decade more significantly defines the lack of substance that underlies Canadian federal and provincial conservation policies than the recent cabinet decision to reject issuing of an emergency order to save the last spotted owls (*Strix occidentalis caurina*). As the saying goes, "the proof is in the pudding." Three decades of conservation campaigns and endless government funding, posturing, and "commitments" to spotted owl recovery in BC have culminated in effective extinction. After sitting on a request to issue a ministerial order to enforce the *Species at Risk Act* for eight months, and only after private citizens took the Minister of Environment to court, did Stephen Guilbeault put the request to issue a ministerial order to cabinet, only to see it rejected.[1]

Notwithstanding that this effectively condemns spotted owls in BC to extinction in Canada, this decision confirms that the keystone legislative tools in the provincial and federal environmental toolbox are only there for the purpose of misleading and assuaging a gullible public, if and when the public cares at all. Apart from concerns voiced by naturalists, biologists, and conservation organizations, public reaction has been deafening by its silence. Extinction should be a source of public outrage, because it is the absolute confirmation of environmental mismanagement at the public expense.

Cultures and economies are mere products of the environment. The environment is who we are, the Group of Seven expressed the settlers' discovery of a country already well-understood by First Nations. Any "reconciliation" is first and foremost reconciliation with the land, because as Delgamuukw vs Regina made clear, the people are the land, without the land there are no people. The land's health is our health, both social and economic. However, public priority is the end of the month, not the end of species, nor the end of the world. The demise of spotted owls in BC is a reliable indicator of the political stewardship of nature in BC and Canada, and why reconciliation is mere hollow double-speak.

First, as I have argued before, the cornerstone of our national conservation policies, the *Species at Risk Act*, is an ineffective and arbitrary tool. When put to the test, as it has been in this case, it is as effective as a punctured inflatable life raft. International representations and commitments made at the United Nations Convention on Biodiversity in 2022 that culminated in the Kunming-Montreal Global Biodiversity Framework are equally vacuous if clearly recognized endangered species and protected areas are neither protected nor protectable. Nature is not protected in Canada. Business and the economy are. Environmental protection is traded for an economist's fantasy called "offsets" wherever nature is an obstruction to gain.

It is not just individual species that are unprotected. Entire areas and regions have been explicitly known for decades by Canada's own scientists to be environmentally important and sensitive. Yet, even those included in the system of "Important Bird Areas" or "Key Biodiversity Areas" are arbitrarily vulnerable to business and government economic priorities. It is bad enough that the loud-sounding system of "Key Biodiversity Areas" does not always include sensitive species, and internationally-recognized Important Bird Areas like Roberts Bank can be arbitrarily nuked by ministerial fiat. Indeed, the entire apparatus of conservation tools such as "Species at Risk," "Key Biodiversity Areas," and "Important Bird Areas," becomes meaningless when provincial and federal politicians can override Environment Canada's scientists, and we find that economic interests prioritize the development of industrial and corporate installations over endangered species and protected areas, regardless of what scientists have determined.

Second, the recent federal-provincial announcement of a $500 million "Tripartite Framework Agreement on Nature Conservation between Canada, British Columbia, and the First Nations Leadership Council," further evinces the system of doublespeak when we stop to consider the intention behind the words. Made just days after the actual denial of an order to save BC's last spotted owls, this agreement rests on the assumption that biodiversity conservation in Canada largely hinges on the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) commitments to respect indigenous rights to the land.[2] While this is important, the agreement is full of weasel representations. The $500 million is "over the life of the framework."[3] That is as re-assuring as a used car warranty "until the car breaks down or the first hiccup, whichever comes first." What will be the life of that framework? The next election? The next minister? How fast cash burns?

Should there be any doubt about the close connection with the spotted owl debacle, and that this announcement is just an offset for the spotted owl announcement, the document is structured around extensive paragraphs and exclusions specifically about spotted owl "recovery." The reader will find it difficult, if not outright hilarious, to square: "Protect ample old growth habitat to support the recovery of 250 spotted owls,"[4] and other ambitious pronouncements at odds with reality. The framework is pure fantasy and promises. Currently, BC has three spotted owls in the wild and 16 in a breeding facility. (So far the three that were released from this facility have not survived.) The low numbers are a direct function of the loss of "old growth." "Old growth" is not just a space of 300 year-old trees. It is intact forest between 2,000 and 7,500 years old. It is extremely difficult to ascertain

how "ample old growth habitat" is to be miraculously provided or grown when in fact, and contrary to government representations, it continues to be actively extirpated by the province of British Columbia.

The board and staff of "Stand.earth" are to be highly commended for investing in satellite monitoring and ground-truthing of logging activity in the provincial government's "deferred areas." This provides a factual insight into the government's duplicity. Although the Old Growth Strategic Review (OGSR) came out in April 2020, the provincial NDP government delayed calling for implementation until November 2021, when it called on the logging corporations to defer logging "in good faith." As everybody knows, the logging has not only continued unabated, it has even accelerated, contrary to the premier's own public representations. The data in the recent Stand.earth report "*Forest Eye: An Eye on Old Growth Destruction*" uses ground-truthed GIS to re-construct logging activity in nominally "deferred areas":

> *"... the total loss by February 2023 is actually an estimated **26,800 hectares of the most valuable old growth**. This includes areas identified as logged through GIS analysis of government data as well as those identified by Forest Eye. Comparing this to the 11,600 hectares reported by government in February 2023 reveals that B.C. underreported old growth deferral loss by 57% ."*

When the data are aggregated to cover the period from the release of the OGSR recommendations to early November of this year, the area of deferrals clearcut comes to 31,800 hectares. This is almost three times the 11,600 hectares claimed by Premier David Eby. And therein lies the spotted owl reconciliation rub, or snake-oil ointment.

For decades, Spuzzum First Nation has been demanding a moratorium on old-growth logging on its ancestral territories, which also happen to be important to them culturally, if only now as home to the last "wild" spotted owl in BC. For the Spuzzum, the spotted owl is sacred; not so for the provincial and federal governments, for whom spotted owl recovery is only useful as a public-relations exercise. For many years now, provincial and federal ministers have been re-assuring Spuzzum Nation Chief James Hobart that they would do, quote: "whatever it takes" to save spotted owls on Spuzzum territory.

All it would take to save spotted owls is to place and enforce a moratorium on old growth logging, as recommended three years ago by the OGSR in April 2020. Instead, three years on, consistent with Stand.earth findings, the provincial government has continued to promote old growth logging and facilitate the continued destruction of biodiversity in British Columbia.

Nathan Cullen (BC minister of Water, Land and Resource Stewardship) re-assures whoever is either gullible enough, or all-too-willing to believe it, that BC runs a world-class facility where 30 spotted owls are raised in captivity "To support spotted owl recovery based on the best available science and Indigenous Knowledge." The best science is always simple as Occam's razor. Occam's razor suggests that intact forests are vital for the spotted owl's recovery: "No intact forest, no owl." It does not get simpler. However, that habitat is increasingly and alarmingly diminishing, as the Stand.earth report confirms. Unlike dollars, that generates no synaptic action in the universe of Minister Cullen and Premier Eby. Re-introduction of spotted owl from a state of the art facility has thus far been a resounding failure, because there is insufficient habitat left. Sadly, this does beg the question: "How long will it be before the government admits that the state-of-the art recovery facility is just another public charade?"

The capitalized "Indigenous Knowledge" appealed to is also conveniently disregarded if it does not align with capitalist economic priorities. "Indigenous Knowledge" as opposed to lower-case " indigenous knowledge" is the ideal indigenous knowledge that aligns with government economic plans. All the talk of "reconciliation" and UNDRIP, which is so useful when it comes to promoting the development of resource industries to grow modern First Nation economies, is set aside when it comes to Spuzzum Nation's simple request for a moratorium. In this case, "conservation" becomes a cover or back door to facilitate business-as-usual in another guise, in the hope that First Nations "partners" will front corporate interests.

In fact, over the last year, correspondence obtained under Freedom of Information applications indicates that Cullen and company spared no pains or expense to intensely lobby the federal government not to issue a ministerial order.[5] While the requests were consistent with the right to defend what the parties feel is their interests, it was inconsistent with the representations made to Spuzzum Nation, and to the public. As Chief Hobart notes: *"Oh your thinking they are taking this seriously and so that's where our minds were going into this. So for this to happen, it's like the rug was pulled from under us....."*[6]

We should make no mistake, UNDRIP and reconciliation are really just more colonial economic assimilation. First Nations like the Pacheedaht, who partner with logging companies like Teale Jones and support old growth logging, reap the rewards, those who do not are simply not heeded, as Chief Hobart has found out. "Reconciliation" is synonymous with "economic integration." It is integration into an extractivist capitalist culture. It is not reconciliation with the land. The prime intention is not the preservation of intact forests or wilderness, though it may lead to a limited outcome.

The tripartite agreement is nominally important, because it appears to finance, and therefore to give substance to, Canada's commitment to setting aside 30% of conservation lands by 2030. Appearances are all that matter. If precedents are anything to go by, these "commitments" are likely to fall short. It is just another Trojan horse. It was introduced as a classic case of misdirection to placate any immediate concerns with the obvious implications of the spotted owl debacle, which is why the document itself extensively refers to the province of BC's "spotted owl recovery programme." The lands that are to be set aside remain undetermined, there are no specific commitments to preserve ecologically important lands or intact forest that are commercially valuable, as are lowland forests. It is all to be worked out in a nebulous future — as were commitments to save the spotted owl over the past three decades. While it appears on surface as a gift of 500 million dollars to protect and finance indigenous and conserved areas, it does so within an unspecific economic framework on the assumption that First Nations will seek to integrate into, and further our economy of endless growth. It is part of the assimilationist strategy of "indigenomics", which is explicitly defined by indigenous proponents as "the systemic

inclusion of Indigenous Peoples in today's modern economy."[7] This is a two-edged sword, while it lifts First Nations out of discrimination and poverty, it also commits them to the destructive economic ideology and priorities of endless growth. The cancer of endless growth is metastatic and promises the illusion of sustainability but never delivers. Where there is endless growth, there can be no wilderness, no intact forest and its denizens, no spotted owls.

This is the business-as-usual framework of a global extractivist and industrial culture to which all of our politicians, from left and right, green to conservative, fully subscribe every time that they continue to endorse the central assumption that we can meet conservation objectives while sustaining economic endless growth and prosperity. This is the economic mirage into which First Nations are invited and expected to partake. Dogmatically inescapable: "It is the one true economy and there shall be no other economies before it." Nobody is really willing to think outside of the box. So instead of doing the hard work, we opt for facile simplistic "solutions," we work out transient subterfuges to placate our consciences, all the while pretending that any of this can be made sustainable.

The latest craze in "sustainability" is the creation of a "biodiversity market"— another "offset market" for the impact of a global economy supporting the needs and insatiable desires of a ballooning unsustainable population. This is Target 19d of the Kunming-Montreal Global Biodiversity Framework. Concern over this made the editorial page of *Science* (2023: 3 Nov. 382:6670). After over a year of scandalous revelations confirming the common sense understanding that the carbon offset market is little more than an elaborate scam,[8] specific audits of leading brokers have led to the conclusion that at least 90% of offsets are completely worthless and of no ecological value.[9] A similar concern is naturally emerging over "biodiversity markets." The most important point is that these markets, which are entrenched in a "market-centred" view of life, are not benign scams. They can and are having an adverse impact on conservation. In the name of "resilience" offsets promote a simplistic and cavalier view of the fragility of life on earth and facilitate actual destruction.

Carbon and biodiversity offset markets are supposed to be designed to offset negative impacts of development. They depend on two broad assumptions: a) that we understand the complexity of existing ecosystems, and b) that we can develop in what are often "intact ecosystems" that are unique and thousands of years old in one place, and compensate by preserving ecosystems of truly equal value in another. Neither assumption is actually warranted. Ecosystems and places are unique in themselves and to the people who inhabit them, and to whom they speak and give meaning. By their very uniqueness, they can neither be substituted nor traded. Business and mass markets do not know the meaning of uniqueness, and therefore are poor measures and managers of wilderness.

These offset markets are not about "saving nature." They are are about saving business opportunities and interests. They are about enabling development and managing development costs and publicly perceived impacts. They facilitate the destruction of little-understood intact ecosystems in exchange for trade-offs of uncertain value that are rarely adequately monitored. As Vardon and Lindenmayer note, these markets are set up with little attention to ecosystem details in which there are no simplistic metrics, a point frequently overlooked where economic gain takes precedence over biodiversity conservation: *"there is a risk they will become conservation doublespeak, legitimizing biodiversity destruction for economic gain while purporting to promote biodiversity conservation."*[10]

This begs the hard question on which all accelerated development and conservation in the last sixty years has rested: do we even know what biodiversity we are "preserving," and how to preserve it? The confidence we put in conservation planning comes from the confidence we have in our environmental data. Are the means and frameworks that we use for conservation planning just more short-term accommodations within the dead-end of the economy of endless growth, intent more on placating and misleading rather than on actually solving the biodiversity crisis? The ballooning diversity crisis should raise doubts as to the self-sufficiency of our conservation planning.

The answer to these questions came this week in a thought-provoking article by an international group of younger conservation scientists representative of non-mainstream concerns. The article is self-explicit: *"The global influence of the IUCN Red List can hinder species conservation efforts."*[11] The IUCN Red List established in the 1960s is an inefficient top-down product of its time. Crucially, it is no longer up to the task and regrettably it underpins almost all conservation programmes. Developed in the 1960s to manage the initial surge of rampant development by identifying key species-at-risk in potential areas of economic interest, it is the architectural keystone of conservation today. As Stuart Pimm has defined it, the IUCN Red List aims to be "a barometer of life on Earth." The barometer, which was cutting edge in 1960, is now a Ford Edsel for 2023.

After six decades, the IUCN Red List has assessed 150,000 species, 42,100 of which are now classed as "threatened." While that may sound like a lot to the lay public, that is less than 10% of the 2 million species currently described, in a world that places global biodiversity estimates at 50 million! The barometer is stuck at 150,000 out of 50,000,000 or 0.3%, which probably corresponds to low pressure "hurricane force" at a time of a biodiversity crisis, also known as the Anthropocene, or the sixth mass extinction. So, going back to question "a" above, current conservation tools and methods derived from the the IUCN Red List represent our state of knowledge. Our state of knowledge is wholly inadequate for the irreversible global-scale experiment, without any replicates, currently being carried out by business-driven governments in support of an economy of endless growth.

Whereas in the 1960s the IUCN alerted the world to a growing problem of extinction, today in the institutional hands of governments and corporations, it now serves to facilitate and sanitize extinction. This is what British Columbians have just witnessed with the normalization of spotted owl extinction in Canada, and the quiet facilitation of the development of the Roberts Bank Terminal 2, against all of the best scientific advice.

In the institutional hands of bureaucracy, governments, and corporations, the IUCN Red List guides all facets of conservation planning, from decision-making, to funding and research. Its logic undergirds policy and legislative implementation tools such as "Species-at-Risk" acts, "conservation frameworks", and

data information tools such as the Important Bird Areas, and Key Biodiversity Areas programmes. As the authors of *"The global influence of the IUCN Red list…"* argue and illustrate from a growing body of scientific review literature, mostly from the last decade, and their own experiences, both the system and its programmes are heavily biased and subjective. The system is based on a top-down and centralized approach, which either disregards or excludes regional and local research. Its reliance on a closed expert circle subjectively favours certain taxonomic groups, and the approach by species and populations has resulted in mapping that has *"limited conservation value because they do not consider local context and knowledge"*(p.4). As a result, it does not include new or undescribed species or regional occurrences of sub-species. Consequently, and in keeping with the fate of the spotted owl in BC: *"This can discourage actions to halt local population declines and known regional extirpations"* (p.4*).*

It is very important to note and understand that new undescribed species, small or unrecorded outlying populations of potentially rare or endangered species, such as Western Screech owl or Old-growth Specklebelly at Fairy Creek, and all hitherto unrecorded small occurrences of species and subspecies, as well as species new to a region, are not included in the IUCN Red List system. This provides an ideal filter to restrict actual local conservation interests, as witnessed by its use by the Ministry of Forests Lands and Natural Resources, which restricts endangered species protection to a narrow list of species in only some geographic areas. Add to this dimension the deliberate and mandatory exclusion of scientists from the territory of First Nations working to protect the interests of a company like Teale Cedar, and you have a perversion of the intent of UNDRIP, and a perfect environment to further and give free reign to corporate interests, guaranteed to exterminate spotted owls and other species troublesome to industry in BC.

The IUCN criteria established 20 years ago have prevented the Red List from keeping up with a rapidly deteriorating situation affecting biodiversity. The system has not evolved because it primarily serves corporate interests endorsed by successive governments. As a result *"33% of species placed in non-threatened categories of the Red List have been found to be declining in abundance,"* (p. 4-5), and most assessments for 30 - 40% of taxa are already outdated. A significant part of the IUCN's Red List assessment process comes from the fact that the framework that guides it is reliant on a closed top-down "by invitation" system, rather than being driven by a participatory bottom up system that would empower local communities to control the fate of their environment. It is a system to make the right decisions by "the right people," who are rarely the local people.

The conclusion to which the authors of this paper come to is worth quoting:

> *"Thus, instead of top-down approaches, we suggest broadening species conservation efforts, where planning and decision-making are rooted in local contexts and integrated across spatial scales. Furthermore, it is imperative to incorporate and center the expertise, voices, and perspectives of diverse conservationists, indigenous peoples, and local communities across geographies, including the Global South, in decision-making. Recognizing local knowledge, both traditional and scientific is also key to developing meaningful indicators of conservation priorities adapted to local and regional realities." (p.7)*

This is the real hope and the really positive news. It is younger scientists coming mainly from outside of the mainstream focusing on a real source of problems and demanding a substantial change in priorities, to be able to deliver effective conservation to their communities. This is diametrically at odds with delivering conservation to facilitate business and placate national and international "markets.

The current top-down approach and the restrictive criteria of the IUCN that guide top-down programmes like the Key Biodiversity Areas (KBA), exist to suit the interests of governments and corporations, less so the needs of this planet. These programmes are just unethical collusion with corporations. They are not geared to recognize the actual complexity and fragility of the local environment. They are designed to re-assure the public that unsustainable development can be managed to become magically sustainable, as with the BC government's magic spotted owl recovery facility that excludes the need to preserve intact forest habitat. Governments and corporations simply fund these programs as a means of both placating the public by involving and controlling "citizen science programmes" and gathering deliberately very limited information to actually guide pseudo-conservation.

For governments, the cost of these programmes is just the cost of continuing to do business-as-usual, as is the occasional positive announcement of the expansion of parks in BC. Earlier this month the government proudly announced the addition of 109 hectares in five parks: 64 hectares in Haida Gwai, 33 in Wells Gray, 8 in Gladstone, 3 in Bowron Lakes, and 0.15 at Mount Pope.[12] This is positive proof of the NDP's environmental concern and magnanimity. Now this would be awesome news and a feel-good positive announcement to rejoice over, if the party poopers at Stand.earth hadn't almost simultaneously reminded the public that the same government had laid waste to 31,800 hectares of prime old growth and intact forest that the public will no longer be able to enjoy and in which a comprehensive biological survey is unlikely to have ever been conducted to account for biodiversity. However, are 109 hectares to be understood as the value of the "Biodiversity Market "offset for the loss of 31,800 hectares? The public entrusted the government with 31,800 hectares of intact forest and got a return of 109 hectares of recreation lands. An edifying investment. This is just more doublespeak. This display of magnanimity is actually just another version of Caesar's "Bread and Circuses" policy to keep people content, and a mark of political contempt for the public and the planet.

Let's put two and two together.

By no coincidence, the 109 hectares saved out of the 31,800 hectares that this same government had laid waste amounts to 0.3%. This is the same 0.3% to be expected from the Kunming-Montreal protocol promises and the IUCN Red List! The returns are commensurate with what you put in. 0.03% is a "significant figure" representative of Canada's actual concern for conservation and biodiversity. Never mind the talk of "30 x 30". When the dust settles, the substance of the 30% is more likely to be 0.3% by 2030 as long as the overriding priority continues to be the sustainability of "business-as-usual" and endless growth. We should learn from three decades of spotted owl "commitments" and three decades of Climate Change "commitments" that frameworks are skeletal

re-assurances or aspirations rather than clearly delineated and enforced laws that bond one to an obligatory trust.

This value of 0.3% should be understood to be the actual measure of political will displayed by Canada and governments around the world to do as little as possible to address the growing Climate and Biodiversity crisis that this planet continues to experience, as growingly urgent UN reports continue to note. Canada came under international criticism in the *Production Gap Report 2023* released by the United Nations in early November.[13] The report identifies Canada as one of the world's top oil producers whose increased production puts them at odds with their international commitments to limit climate change. Canada is not alone. The United States broke its oil and gas production records this year and China continues to grow its reliance on coal.[14] Where are all these 2030 commitments?

If anything is going to change, the priority can no longer be the economy. The priority must be this planet, but we have no reason to hope that governments can do better for the planet than they did for BC's best bio-indicator species of the lack of political will to address the Biodiversity and Climate Crisis —BC's truly unique and disappearing spotted owl.

Time to get it right. The only priority is the one key biodiversity area in the universe. All 50 million species are endangered by economies of endless growth and endless development. The time and place to protect species is while they are present wherever intact and viable habitat still exists. There should be no obscene triage or offsets for the good of the economy. It is time to implement Earth priorities and place "Earth First!"

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Biodiversity and A New Species of Gastrotrich in Strathcona Provincial Park?

Submitted by Loys Maingon, CSEB BC Director

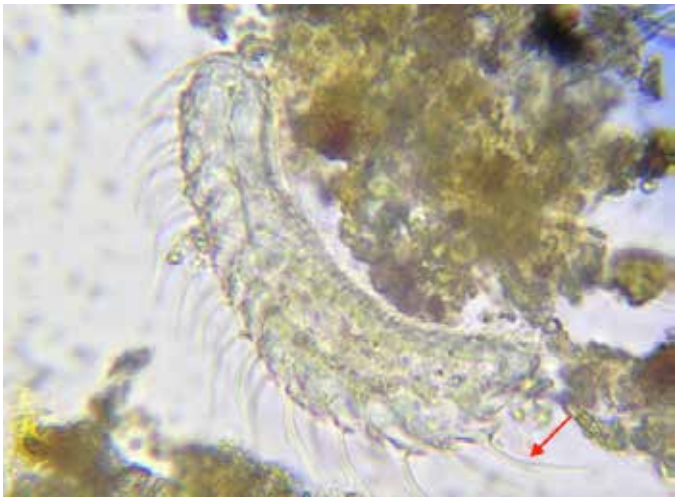

Figure 1: "Chaetonotus X", a species of gastrotrich apparently new to science found in Paradise Creek in Paradise Meadows in Strathcona Provincial Park in September 2023. Red arrow points to the unusual forking on auxiliary spikes. (magnification ~ 1000x).

At a time when conservation scientists report that a human-driven sixth mass-extinction is well underway at rates 354 times higher than expected, it may be comforting to consider that the waters of Strathcona Provincial Park seem to be home to species yet unrecorded by science.[1] It may also be a bit disconcerting that these rare species are likely regularly killed every time hikers collect drinking water and treat it with ultraviolet lights and water filtration systems! While clear water is taken for granted to be "clean," we frequently overlook the fact that natural "untreated waters" are actually a product of biogeochemical processes. Natural waters are a biologically-conditioned chemical solution, which carries and is also a suspension of, organic debris and micro-organisms.

Even a cursory exploration reveals that natural waters are miniature ecosystems of a flora and fauna with familiar-sounding names such as "*Trachelomonas*," "*Closterium,*" "*Amoeba,*" and "*Cryptomonas*." These are names frequently associated with adverse human gastro-intestinal reactions. Some are benign, some we have a genetic and cultural resistance to, and some are downright dangerous to humans. While drinking natural untreated water used to be commonplace, as it was with "whole unpasteurized milk," the combination of increased risk of pollution and a lowered immunity in human populations has made the ingestion of these substances hazardous to one's health. Water treatment by filtration or UV before consumption, therefore, remains strongly-recommended when drinking natural water.

That does not mean, however, that these micro-organisms are unimportant or undesirable. Quite the contrary! In a counter-intuitive way, these organisms are extremely important and much to be desired by human beings. Gastrotrichs are indicators of "unpolluted waters." They are sensitive to anthropogenic

1 https://www.theguardian.com/environment/2023/sep/19/mutilating-the-tree-of-life-wildlife-loss-accelerating-scientists-warn

contaminants. They feed on bacteria and micro-algae and appear to be responsible for controlling bacterial and algal blooms that can de-oxygenate waters and result in eutrophic conditions. In that sense, they are part of the clean-up crew in biological processing chains that control nutrient cycling across entire watersheds. As research has demonstrated, the complexity of intact natural ecosystems provides a multitude of ecological niches. The higher the number of niches, the greater the biodiversity of ecosystems. The greater the biodiversity of a system is, the greater is its ability to control nutrient flows, and maintain high water quality.[2]

That most people overlook the presence of these microorganisms should come as no surprise since even the scientific world and the arcane world of "zoobenthology," the study of micro-organisms that inhabit aquatic environments, willingly admit that we know relatively little about these poorly-studied organisms. Most of what is known about gastrotrichs can be found in a publicly available chapter of James Thorp's and Alan Covich's 2010 third edition of *Ecology and Classification of North American Freshwater Invertebrates.*[3]

Although they are some of the most abundant microorganisms in freshwater ecosystems reaching densities between 100,000 to 1,000,000 per cubic metre, all we really know is that gastrotrichs feed on bacteria, and therefore probably control bacterial populations in water. Furthermore, given their densities, they are likely to be important in freshwater food chains. Exactly how remains unclear.

As with other non-economically important organisms, their general life cycle has only been worked out recently. They are hermaphroditic, and until recently, they were thought to reproduce only parthenogenetically (i.e., by cloning). Their life cycle is in fact much more interesting, because it is unique among invertebrates and admirably well-suited to their ecology. The newly-hatched juvenile is born with four parthenogenic eggs, which are laid within four days once water temperatures reach 20°C. The fourth egg is a "resting egg," which is resistant to freezing and drying. The fourth egg serves as a long-term investment in the bank. It assures continuity from year to year through winters and drought. The first three eggs are a population explosion. Once the parthenogenic cycle is over, the adult develops an "X-shaped body" (which to this day is not well understood). The X-body is associated with sexual reproduction (which has yet to be witnessed). How sexual reproduction takes place is not known. This reproductive cycle enables gastrotrichs to survive environmental extremes, increase populations exponentially in a matter of days, and maintain genetic and species diversity.

Where they fit taxonomically also still remains a matter of debate. They are neither nematodes nor rotifers, so recent work places them in their own phylum. There are two orders: Macrodasyida, which with two exceptions are marine species, and Chaetonotida which can be found in both marine and freshwater environments.

Gastrotrichs are quite elegant ghostly silvery transparent organisms between 50 to 100 microns. They are covered with fine scales and can be observed gliding effortlessly through water and sliding in and out of the debris and detritus they feed on. They are easily recognized by their rounded heads, terminal circular mouth, and a plump elastic abdomen that ends with a distinct two-pronged fork that houses two adhesive tubules with which gastrotrichs can attach themselves to substrates.

Although they are microscopic, they have well-developed organs, including a proportionately large brain. They are "acoelomate" – they have no "coelom" – no body cavity with tissues that line and contain the organs, such as is found in evolutionary lineages that lead to vertebrate evolution.

Currently 100 species of gastrotrich are accounted for in North America. As noted by Strayer, Hummon, and Hochberg: *"In North America, perhaps 75-90% of the probable diversity of freshwater gastrotrichs species are undescribed."* [4] That means that between 400-1000 species have yet to be discovered! It therefore is not too surprising to discover as yet undescribed species in the lakes and streams of Strathcona Provincial Park. All it takes is the will to look and consider the importance of species that seem as unimportant to most humans as is biodiversity, because their link to water quality and watershed processes is as under-esteemed as is biodiversity's to climate change.

This new species is easily identified to genus as a *Chaetonotus*, because members of that genus have scales with long spikes. This species has very long and very abundant spikes. It was further identified as a yet undescribed species by Michael Muller, a researcher specializing in gastrotrichs, who lives in Ratisbon, Germany. Muller notes that: *"... the form of the spikes is very uncommon: they have an auxiliary point far away from the tip and a doubled tip. I don't know any species with this kind of spikes.... I would be very surprised, if this species is already described!"*[5]

There is no point talking about biodiversity and ongoing extinction rates if the actual importance of biodiversity, not just for humans, but for the functioning of ecosystems and the well-being of the planet continues, to be ignored. The discovery of a new species in one of the most intensely trodden corners of Strathcona Provincial Park should make us pause. It may well have been discovered prior to imminent extinction. The last time that the Strathcona Wilderness Institute was able to get reliable official numbers on the annual number of visitors to Paradise Meadows was for 2019 when 37,564 people used that trailhead. Since COVID in 2020, those numbers are known to have doubled or tripled, as has user impact on the trail system, which is now in dire need of repair.

The now 14 year old Centennial boardwalk is in many places nearing collapse. Ironically, it was developed in a sensitive wetland, without an intensive prior assessment of biological values. *As intense traffic grows, at what point will pollution overwhelm pollution- sensitive species in a watershed's water quality processing chain?*

As E.O. Wilson famously quipped: "It is the little things that run the world." This new species is a minimal subsample of a world that remains largely unexplored, poorly understood, and whose complexity remains largely unknown at a time when it may be more important than ever for humanity's future. The importance

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of biodiversity remains largely ignored and taken for granted by both the public and the politicians they elect. When politicians and public refer to biodiversity, it is with reference to megafauna, big mammals, big salmon, big birds, etc. The micro-system that sustains them isn't even on the radar. Resulting conservation efforts, therefore, are often reactive and ad hoc exercises in public theatre, as has been Canada's 40-year strategy to save spotted owls (*Strix occidentalis*), now abandoned by an ineffective *Species at Risk Act*.

In keeping with the *BC Parks Act,* most visitors take for granted that the park exists mainly for their right to recreation. They are oblivious to their impact on the park. The rights of other species, their importance to life on this planet and how they make recreation possible need to be given greater public prominence.

That a new species was found in a highly-managed area speaks volumes to the heroic success of present management practices and efforts. However, these practices are not meant for the growing numbers and impacts we are witnessing, no more than the boardwalk was. This is at best a stop-gap reactive strategy, if it is not complemented with a much needed public education campaign on the importance of biodiversity conservation.

BC Parks, because it manages the greatest area of conservation lands in the province, is in a unique position to deliver that education. However, to do so it needs to reactivate its naturalist service, and seriously engage with the naturalist community in order to support research and citizen science programmes from a local bottom-up approach, not the current colonial top-down practice which excludes the public and treats scientific research as a secondary consideration in the management of the park. That approach has only guaranteed that rare species have gone unrecorded since the inception of the park. The big question remains: How many undescribed species have yet to be identified in BC's parks before we lose them? That consideration is no longer acceptable in a biodiversity crisis.

ALBERTA News

Submitted by Brian Free, CSEB Alberta Regional Director

Approval to Expand Oil Sands Mining into the McClelland Lake Wetland Complex Has Been Upheld.

The Alberta Energy Regulator (AER) has ruled that it won't reconsider approvals issued for Suncor's Fort Hills Mine expansion in spite of objections raised based on additional scientific evidence. This expansion of open pit mining is proposed for a large portion of a unique patterned fen, called the McClelland Lake Wetland Complex, located about 90 km north of Fort McMurray. This wetland has long rows of trees and shrubs separated by narrow pools. Studies have identified 20 rare or endangered plant species and more than 200 species of migratory birds, including endangered whooping cranes. For more information about the McClelland Lake Wetland Complex, visit the Nature Alberta website.

The McClelland Lake Wetland Complex. Photo Credit: Joyce Hildebrand, Alberta Wilderness Association

The AER had initially approved the application to develop the site, despite warnings from an environmental impact assessment that mine dewatering and other disturbances would likely kill the fen's distinctive peat-forming mosses. To protect the unmined wetland while the rest is drained and excavated, Suncor proposes a complicated set of wells and pumps to control and monitor water levels and chemistry. Central to this undertaking is an underground wall, nearly 14 kilometres long and between 20 and 70 metres deep. Wetland scientists have pointed out the technology is untested and will have to work perfectly for decades.

Suncor has stated its commitment to maintaining the ecological diversity and function of the unmined portion of the wetland complex. After all, they're going to build a wall!

CSEB VOLUNTEERS NEEDED

Social Media Coordinator:

CSEB requires a volunteer to manage our social media (e.g., Facebook, Twitter, etc.). The volunteer should be familiar with social media, have a good command of the English language, and willing to spend the time to post new items, keep the social media current, and communicate with our members. Awareness of environmental biology issues would be an asset.

If interested, please contact President Curt Schroeder at schroederc@saskpolytech.ca.

Regional Directors

CSEB Requires Regional Directors for the following Regions:

Alberta (1), Saskatchewan (1), Manitoba (2), Ontario (2), Quebec (2), Atlantic (1), and Territories (2).

Duties involve promoting CSEB in the Region, participating in monthly Board conference calls (1 hour/mo), and providing regional news for the CSEB Bulletin four times per year.

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

MANITOBA News

Submitted by Robert Stedwill, CSEB Vice-President

With the election of an NDP government in Manitoba on October 3, I dare say that there may be some significant policy changes under this new government and the leadership of Premier Wab Kinew.

Two significant portfolios worth watching over the next while are the Ministry of Environment and Climate Change, and, the Ministry of Economic Development, Investment, Trade and Natural Resources.

The minister responsible for Environment and Climate Change is Tracy Schmidt, a lawyer with a background in labour law. There appears to be no reference to experience with environmental issues. In Premier Kinew's Mandate Letter to Minister Schmidt, he recognizes that "climate change is one of the greatest challenges of our time. We see the consequences all around us from floods, to wildfires and droughts. As the Minister of Environment and Climate Change, it is your goal to face these challenges head on to address environmental impacts. You will also provide a critical lens to your cabinet colleagues that ensures we measure the environmental impact of our decisions as a government." In addition to other expectations, Premier Kinew asks the minister to "work with Indigenous communities on the goal of protecting 30% of Manitoba's diverse landscapes by 2030."

Three other areas that will be the subject of some effort by the minister will be working with experts and scientists to protect Lake Winnipeg and safeguard the health of all waterways; protecting and investing in parks; and finally, restoring funding to environmental organizations. "Restoring funding" will be interesting to watch, in that most if not all environmental organizations are governed, and operated by, volunteers. Further, how will funding be allocated to which organizations in light of the government's overall environmental agenda, and most importantly, how big is the pot?

The minister responsible for Economic Development, Investment, Trade and Natural Resources is Jamie Moses.

The mandate for Minister Moses as set out by Premier Kinew is one where the responsibility for growing the economy, increasing investment in the province and maximizing trade relationships is his. Hopefully, this responsibility will not be at the expense of the environment, nor add to the current level of emissions contributing to climate change.

The request by the Premier to create "a Premier's Business and Jobs Council to bring together leaders from business, skilled trades, agriculture, Indigenous communities, labour, and other sectors" is a positive step. This Council will surely be a challenge, by virtue of trying to bring together diverse sectors as described above, and the "other sectors" as yet, not identified. One would hope that those other sectors might include an environmental component.

ONTARIO News

Submitted By Gary Ash, CSEB Bulletin Editor

Ontario Strengthening Penalties for Landfill Facilities that Contravene Environmental Laws

TORONTO — November 9, 2023.The Ontario government is strengthening regulations to clamp down on landfill site owners who contravene environmental laws. The changes will allow the province to take stronger action against illegal activity by giving enforcement officials the ability to issue monetary penalties. Without this type of penalty available, the ministry must take violators to court – a lengthy and costly process that can often take years to get results.

"Our government takes environmental violations very seriously, and we are committed to holding polluters accountable," said Andrea Khanjin, Minister of the Environment, Conservation and Parks. "By expanding environmental penalties to landfill facilities, this regulation gives us the ability to take stronger actions to protect Ontarians through swift financial consequences for breaking the law."

The environmental penalties will range from $1,000 per day for less serious violations to $100,000 per day for the most serious violations. The funds collected from these penalties will be reinvested in impacted communities through the Ontario Community Environment Fund to support activities such as shoreline cleanups or tree planting.

These local projects are in addition to other actions companies may have been ordered to do to repair harm caused by a violation of environmental laws, such as taking steps to prevent discharges of contaminants, including odour, that cause an adverse effect.

"This is welcome news for people in my community who have had to endure an intolerable odour from a nearby landfill," said Donna Skelly, MPP for Flamborough-Glanbrook. "This move will help ensure all landfills are in compliance with laws that help protect and preserve our air, land, and water."

The ministry has successfully used environmental penalties to support enforcement of violations at industrial plants that emit pollution or discharge effluent directly to land and surface waters, and petroleum facilities that discharge sulphur dioxide into the air. Over the past three years, more than 95 per cent of facilities issued penalties were able to demonstrate actions to prevent or mitigate the violation and/or for having an environmental management system in place.

Ontario Supporting Local Projects to Protect Lake Simcoe

BARRIE — November 9, 2023.The Ontario government is investing over $1.3 million in four new multi-year projects to further reduce the amount of phosphorus entering Lake Simcoe, which will help improve the ecological health of the lake and the communities that depend on it.

"It's incredibly rewarding to know that our collective efforts are having a positive impact on the health of Lake Simcoe — a

lake and region so many of us, including myself, are proud to call home," said Andrea Khanjin, Minister of the Environment, Conservation and Parks. "Our government knows that a healthy Lake Simcoe provides the foundation for healthy communities, healthy people and a healthy economy. That's why we're continuing to invest in projects and work with local leaders to further protect and restore the lake and its watershed."

Since 2018, our government has committed more than $27.3 million to protect and restore Lake Simcoe, including a $24-million investment for a new phosphorus recycling project to help reduce phosphorus discharges from the Holland River into Lake Simcoe. These investments are part of Ontario's continued commitment to implement the Lake Simcoe Protection Plan.

This year, the majority of the projects being funded are led by the Lake Simcoe Region Conservation Authority and local partners. These include:

- Water sampling and analysis to monitor phosphorus and other nutrients flowing into Lake Simcoe. This information will be used to help determine which future actions can be taken to improve the lake's overall health.
- A study of chemicals and metals in the water and sediment that could harm the lake. This research can help identify new threats to the watershed as well as ways to protect it, now and over the long-term.
- Creating wetlands and ponds, restoring streams, building channels, and planting grasses to better manage stormwater in Innisfil, Newmarket and Oro-Medonte. These projects will help landowners and municipalities lower the amount of pollution going into Lake Simcoe from urban areas.

Toronto Metropolitan University has also received funding to conduct water quality research that will help tackle barriers to improving water quality from the Holland Marsh.

ATLANTIC News

By Peter Wells, CSEB Atlantic Member

Over the past few months, in a remarkable year in Nova Scotia with droughts, wildfires, floods from excessive rain, and strong post-tropical storms (not quite hurricanes), there has been a remarkable number of associated stories in the local press and on other media. The discussion here is just a snapshot of the environmental issues that are continually facing the Province and indeed the region, as well at times the wider world, many without clear resolution.

Climate Change

This issue is pervasive in the press in the region, due in part to the unusual year we have had. The ongoing research of Bryndum-Buchholz (2023) from Memorial University shows "the need to account for climate change impacts and adaptations in marine conservation planning" and the location of marine protected areas and refuges. Concerns are especially around the warming trends and the impacts on particular species and ecosystems. She stresses the need to re-calibrate the marine conservation approach. Sadly, the implementation of the *Coastal Protection Act* for NS and to put into place regulations controlling building in inappropriate places along the coast, given sea level rise and storm impacts, has been delayed by the government (Campbell 2023a,b). This has caused a considerable backlash from the environmental and academic community, given the recent crises of devastating hurricanes, floods, and wildfires. There is currently no time-line for moving ahead, as the government continues to consult with coastal property owners.

Other climate change articles of interest described the loss of sea ice in polar areas (Spring 2023), the impact in Europe and the American midwest of the high air temperatures this summer (Reuters 2023, Dickie 2023), the various impacts in Africa (Miriri 2023a,b), and the release of the comprehensive fifth National Climate Assessment report in the USA (Gardner 2023). Climate change dominates the news cycle in the Atlantic Region, especially given the local events of 2023.

Wildfire Management

According to the Nova Scotia government, "wildfire is Nova Scotia's biggest climate change risk" (Fairclough 2023b). This year had the highest recorded losses to fire in the Province. Monies have been committed by Ottawa to train local firefighters and improve the monitoring of wildfires from satellites, hence supporting wildfire management.

Energy Needs

Nuclear power is back in the news with several Mi'kmaq communities in New Brunswick investing in two companies that want to build small nuclear reactors at Point Lepreau on the Bay of Fundy, including a waste recycling facility; this has generated some discussion amongst indigenous communities due to the waste disposal challenge (Chilibeck 2023a).

Fisheries

The lobster fishery in St. Mary's Bay, SW Nova Scotia, continues with controversy as local indigenous fishers insist on running a moderate livelihood fishery outside of the regulated/established period that is allowed for the commercial fishery under the Canadian *Fisheries Act* (Beswick 2023a,b). This has created tension with the commercial fishermen and a challenge for the Department of Fisheries and Oceans, concerned with the sustainability of the fishery but under the constraints of the Marshall decision of many years ago. As Hurley (2023c) puts it, the management system for lobsters in this area is under threat, while waters warm and invasive species proliferate under climate change, with unknown long term effects on lobster populations and consequent catches.

Water Quality

The condition of freshwater bodies is of concern in several locations. A number of lakes have been suffering from outbreaks of blue-green algae, leading to closed beaches and risks of illness to people and their pets (Hurley 2023a). This problem is getting worse each summer with increased water temperatures, nutrient runoff from lawns, and poor land use practices. Some lakes also have excessive growth of aquatic plants, fecal bacterial

contamination, and swimmer's itch. As Hurley states, "the first step towards a cure is to stop overloading with nutrients". Out on Sable Island, there has been a decrease in fresh water in the islands ponds due to increased storm activity and loss of sand dunes, leading to salinization of the groundwater (Fairclough 2023a).

Forest management

Forest strategies continue in the news (Chilibeck 2023b). While discussions continue, cutting continues as always. A new 80-year strategy "Our Forests are for Everyone" has been released in NB. It is not without its controversy. While some support it, as it increases planting and cutting of existing softwood tree plantations while reducing clearcutting, and there will be more protection of old growth forests and riverside buffers, others say the choice of trees is wrong in the face of climate change and that there will be more plantations and continued glyphosate use. What is so apparent when one drives through that province is that the trees are all the same, surely not a good sign of healthy forest ecosystems.

Dams and Causeways

In an excellent overview article, Hurley describes the benefits of open rivers and problems to fish migration and habitat caused by dams and causeways (Hurley 2023a). He focuses on the history of the causeway at Windsor and the controversy around its removal or its staying in place for the expansion of the main highway. He advises removal of old dams wherever possible to facilitate fish movement. This discussion has been going on for decades, given the hundreds of dams in NS and their age, safety, and environmental hazards.

Aquaculture

Wild salmon are endangered in the Bay of Fundy and Gulf of Maine, yet open pen salmon farming is expanding, and escaped salmon remain a big problem as "they interbreed with the wild fish and make them lazy and unable to survive the annual migration up rivers" (Chilibeck 2023c). The problem exists largely due to seals tearing their way into the sea pens in which the salmon reside. It is a very hot topic, with the two sides — the conservationists led by the Atlantic Salmon Federation, and the industry led by Cooke Aquaculture — at loggerheads with each other. Clearly the wild salmon populations, so few in number, are at risk of extirpation. Salmon farming is now the regions biggest seafood export, worth $2 billion. Wild salmon in the regions many rivers and estuaries may soon be a memory.

Pollution Control and Contaminants

Three articles caught my attention on this topic. The Northern Pulp kraft mill saga continues with the mill at Boat Harbour remaining idle, a law suit underway, and the chances of the mill going back into operation with an advanced effluent treatment plant remaining very slim (Beswick 2023c). The plant's future is

very dim but Boat Harbour remains highly contaminated and in need of an expensive restoration effort. An extensive article on the chemical contamination of Orcas. written by Remili, a wildlife ecotoxicologist, pointed to the risks that these animals face due to exposure to a wide range of persistent organic chemicals, amongst them a flame retardant HBCDD or hexabromocyclododecane (Remili 2023); risks are high in the western North Atlantic where they have mixed diets of fish and mammals, both groups with high levels of chemical contaminants. Finally, it is worth pointing out an excellent review on the impacts of metal mining in river systems (Macklin et al. 2023) with reference to lead, zinc, copper, and arsenic, and the risks to humans and livestock; this paper should be read by all biologists involved in risk assessments of mine sites and tailing storage facilities.

Wilderness Protection

The conflict between gold mines, new and old, and the protection of nearby waterways continues unabated (Beswick 2023d,e). The primary controversy surrounds the desire of the mining company to build an open pit mine and tailing pond very close to Archibald Lake, in a protected area, and the St. Mary's River, along the eastern shore of Nova Scotia; the environmental assessment is in limbo and the environmental organizations are totally opposed to the project. Other locations in the same area are being considered for new mining too, the attraction being the rich veins of gold! The mining company is putting up a fight.

Newington (2023) has written an interesting Commentary describing Nova Scotia's need to increase the area of its protected crown land, especially from the impacts of forestry. So little of the Province is covered with old growth forest (does this sound familiar, BC?). What is needed is for the provincial government "to give the Protected Areas Branch of the NS Environment and Climate Change Department sufficient authority and resources to do their job", so as to meet the target of 20% protected land in NS by 2030, fast approaching. There is enough information about the ecological value of Crown lands in NS to do this job with urgency.

Biodiversity and Wildlife

Atlantic salmon (*Salmo salar*) is the region's iconic fish, and its wild populations have been threatened for many decades. Dyment (2023) describes a new program of the Atlantic Salmon Federation (ASF), called Wild Salmon Watersheds; it will bring money and other help to the many small struggling conservation groups across the region, to enhance their programs of research and conservation. Salmon are in trouble in many of the small rivers, and new monies will help in studying and conserving the rivers spawning grounds wherever possible, ameliorating threats from landslides, warmer-than-normal water temperatures, erosion, and dams. The work of conservation groups across Cape Breton Island is highlighted in Dyment's article.

Along the same lines of required conservation, Zebra mussels (*Dreissena polymorpha* [Pallas 1771]) have been found in the upper stretches of the St. John River in New Brunswick (Chilibeck 2023d). Federal monies have been allocated to support precise mapping of where the mussels are settled, and to ensure that boaters are cleaning boat hulls to help prevent the spread, a similar approach to that in place in other parts of Canada. White sharks (*Carcharodon carcharias*) have been seen in inshore waters this summer, a juvenile noted for attacking a swimming dog in southern NS! (Lambie 2023). According to one expert, their numbers are climbing due to higher numbers of grey seals since the 1980s when seal culls were stopped in the region. Research continues on saw-whet owls (*Aegolius acadicus*) at St. Francis Xavier University, with a long-term banding study to describe "the who, when, and where of these migratory owls" (Beswick 2023g), and considerable attention is being given to the provincial coyote (*Canis latrans*) population and the behaviour of these animals in the wake of recent interactions with people (Beswick 2023f).

On a more global scale, attention is being given to amphibians in crisis (Dunham 2023) and to the ecology of whales in a changing climate (Read 2023), both topics of obvious interest to us in this region of Canada.

Finally, on a lighter note, an escaped "pet" African serval cat (*Leptailurus serval*) was captured in Halifax in the summer, causing some public concern when it was on the loose (Rankin 2023). It has been sent to a wildlife park and officials have advised the public that such a cat makes a poor pet!

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Living in a Global Environmental Emergency Ward – the Need to Address Problems With Science, Action, and Speed

This article was written at the end of the summer, midway through another hurricane season in the Maritimes, and this one purported to be noteworthy. So far, three storms have barrelled up the Atlantic coast, with post-tropical storm Lee hitting us directly and with more predicted to come. This follows several months of unsettled weather, resulting in Nova Scotia being marred by wildfires, excessive rain, unusual and tragic flooding, and a slow recovery from last years massive subtropical storm Fiona. Wildfires continue in Quebec and out west in Alberta, BC, and the NWT, causing people to evacuate and resulting in enormous loss of forests, homes, and other community infrastructure. It has made Canadians across the country, especially residents of Nova Scotia, much more aware of extreme weather events and the changing climate, and wondering what the future holds for their descendants.

During times of reflection about such issues, the environment in general, and with my head in an excellent autobiography penned by a distinguished environmental biologist (Ehrlich 2023), it appears as though we are currently living in an environmental emergency ward, the patients (forests, waters, coastal and ocean ecosystems, wildlife, our homes and communities, us!) coming in faster than they can be diagnosed, stabilized, and treated. Although the gravity of these events may be accentuated by the 24 hour news cycle, it is clear that the problems we face are real, serious, and a bit overwhelming.

Throughout much of my career as a marine environmental scientist, I have felt that based on the facts, humanity is in a dire environmental situation. This was predicted by some but until recently, not generally recognized. My first wake-up call to the challenges was as a young zoology graduate student involved in a global population conference in Fall,1968 (Regier and Falls 1969). It alerted me to the population explosion that was occurring throughout the 20th century (3.45 billion in 1968, now 8 billion in 2022), with many implications for society. Soon afterwards, I read some of the literature on global issues of concern (e.g., Ehrlich 1968; Meadows et. al. 1972; Dubos and Ward 1972), spurred on by Silent Spring (Carson 1962). Then, in my first job conducting fisheries research at sea, I saw firsthand the pollution, over fishing, and habitat damage in our Atlantic coastal waters. I continued studying zoology, marine science, and aquatic toxicology and the rest is personal history, a career in the nascent Environment Canada and in academia spanning over 50 years. It has been clear to me throughout the years that the list of environmental stressors is endless, all operating against a back drop of greater numbers of people and global climate change.

Circa 2023 - on top of such problems, there is the continued and growing demand for resources (minerals, oil and gas, lumber, food, chemicals). We are clearly making huge demands of the planet, some saying that we have overshot that mark. What is our future with 8 billion people all requiring a place to live, food, essentials, health care, and security? As Paul Ehrlich and others have asked — are we at the point of continuing to extract more resources from the earth each year than we are returning to it? Will food famines, mass migrations, and wars eventually overwhelm us, in addition to the current major environmental concerns of climate change, loss of biodiversity, over fishing, environmental contamination, etc.? Are we at a crucial tipping point for a livable planet? These are crucial questions that should engage us as citizens and scientists, be rigorously discussed, and foster an interdisciplinary approach to solutions with all haste.

I try to be optimistic. The good news is that many core problems are recognized, they are being well studied and considerable efforts are occurring to address them. There is much effort to optimize the science-information-policy-management interface. We should be especially thankful for the continued work of the United Nations and its many agencies and advisory groups; the UN is truly our Florence Nightingale in the efforts to care for people and the environment, and to respond to ongoing crises (wars, famines, earthquakes, floods, mass migration). Great strides have been made globally to increase food production and distribution. Advances in medicine continue, at times seemingly miraculous as shown by the rapid production of novel and effective vaccines in the recent (and still ongoing) COVID

pandemic. Finally, diplomacy continues on many fronts to diffuse confrontations and increase understanding and cooperation in this rapidly changing world.

That said, there is an ongoing climate crisis, recognized now by most governments and influential groups. As this is being submitted to the Bulletin, the COP 28 climate change meeting is taking place in Dubai. Climate change is here and finally recognized by politicians and the business community; the globe is warming, and the 1.5°C rise as an acceptable limit will be exceeded soon. This issue will be a primary concern for the rest of the century (please see the references and the last IPCC report).

Solutions for many of the above mentioned problems have scientific, technological, and social underpinnings. Reliable, salient. and timely information is always needed, hence the continued role of environmental science (biology and ecology) and communications work of groups such as the CSEB. The CSEB should continue to be a hot bed of talks and actions on these important topics, utilizing the immense scientific resources and knowledge of its members and those of its various networks. The problems that we collectively face require discussion, collaboration, scientific and social understanding, and above all, timely decision making and action. Importantly, perhaps offer an alternative view to this polemic, penned by this CSEB member, a "despairing optimist" (Dubos 1970), in a year of much change and concern for our future.

Acknowledgements I thank David Richardson (SMU), Jon Percy (SEAPEN and BoFEP), and Mike Butler (International Ocean Institute – Canada) for their comments on the draft of this article when it was preparation for the PNSIS, Vol. 53, part 1, 2023, of the Nova Scotian Institute of Science. It is slightly revised from the original article so as to engage CSEB members in the discussion of important topics that require their dedicated input and action.

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TERRITORIES News

By Anne Wilson, CSEB Territories Director

Northwest Territories

The summer and fall of 2023 were the worst on record for forest fire activity, resulting in over 4 million hectares being affected, and a total of 303 fires for the year. There were multiple evacuations of residents, loss of substantially all of the community of Enterprise, and a tremendous commitment of resources to fight the fires. The Territorial Minister for Environment and Climate Change summarized it well:

Shane Thompson: Historic 2023 Wildfire Season, September 28, 2023 (excerpted)

"Before the 2023 wildfire season began, weather forecasts predicted an early start to the season and a high risk for many areas in the NWT. We saw record temperatures, very little rain, and severe drought throughout the summer and fall. All of this resulted in extreme fire conditions for most of the season.

Based on the forecasts, the Department of Environment and Climate Change brought on fire crews, air tankers, and helicopters earlier in the season than normal, and added additional resources. Unfortunately, all of our wildfire personnel and aircraft were put to work right away.

We saw our first wildfire of the season on May 4th, almost a month earlier than normal, which was followed by a record number of fires, area burned, and community evacuations because of fire.

The first major fire followed on May 14th, threatening the K'atl'odeeche First Nation and Hay River. By the end of June, four NWT communities had been evacuated given the threat of wildfires, including K'atl'odeeche First Nation, Hay River, Sambaa K'e, and Wekweeti.

In July, residents of Behchoko and people living along parts of Highway No. 3 also had to leave their homes, and by mid-August, the residents of Kakisa, Enterprise, Fort Smith, Yellowknife, N'Dilo, Dettah, the Ingraham Trail, and Jean Marie River had been evacuated. Additionally, Hay River and the Katlodeeche First Nation had to evacuate for a second time this summer.

As of this week, 299 fires have burned over four million hectares across the NWT this season. These fires resulted in 12 community evacuations, displacing more than two-thirds of NWT residents from their homes.

These fires grew not because of a lack of action or resources, but due to a perfect storm set in motion by nature. With record temperatures and severe droughts in the Dehcho, South Slave, North Slave, and Sahtu regions, we had fires that burned deeper, hotter, and faster.

With the buildup of forest fuels twice what is considered extreme, the forests were primed for explosive fire growth. This, combined with relentless wind events, intense smoke, and proximity to communities, made conditions very difficult for our crews. On the most difficult days, there was no amount of firefighters or aircraft we could have put in front of these fires to stop them.

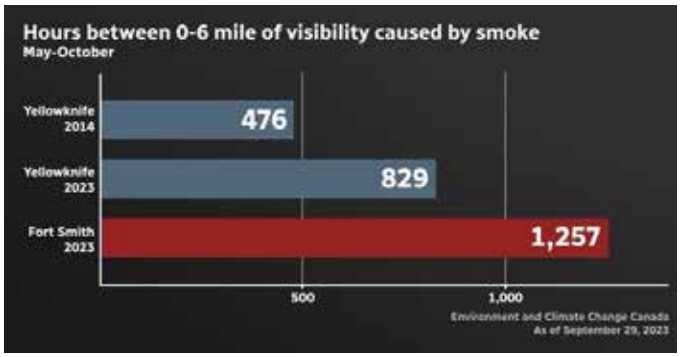
Over the course of the season, more than a thousand wildfire experts and crew members were brought in from across the NWT, Canada, and around the world. Hundreds more structural firefighters helped to protect our communities. Hundreds of armed forces members, workers from communities and private companies joined the effort, and dozens of additional aircraft and heavy equipment also assisted. Crews did an incredible job FireSmarting and building fire breaks that will now serve as long-term protection for many of our communities.

Mr. Speaker, I want to close by acknowledging the immense human toll of this season. This has been the most damaging wildfire season the NWT has ever experienced. The community of Enterprise has been devastated. More than two-thirds of all NWT residents were separated from their communities for weeks. Some people lost their homes and cabins, and others had their businesses or livelihoods impacted by wildfires.

To everyone who was impacted by this year's wildfire season, our government gives not only our heartfelt thoughts, but our commitment to help you as we work to rebuild."

Air quality:

In addition to the risks to life and property, air quality was the worst in memory, with prolonged exposure to smoke. Particulates levels in the air were over 1000 micrograms per cubic metre compared to normal levels of below 10. The number of hours of smoke broke records as well.



Because of exceptionally dry conditions going into the fire season, and throughout the summer and fall, fires burned hotter and deeper into the soil. Fires have burned deep into the peat layer, burning older carbon and breaking down the carbon sequestration mechanisms in the boreal forest. Blackened earth and loss of insulating layers can also affect permafrost thawing. Erosion of the soils often occurs, leading to impacts on water quality. It will take some time to observe and understand the extent of the effects arising from the 2023 fire season.

Nunavut

Winter is well-established in Nunavut communities, with many under regular blizzard warnings and daylengths ranging from a few hours to no sunlight. Long-range weather forecasts show high probabilities over the coming six months of higher than normal temperatures.

Mining news in NU:

Agnico Eagle Mines Ltd had proposed an extension to operations at the Meliadine Gold Mine. After extensive review processes and assessment of the potential ecosystemic and socio-economic effects, the Nunavut Impact Review Board report stated that:

> *"…the Board has found that there is considerable uncertainty about the potential for the Proposal to have significant negative effects on caribou, and cumulative effects on air quality, fish, freshwater quality and marine water quality. The Board has determined that if these ecosystemic impacts occur, the Proposal could also have adverse socio-economic effects on health, livelihood, culture and traditional land use for Inuit, Dene and Denesuline who rely on the health, abundance and access to the Qamanirjuaq caribou herd."*
>
> *…" the Board has concluded that on the basis of the potential for significant adverse ecosystemic and socio-economic effects that, in the Board's view, cannot be adequately managed and mitigated, the Extension Proposal should not be allowed to proceed at this time."*
>
> *The document can be found on the NIRB website at* https://www.nirb.ca/application?strP=r

At Agnico Eagle's Meadowbank Mine, changes have been required and implemented to comply with caribou protection measures and the way caribou activity is monitored and reported.

The Baffinland Iron Ore Mine applied to be allowed to ship additional ore and extend production and transportation of iron ore up to six million tonnes per year until the end of 2024. Approval from the Nunavut Impact Review Board has been granted for this, with requirements for development of a cumulative effects assessment framework.

Closing

If you are connected to activities in the Yukon, Northwest Territories, or Nunavut, doing work north of 60° that you would like to highlight in the newsletter, or running some seminars or other training opportunities, please let us know. The CSEB provides a valuable networking and communication forum, and a voice for biologists on any issues to be raised. There is also the option of instigating other CSEB activities — both of the fun and/or of the educational variety – with colleagues in the North. Please email your thoughts to Anne Wilson at agilewilson@shaw.ca. There is also an opening for another Territories Director — please contact Curt Schroeder or myself if you would like to take on this role!

NOTICE OF CSEB ANNUAL GENERAL MEETING

To be held on
December 18th, 2023
Check website for details.

COSEWIC NEWS

Hope and Peril for Killer Whales and Other Canadian Species

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed the west coast's charismatic Southern Resident Killer Whale as Endangered, as there are fewer than 75 individuals that remain. Perched above the Pacific Killer Whales' home live two wildflowers, Hibberson's Trillium and Macoun's Meadowfoam, occurring nowhere else in the world. These plants were assessed as Threatened and Special Concern.

(Ottawa, December 6, 2023). The sight of a breaching orca can be a once-in-a-lifetime experience. With a similar lifespan to humans and complex social behaviour, orcas are iconic coastal animals. At their semi-annual meeting, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) concluded that all five populations of the charismatic Killer Whale in Canada are at some level of risk.

Killer Whales are top predators, found in all the world's oceans. Many populations have a distinct culture, dialect, and diet. Southern Resident Killer Whales on the Pacific coast mostly eat Chinook Salmon. These whales currently number 75 individuals. Dwindling Chinook numbers pose a grave threat, alongside pollution, increasing ship strikes, underwater noise, and inbreeding. The committee assessed this population as Endangered.

Killer Whale (Northeast Pacific Offshore population) © Brian Gisborne

"These whales usually don't have their first calf until they are 14 and only produce a surviving calf every 5 years on average," said John Ford, COSEWIC member and Killer Whale expert. "So even if all threats stopped tomorrow, this orca population would be slow to recover."

While still at risk, other Killer Whale populations on the Pacific Coast seem to be doing better. Although they still number fewer than 350 individuals each, both the fish-eating Northern Resident population and the seal-eating Transient population are growing, the latter benefiting from increasing seal and sea lion numbers. The Offshore population, which specializes in eating sharks, continues to occur in small numbers and may be especially threatened by contaminants. All three populations were assessed as Threatened.

Much less is known about Killer Whales in the Eastern Arctic and off the Atlantic coast. These whales likely number in the hundreds and range widely. Inuit report seeing more Killer Whales in the Arctic. As climate change causes increased environmental shifts in this region, there's a need to research this population, which was assessed as Special Concern.

Orcas hold a special cultural significance to Indigenous Peoples, with unique names in over 13 Indigenous languages on the west coast alone. According to Larry Johnson of the Maa-nulth First Nations on the West Coast, "For us, Kakaw'in are the wolf of the sea – wolves ensure there is balance on the land and the Killer Whales ensure there is balance in the ocean. Killer Whales are messengers, they are guardians of the sea. They protect those who travel away from home and lead them back when it is time."

COSEWIC assessed 30 different wildlife species across the country, including Ivory Gull in the High Arctic (assessed as Endangered) and Canada's largest salamander, Manitoba Mudpuppy (assessed as Threatened; the Great Lakes/St. Lawrence River Mudpuppy was assessed as Special Concern). Back on the West Coast, perched above the Pacific Killer Whales' home live two wildflowers, Hibberson's Trillium and Macoun's Meadowfoam. Both occur nowhere else in the world. Hibberson's Trillium, a small-statured relative of Ontario's provincial flower, grows on limestone cliffs. The meadowfoam prefers areas where light disturbance keeps invasive species at bay. For example, this plant thrives in cleared firebreaks and parks with moderate levels of recreation. The trillium was assessed as Threatened and the meadowfoam was assessed as Special Concern.

According to David Lee, Chair of COSEWIC "Our committee tries to identify all wildlife species that might be at risk, from the majestic to the minute. Science and Indigenous knowledge are an integral part of society's commitment to safeguard Canadian biodiversity."

Next meeting

COSEWIC's next scheduled wildlife species assessment meeting will be held in April 2024.

About COSEWIC

COSEWIC assesses the status of wild species, subspecies, varieties, or other important units of biological diversity, considered to be at risk in Canada. To do so, COSEWIC uses scientific, Aboriginal traditional and community knowledge

provided by experts from governments, academia and other organizations. Summaries of assessments are currently available to the public on the COSEWIC website and will be submitted to the Federal Minister of the Environment and Climate Change in fall 2024 for listing consideration under the Species at Risk Act (SARA). At that time, the status reports and status appraisal summaries will be publicly available on the Species at Risk Public Registry.

At its most recent meeting, COSEWIC assessed 30 wildlife species in various COSEWIC risk categories, including 10 Endangered, 10 Threatened, and 8 Special Concern. In addition to these wildlife species that are in COSEWIC risk categories, COSEWIC assessed 2 as Extinct.

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Fisheries and Oceans Canada, and the Canadian Museum of Nature), four Non-government Science Members, Co-chairs of the Species Specialist and the Aboriginal Traditional Knowledge Subcommittees, and two early career scientists.

Definition of COSEWIC Terms and Status Categories:

Wildlife Species: A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.

Extinct (X): A wildlife species that no longer exists.

Extirpated (XT): A wildlife species that no longer exists in the wild in Canada, but exists elsewhere.

Endangered (E): A wildlife species facing imminent extirpation or extinction.

Threatened (T): A wildlife species that is likely to become Endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

Special Concern (SC): A wildlife species that may become Threatened or Endangered because of a combination of biological characteristics and identified threats.

Not at Risk (NAR): A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

Data Deficient (DD): A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

Species at Risk: A wildlife species that has been assessed as Extirpated, Endangered, Threatened or Special Concern.

For general inquiries:

COSEWIC Secretariat, Canadian Wildlife Service, Environment and Climate Change Canada, 351 St. Joseph Blvd, 14th floor Gatineau QC K1A 0H3.

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USA Moves To Protect Threatened Wolverines

North America Wolverine. Photo from Wikipedia.

The North American wolverine (*Gulo gulo luscu*) will receive long-delayed threatened species protections in the US under a Biden administration proposal in response to scientists warning that climate change will likely melt away the rare species' snowy mountain refuges and push them toward extinction in the US. Across most of the US, wolverines were wiped out by the early 1900s from unregulated trapping and poisoning campaigns.

About 300 surviving animals in the contiguous US live in fragmented, isolated groups at high elevations in the northern Rocky Mountains. In the coming decades, warming temperatures are expected to shrink the mountain snowpack wolverines rely on to dig dens where they birth and raise their young.

Adapted from The Associated Press

Editor's Note: In Canada, the Committee on the Status of Endangered Wildlife in Canada considers Wolverines found west of Hudson Bay to be of "special concern" and the eastern population, found in Québec and Labrador, to be "endangered."

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.

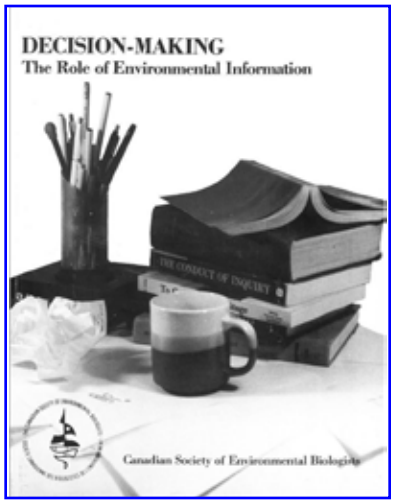
Are You Doing Interesting Biological Work?

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

BOOK Review

Submitted by Peter Wells, CSEB Atlantic Member

Discovery of the 1984 Canadian Society of Environmental Biology Report — *Decision-Making: The Role of Environmental Information*



Serendipitous discoveries often fuel breakthroughs or important insights in research in the natural, health, and social sciences. This is true in the field of "grey literature". Excellent reports are produced but are often lost or forgotten on the milieu of huge numbers of publications, informally produced but not catalogued or otherwise formally noted (e.g., with ISBNs, ISSNs, DOIs, etc.), despite their potential importance. Only relatively recently (since the mid-1990s) have publications been routinely digitized (or born digital) and made available online. Much of the older material may never be placed on the web and will remain largely hidden or even lost.

Imagine my surprise this summer when the hard working CSEB Editor, Gary Ash, handed me a copy of a symposium report entitled, Decision-Making: The Role of Environmental Information. The report, informally produced and printed by the CSEB in 1984, contains the papers presented at the symposium at Red Deer College, Red Deer, Alberta, in March 1984. Nine papers cover environmental topics that were of considerable concern in Alberta at the time, e.g., energy projects, mining projects, water resource projects, etc. The preface of the report, one printed in very limited numbers primarily for the attendees, states a theme very familiar to followers of our Dalhousie University EIUI (environmental information: use and influence) research program (www.eiui.ca), which began more than 20 years later, indeed it could have been written by us as part of our "new" program:

"Making good decisions depends on having good information. The decisions are influenced by the kind and extent of information available and how it is used. Understanding better the current role and importance of environmental information in relation to decision making is the focus of this symposium. An opportunity exists to improve the process and make better decisions, by exploring what information is needed, where it is applied, and how it is utilized."

This report is available on the CSEB website under "publications". It is not available in digital form, hence its distribution was very limited, primarily to attendees. However, a print copy is still available from the CSEB Editor. Its existence was overlooked by me, a member of the EIUI program that for many years has studied the importance of grey literature in the context of the role of science at the science-policy-decision-making interface. Hence, the report is quite noteworthy; its content has not aged. As well, there is an important message here: if one has a "novel" idea, it is likely that someone else or some other group has thought about it too. If the idea or concept is important, it will likely surface more than once and be followed by serious questions and innovative research.

Past publications if not digitized can be hard to find and easily missed. Searching the literature on a topic comprehensively, especially the grey literature, is a challenging task. It is very easy to overlook potentially important documents, especially if their distribution is limited and often only within professional groups. Grey literature, such as workshop or symposium proceedings, should be documented and catalogued appropriately for availability to any scholar conducting a rigorous search for pertinent literature. Grey literature can only have an impact if its existence is known!

The message for the CSEB: please digitize all of our past publications immediately, as much valuable information is contained within them and many insights may otherwise go unnoticed.

References

Canadian Society of Environmental Biologists. (1984). Decision making: The role of environmental information. A symposium sponsored by the Canadian Society of Environmental Biologists Alberta Chapter, Red Deer, Alberta, March 17, 1984. 126 p.

Editor's Note: Limited copies of this publication are available from Gary Ash, CSEB Bulletin Editor (garyash@shaw.ca) for the cost of postage.

Northern Madtom Progress Report Now Posted on the Public Registry

Fisheries and Oceans Canada has posted the Report on the Progress of Recovery Strategy Implementation for the Northern Madtom (*Noturus stigmosus*) in Canada for the Period 2012 to 2016 on the Public Registry. In Canada, this species is distributed in the province of Ontario.

French and English versions of the document are as follows:

EN/AN : Report on the Progress of Recovery Strategy Implementation for the Northern Madtom (*Noturus stigmosus*) in Canada

FR : Rapport sur les progrès de la mise en œuvre du programme de rétablissement du chat-fou du Nord (*Noturus stigmosus*) au Canada

These reports can be found on the Government website at the following URL:

https://species-registry.canada.ca/index-en.html#/documents/3348

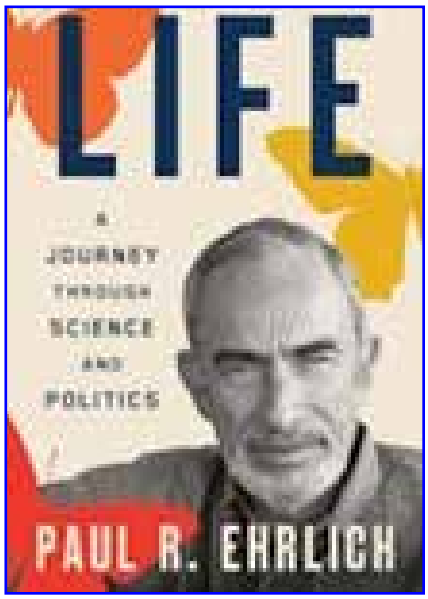
BOOK Review

Submitted by Peter Wells, CSEB Atlantic Member

Life. A Journey Through Science and Politics

by Paul R. Ehrlich. 2023. Yale University Press, New Haven and London. 374 p. (HC)

Available from Amazon.ca: *$37.05 Kindle Edition.*



This is one of the most informative, entertaining and compelling autobiographies that I have read in a long time. Written by a brilliant and well-known population ecologist and environmentalist in the USA, Ehrlich is well known publicly for his best-selling 1968 book "The Population Bomb", his book with coauthors "Population, Resources, Environment: Issues in Human Ecology" (1970, revised 1977), his many appearances on the Johnny Carson show in the 1970s and '80s (likely before the time of many CSEB readers), and many academic papers. Ehrlich is perhaps less known by us for his many contributions to butterfly taxonomy and ecology (still his number one biological passion), avian ecology, evolutionary theories, and mountain ecology, fields in which he has made many seminal contributions.

The book was very hard to put down. It is written in a personable, indeed jaunty style, with many personal side stories recalled in amazing detail and with humour. It is a life spent largely with his wife Anne, a noted biologist on her own turf, and likely a very patient companion of an eco-centric and highly driven man. The Ehrlich family travelled widely for their work, to all the continents, so much of the book is a travelogue of trips across the globe, often in hunt of butterflies and birds but just as often for the experience of seeing a wide range of ecosystems, from polar to tropical, and thinking about how species evolved, adapted, and survived. One meets many other prominent scientists throughout the pages of this book, as Ehrlich and his wife were well connected and highly sociable, at work and at home. I learned a lot about butterflies and tropical birds, and not just a little about his other diverse interests (e.g., flying his own plane, diving and exploring coral reefs, tasting foods and wines in many countries, and especially upsetting the politicians with his stance on topics such as population control, land conservation, and US immigration policy).

Now 90 years of age, Ehrlich remains highly committed to spreading the word about how too many people on the planet (now 8 billion), and too many wealthy consumers in the west, will impact its biodiversity and ultimately our combined futures. This likely was a primary reason for penning this book; it is his final plea for us to keep up the battle in support of global conservation and protection. A warning though — his views about population control over the decades have some racist and anti-immigration undertones. I encourage the interested reader to read a chapter entitled "Mathus's Hideous Blasphemy" in Sonia Shah's recent book to gain a more balanced view about our growing human population — its contributions as well as its risks.

That said, Erhlich's book is a thoughtful, highly detailed, and entertaining read about the natural world and our place in it during these challenging times. We should all be writing such memoirs as every biologist has an interesting and unique tale to tell about life on our small planet and our role in caring for it.

Reference

Shah, Sonia. 2020. The Next Great Migration. The Beauty and Terror of Life on the Move. Bloomsbury Publishing, New York, London. 387 p.

BOOK Review

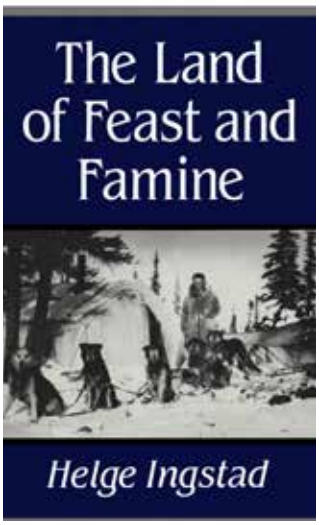
Submitted by Bob Gainer, CSEB Alberta Member

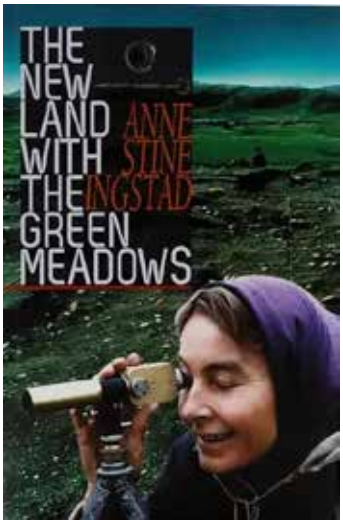
The Land of Feast and Famine

by Helge Ingstad. 1992. McGill-Queens University Press, Montreal, PQ. 366 p. Available from Amazon.ca *$30.19 paperback.*

The New Land with the Green Meadows

by Anne Stine Ingstad. 2013. Historic Sites Association of Newfoundland and Labrador, St. John's, NL. 180 p. Available from Heritage Shops of Newfoundland $19.99 paperback





Two fine Canadian editions of three fine Norwegian adventurers (I include their daughter) that left a tremendous legacy to this country. Helge first came to Canada to be a white fox trapper in the Northwest Territories just before the start of the Great Depression (CSEB Bull 79(4)). For some reason, the price

of white fox fur went through the roof at the same time as just about everything else went through the floor. The barrenlands and the arctic coast further to the north were flooded with white (non indigenous), white fox trappers as well as the regular indigenous trappers. White fox (about the same size and shape as the kit fox, essentially extinct in the southern prairies now) are about half the size of a regular fox and more "cat like". White foxes live beyond the northern tree zone specializing in lemmings, ground nesting birds, and scavenging after wolves. In the winter, they were easy to trap and snare, but even easier to bait with strychnine in caribou carcasses. The additional wolf skins that were recovered were also worthwhile for the bounty and their hide value.

In addition to describing the life style of these white trappers, Helge also described his one year living with the Ethen-eldilli, the Dene "Caribou eaters", who lived on the edge of the barrenlands in the "Tree zone" from where they foraged out into the barrens to obtain caribou. His observations were important ethnological contributions as noted in Bryon Gordon's study: "People of Sunlight, People of Starlight". His book about his adventures was originally the name that Jack Hornby was to call his autobiography of his life on the barrenlands, only Hornby didn't survive while Helge did. Because of Hornby's death, his biological description of the barrenlands and the publicity Ingstad's book made of the area, the Federal Government created the giant Thelon Game Sanctuary in the middle of a vast "nowhere".

Four years after Hedge came to Canada and became a white trapper, he was back in Norway resuming his law practice. Approximately 25 years later, he was back in Canada recreating the route of the Vikings in their sagas about their trips to and their colony in, the so called Vinland. There it was, exactly where you would expect it to be if you were a Viking in a Viking ship being driven southward by the Labrador Current—L'anse aux Meadows on the northern tip of Newfoundland. These ruins were superficially identical to the ruins from Greenland 1,000 years ago before the disappearance of the Vikings from that area as well. Helge had deduced this from a linguist's interpretation of old Norse that Vin in Vinland referred to green as in green pastures rather than grapes; all the previous interpretations had placed Vinland far to the south, where "grape like" berries grew in profusion. Vikings' first thoughts about a place to settle was meadows for their livestock. (Helge wrote a book about it "*Land under the Polar Star*").

In the interim 25 years, Helge had married an archaeologist, Anne Stine. Immediately and wholeheartedly she immersed herself in the business of establishing that the ruins Helge had found were from a significant colony of Leif Eiriksson, son of the outlawed Eirik the Red, Torfinn Karlsevne, Torvald and their families and friends, some of the names in the Viking sagas about Vinland. Years of her training had prepared Anne for this exact exercise. Their daughter Benedicte, a Norwegian captain, a Norwegian doctor who was cook, and a Norwegian photographer who was handyman and ship's mate sailed a Norwegian rescue vessel up and down the east coast of Labrador to find the ruins that the locals knew about all along. The locations mentioned in the Sagas matched locations identified along the Labrador coast.

Anne recruited as many of the locals as she could and over the space of eight years fell in love with them and them with her. Meanwhile Helge was busy writing as many articles as he could with National Geographic and on public tours to raise the funds to support the expensive work. At the location was an extremely remote area accessible only by sea, and occasionally by small aircraft. Anne's writing of this book showed how personally she was involved and how unsure she was of being able to establish beyond any professional doubt that this is what the Vikings' Sagas had been describing. That is, they were not just a myth, but true. It wasn't until the very end when they recovered brass objects characteristic of those in the Greenland ruins that it was proved beyond a doubt that it was a Viking colony.

The ruins supported, as was implicit in the sagas, that the Vikings made several trips back and forth to Greenland over several years, maybe dozens. Following the currents along the east Greenland shore sent the ships over the Davis Strait where the Labrador Current came storming out of the Arctic Ocean and drove them down the east coast of North America. To return, they followed the Prevailing Westerlies eastward where the Gulf Stream drove them north back to Greenland. Anne found evidence of families and livestock being raised. They must have been in Vinland many years. Vikings were a livestock based culture, with their Norwegian Fjord ponies, highland cattle, pigs, and sheep that required grazing land (Vin land).

The Norwegians were the original Vikings in Greenland, Iceland, the Faroes, Shetlands, Orkney Islands, and the Northern highlands of Scotland. Their capital was in Kirkwall on the Main Orkney Island until about the year 1500 when the Norwegian King's daughter married the Scottish King's son, and these now Scottish lands were given to Scotland as a dowry. The King moved his capital back to Norway and lost interest in his Arctic possessions. The Norwegian Vikings had colonized this whole area before 1000 A.D., Vinland about 1000 A.D., and it is speculated that several hundred years of a cold spell resulted in the disappearance of them from Greenland (and Vinland) about 1500 A.D. A few hundred years later, whalers started invading the seas around Iceland, Greenland, and the Canadian arctic and the Danish Vikings took knterest in possession of Iceland, Greenland, and the Faroes. Eventually Knud Rasmussen and Peter Freuchen established Danish sovereignty except for the still disputed Hans Island (despite the Norwegian Otto Sverdrup discovering and laying claim to what are now Arctic Islands that are part of Canada).

Essentially this is Anne's diary of how a professional archaeologist would have to proceed step by step to conclusively make the case for Viking these ruins being Viking,and this she did in a fine, meticulous manner. In the end, she was exhausted but satisfied that she had succeeded in making her case and satisfied that she had helped this subsistence community with an improved standard of living. I noticed that as an educated Norwegian, she spoke Norwegian, Danish, German, French, and English but couldn't understand a word of the local Newfoundlanders. After eight years, she had learned this new language.

This whole Norwegian, part time Canadian, family (father, mother, and daughter) made an enormous, outstanding and magnificent contribution to the knowledge of our country and continent's heritage. Supposedly, climate change (cooling) and fighting with the natives prevented the Vikings from further expanding their North American colony 500+ years before Columbus. We owe them a debt of gratitude for adding to our history.

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