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THE CANADIAN SOCIETY OF **ENVIRONMENTAL BIOLOGISTS** **Bulletin**

In this Issue:

- *BC Parks and Wilderness is a Mess*
- **Agricultural Practices in Saskatchewan Take a Step Toward Sustainability**
- **Checking in on the state of the Great Lakes**
- **Book Review - Fishes of the Salish Sea. Puget Sound and the Straits of Georgia and Juan de Fuca**
- **Opinion - Art Review: Hanky Panky by Kent Monkman**



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

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Front Cover: A sunset profiles an inshore fishing boat returning to Port Hood harbour, St. Georges Bay, off Cape Breton Island, NS, Sept 2020.

Back Cover Top: Salt marsh, behind a barrier beach, on St. Georges Bay, just off the Celtic Shores Coast Trail, near Port Hood, CBI, NS, Sept 2020. There are many square km of highly productive salt marsh along parts of the NS coastline, such as in CBI, essential habitat for invertebrates, fish, turtles and birds.

Top Insert: Kiosk on the Celtic Shores Coastal Trail, view of lagoon behind a barrier beach of Georges Bay, Cape Breton Island (CBI), NS.

Bottom Left: Large bracken fungi in Kejimikujik National Park, NS. Photos Credit: Cover photos by Peter Wells, CSEB Atlantic member.

NATIONAL EXECUTIVE (2020)

President:

Curt Schroeder
(Home) 306-531-3627 (Work) 306-775-7678
(E-mail) president@cseb-scbe.org

1st Vice-President:

Patrick Stewart
(Work/Fax) 902-798-4022
(E-mail) enviroco@ns.sympatico.ca

2nd Vice-President:

Robert Stedwill
(Home) 306-585-1854
(E-mail) rjstedwill@live.ca

Secretary/Treasurer:

Anne Wilson
(Home) 780-737-5522
(Cell) 867-765-8480
(E-mail) anne.wilson2@canada.ca

Past-President:

Anne Wilson
(Home) 780-737-5522
(Cell) 867-765-8480
(E-mail) anne.wilson2@canada.ca

Newsletter Editor:

Gary Ash
(Home) 780-472-0098
(E-mail) garyash@shaw.ca

Membership:

Gary Ash
(Home) 780-472-0098
(E-mail) garyash@shaw.ca

REGIONAL DIRECTORS

Atlantic:
Patrick Stewart
(Work/Fax) 902-798-4022
(E-mail) enviroco@ns.sympatico.ca

Québec:

Vacant

Ontario:

Barbara Hard
(Work) 905-614-1978 Ext. 287
(E-mail) barbara.hard@arcadis.com

Vacant

Manitoba: Vacant

Saskatchewan:
Robert Stedwill
(Home) 306-585-1854
(E-mail) rjstedwill@live.ca

Alberta:

Brian Free
(E-mail) bfree@cseb-scbe.org

Joseph Hnatiuk
(Work) 403-524-1147; (Fax) 403-524-1148
(Cell) 403-332-1455
(E-mail) hnaj@shaw.ca

British Columbia:

Loys Maingon
(Work) 250-331-0143
(E-mail) BCDirector1@cseb-scbe.org

Sean Mitchell
(Home) 250-889-6195
(E-mail) BCDirector2@cseb-scbe.org

Territories:

Sharleen Hamm
(Work) 604-996-1110
(E-mail) sharleen@sharleenhamm.com

Anne Wilson
(Work) 780-951-8856
(Cell) 867-765-8480
(E-mail) anne.wilson2@canada.ca

REGIONAL CHAPTERS

Newfoundland & Labrador
Contact: Pat Ryan
(Home) 709-334-2962
(E-mail) patrickr@mun.ca

Atlantic Chapter
Contact: Pat Stewart
(Work/Fax) 902-798-4022
(E-mail) enviroco@ns.sympatico.ca

Ontario
Contact: Barbara Hard
(Work) 905-614-1978 Ext. 287
(E-mail) barbara.hard@arcadis.com

Manitoba: Vacant

Saskatchewan

Chairperson: Robert Stedwill
(Home) 306-585-1854
(E-mail) rjstedwill@live.ca

Alberta

Contact: Brian Free
(Work) 780-427-7765
(E-mail) bfree@cseb-scbe.org

Contact: Joseph Hnatiuk
(Work) 403-524-1147; (Fax) 403-524-1148
(Cell) 403-332-1455
(E-mail) hnaj@shaw.ca

British Columbia:

Contact: Loys Maingon
(Work) 250-331-0143
(E-mail) aardscanltd@gmail.com

Territories

Contact: Anne Wilson
(Work) 780-951-8856
(Cell) 867-765-8480
(E-mail) anne.wilson2@canada.ca

Sharleen Hamm
(Work) 604-996-1110
(E-mail) sharleen@sharleenhamm.com

CSEB BULLETIN 2020

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

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

Editor: Gary Ash
Layout: Gary Ash

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LE BULLETIN de la SCBE 2020

Vol. 77, Numéro 3, Automne 2020

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 courants 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 diversifié d'environnementalistes canadiens. Les membres sont invités à contribuer des articles, photos (noir et blanc) ou des messages qui sont d'intérêt nationale en sciences biologiques et environnementales. Les lettres à l'éditeur sont bienvenues.

Tout la correspondance 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'éditeur:** Gary Ash, Editor, Courriel: garyash@shaw.ca
Rédacteur en chef: Gary Ash

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The views expressed herein are the writer's of the articles and are not necessarily endorsed by CSEB, which welcomes a broad range of viewpoints. To submit a piece for consideration, email newslettereditor@cseb-scbe.org.

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.

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Gary Ash
8108 155 Avenue NW, Edmonton, Alberta T5Z 2S9
Phone: 780-472-0098 • E-mail: garyash@shaw.ca

NATIONAL News

PRESIDENT'S Report

By Curt Schroeder, CSEB President

Since our last issue of the CSEB Bulletin, much of our society, if not globally, has been rocked by racist acts and the ensuing anti-racism protests, vandalism of historic statues, return to school anxiety amid the ongoing COVID-19 pandemic, and seemingly greater sensitivity for justice and equality.

Members of CSEB are no doubt affected in their personal and professional lives. Like many, I'm working from home — or is it living at work? At my work, language use is reflecting these social pressures. Terms such as “blacklist” and “whitelist” are being replaced to describe restrictions/allowances of specific sets of users, web addresses, etc. Businesses are changing their advertising and websites to avoid terminology that may be reflective of oppressive language. Perhaps CSEB members are seeing similar changes in their workplace.

CSEB and its members could commit to doing our part and look at ourselves, our processes, and our deliverables such as this Bulletin to see where we can be more inclusive in things we do and stand for.

SCIENCE TIDBITS

Submitted by John Retallack, CSEB Alberta Member

Dogs vs. Cats – The Science Is In!

As we all know, dogs can't do enough to please their human hosts, and, as we also know, humans can't do enough to please their feline masters! But which animal is the smartest? Not wanting to prompt a pet owner bun fight...well maybe just a little!

In their Issue #55 (interview of Jose Canello by Sophie Roell), Future Crunch reviews the five best books on Canids (wild and domesticated dogs). Bottom line, "...dogs have about twice the number of neurons in their cerebral cortexes as cats, and according to some scientists, dogs' mental abilities are close to a human child of age 2 to 2.5 years. As for language, a dog can learn 165 words, including signals, can count up to four or five, and also has a basic understanding of arithmetic.

Based on the relative size of the brain (compared to the animal's body size), the most intelligent animals are, in descending order, humans, followed by great apes, porpoises, and elephants. The dog is close behind elephants. Only further down the list do we find cats..."

I think the results are quite clear, and science prevails once again! Sorry cat people! After all, who ever heard of anyone taking their cat along on a research hike!

'Puppy Dog Eyes' - An Evolutionary Trick to Manipulate Humans, Say Scientists

If scientists say so, it must be true! Come on dog people...admit it! Your dog manipulates you and now you will know why!

The next time a dog looks up at you with those big, puppy-dog eyes and your heart begins to melt, be aware: you are being manipulated by 33,000 years of evolution.

Dr. Juliane Kaminski (University of Portsmouth) looked at facial musculature in wolves and domestic dogs and found distinct differences in facial muscle concentrations. While modern dogs have developed small muscles around the eyes that allows them to raise their inner eyebrows, wolves have very limited comparable muscles. The researcher notes: "The findings suggest that expressive eyebrows in dogs may be a result of humans' unconscious preferences that influenced selection during domestication."

A dogs' ability to read human behaviour and emotions is well known and almost unique within the animal kingdom, and there is growing evidence that eye contact is crucial to this. A study in 2015 even showed that a shared gaze between humans and dogs results in a hormonal response in both parties similar to that between a mother and baby.

Cats in Australia Kill Over 2 Billion Wild Animals Each Year

Each feral cat in Australia kills more than 700 wild animals annually and, based on the number of feral cats in Australia, that is estimated to be in the order of two billion native wild animals per year!

Cats were introduced to Australia in the 18th Century by European colonizers. According to the book "Cats in Australia" (Woinarski et al. 2019), feral cats now occupy 99.8% of the continent and can be found on more than three quarters of Australian islands. Estimates of the number of feral cats ranges from two to six million animals, varying largely on the amount of rain in various areas. In just one day, Australia's feral cats kill approximately 1.3 million birds, 1.8 million reptiles, and over 3.1 million mammals.

There are also about 4 million pet cats in Australia. A single 'outdoor' pet cat kills, on average, 75 animals each year.

According to Australia's Department of Sustainability, Environment, Water, Population and Communities, cats are recognized as an immediate threat to many native species, including 35 bird species, 36 mammal species, seven reptile species, and three amphibian species.

Woinarski CZ, Legge SM, Dickman CR. 2019. Cats in Australia; Companion and Killer. CSIRO Publishing, Clayton South VIC 3169 Australia.

REGIONAL News

BRITISH COLUMBIA News

Submitted by Loys Maingon, CSEB BC Director

BC Parks and Wilderness is a Mess

“You have done nothing...”

— Greta Thunberg (2020)

“*Far from realizing the vision of its founders, the Park, in a word, is a mess.*”¹ With these memorable words, on 28 June 1988, Dr. Peter Larkin signed off on a damning report summarizing the mismanagement of nature in BC’s oldest and biggest provincial park. That was then an objective description of the state of BC’s environment in what was publicly touted as prime BC wilderness. Larkin had found that “*The Park now embraces a reservoir that once was a lake, logged-over land that has not been replanted, a number of mineral claims and an operating mine, a power line right-of-way, and a boundary that defies Park principles.*” None of that really went away after the government of the day accepted Larkin’s report. As with the Site C hydro project today, which has become a spiralling economic disaster with no end in sight², the government made conciliatory moves to adapt to a bad situation, but with some border additions, the operating mine, the flooding, and the logging stayed.

What Larkin described then would now be known as “the industrialization of wilderness,” a term minted five years ago to describe government-sanctioned destruction of BC’s wilderness and biodiversity in favour of the development needs and demands of industry.³ The sort of relationship to nature that Larkin condemned in 1988 was re-asserted in 2014 with the passage of Bill 4, which now enables the building of pipelines and transmission lines through all BC parks, none of which was repealed by the new NDP government. What Larkin described 32 years ago was perceived by the public to be a shocking anomaly, something at odds with their image of a wild and natural BC. It was in fact a historical and cultural norm that is perpetuated and legitimized to this day.

The industrialization of wilderness defines the history of the relationship of our settler culture with BC’s wilderness from the nineteenth-century to today. As the work of Bill Gammage has documented, the parks system that was created at the onset of the twentieth century is a colonial adaptation of privileged estates that excluded and erased aboriginal presence and claims across the British Empire. Larkin found that for decades BC Parks had been doing the bidding of a succession of governments and forestry and mining companies who often seemed to be one and the same. BC Parks traded productive old-growth lands of high economic and ecological value within the park to mining and forestry interests for other “recreational spaces” of lower economic value elsewhere in the province. BC Parks was essentially portrayed in the Larkin report as a recreational arm of the Ministry of Forests. It provided the public with the illusion that in spite of the industrialization of forests in an era of a booming forest and natural resources

economy, with its parks, BC remained the custodian of vast and endless “recreational” forests, which future generations would enjoy. The myth of endlessness endures to this day even as BC’s original forests become a memory.

Perhaps significantly, four days before Larkin submitted his report, James Hansen had presented his first landmark testimony on climate change to the US Senate. Just as Hansen’s report would set off a chain reaction of climate protests urging governments to act, the Larkin report and the protests that called for it, would trigger a cycle of “wars in the woods,” in the 1990s urging governments to save “old growth.” There is an uneasy convergence in the trajectory of Larkin’s and Hansen’s submissions. Substantially, little has changed and generations can say that we did nothing.

Today, BC has become a notorious quiltwork of clearcuts right up the borders of national and provincial parks, which are now overwhelmed with tourists.⁴ The logging in the parks moved to logging around the parks. Areas that the Larkin report recommended be integrated in the park such as the Buttle Lake corridor and Willemar and Forbush lakes, which were then felt to be “too inaccessible”, have been heli-logged and clearcut in the last two years. These endless clearcuts are internationally known as a greater source of greenhouse gases than fossil fuels.⁵ The provincial parks, magnificent as they are, are for the most part left-overs made up mainly of sensitive subalpine and alpine ecosystems traded for the more valuable low elevation old growth rainforests.

However, how much we fail to appreciate the situation in which we now find ourselves is best illustrated by the totally vacuous recommendation of the Canadian Parks and Wilderness Society.⁶ At a time when provincial parks have become some of the last island refugia of biodiversity in a recognized sea of clearcuts, CPAWS recommends an increase of infrastructure to facilitate and increase human footprint in provincial and national parks. It is difficult to think of anything more disconnected with reality. It only demonstrates that CPAWS is just the doppelganger of the recreation industry. Both live in the same disconnected anthropocentric reality that is quickly endangering life on earth. If anything, we need more parks, not less conservation.

After over three decades of protests and grand statements by a succession of governments that better management will be implemented, and that a strategy to save old-growth will also be legislated, all we see is a continuous erosion of wilderness and high-productivity old-growth. The situation has so deteriorated that concerned foresters, Karen Price, Rachel Holt, and Dave Daust, felt compelled in April 2020 to produce a detailed report estimating what really remains of BC’s lowland old-growth forests.⁷ The report confirms that over the past three

decades, government policies have done nothing to protect high productivity old-growth forests. The more productive a forest is naturally, the more it has been commercially exploited, to the point that we have collapsed lowland old growth to about 1% of the original forests, about only 2% of which remains in provincial and national parks.

This has huge negative implications for the future of BC’s biodiversity, and for life on earth. As Price et al. point out, decades of failing to recognize the problem and address it has effectively pushed these forests to the brink, if not the point, of extinction:

“Productive old forests are naturally rare in BC. Sites with the potential to grow very large trees cover less than 3% of the province. Old forests on these sites have dwindled considerably due to intense harvest so that only 2.7% of this 3% is currently old (see pie chart). These ecosystems are effectively the white rhino of old growth forests. They are almost extinguished and will not recover from logging.”⁸

Figure 1 below from Price et al. illustrates the state of “old growth” in different classes of forests based on their productivity. The areas of highest productivity are lowland coastal forests (SI 20-25 and SI>25), which are currently targeted for commercial extirpation. The size of the circles represents the relative abundance of the various classes of forests within the province.

If we accept the “biotic pump” model, which postulates that forests are complex rain-making systems, the regional changes implicit in this analysis should give pause for serious concern.⁹ The scale of loss of old-growth forests heralds major changes in the province’s rainfall patterns that are already at risk from climate

change. It means major changes to the province’s hydrology, which is already showing the strains of climate change. It is like removing coastal mangrove forest in tropical cyclone zones. The long-term implications of the loss of coastal old-growth go far beyond the loss of direct extirpation of species and changes in landscape.

Following yet more protests and consternation at continuing old-growth logging, in July 2019 Doug Donaldson, Minister of Forests, Lands, Natural Resource Operations and Rural Development, called for a public consultation on the “Old Growth Strategic Review”, which was to provide a report by April 30, 2020. The public consultation was viewed with skepticism, and it seems that the independent report by Price et al. may have overshadowed yet another disingenuous government report. The report expected in the fall, was released on September 11 amid a flurry of speculations about a much-anticipated election.

Although the media suggested that this release was enthusiastically espoused by environmentalists, the reality is otherwise, because the report falls short of the need to place a moratorium on old-growth logging. The Gorley and Merkel report promises to save 353,000 hectares of old-growth forest. Minister Donaldson still relies on a nebulous definition of “old-growth” and still promises to take a “balanced approach” to meet industry’s demands. Therefore what remains of lowland old-growth, the white rhinoceros, is not really being protected. While “353,000 hectares” may sound generous, it is important to consider that number in the light of the forest industries annual rate of clearcutting, which is about 300,000 hectares a year.¹⁰ That is really a very small percentage of the total available forests.

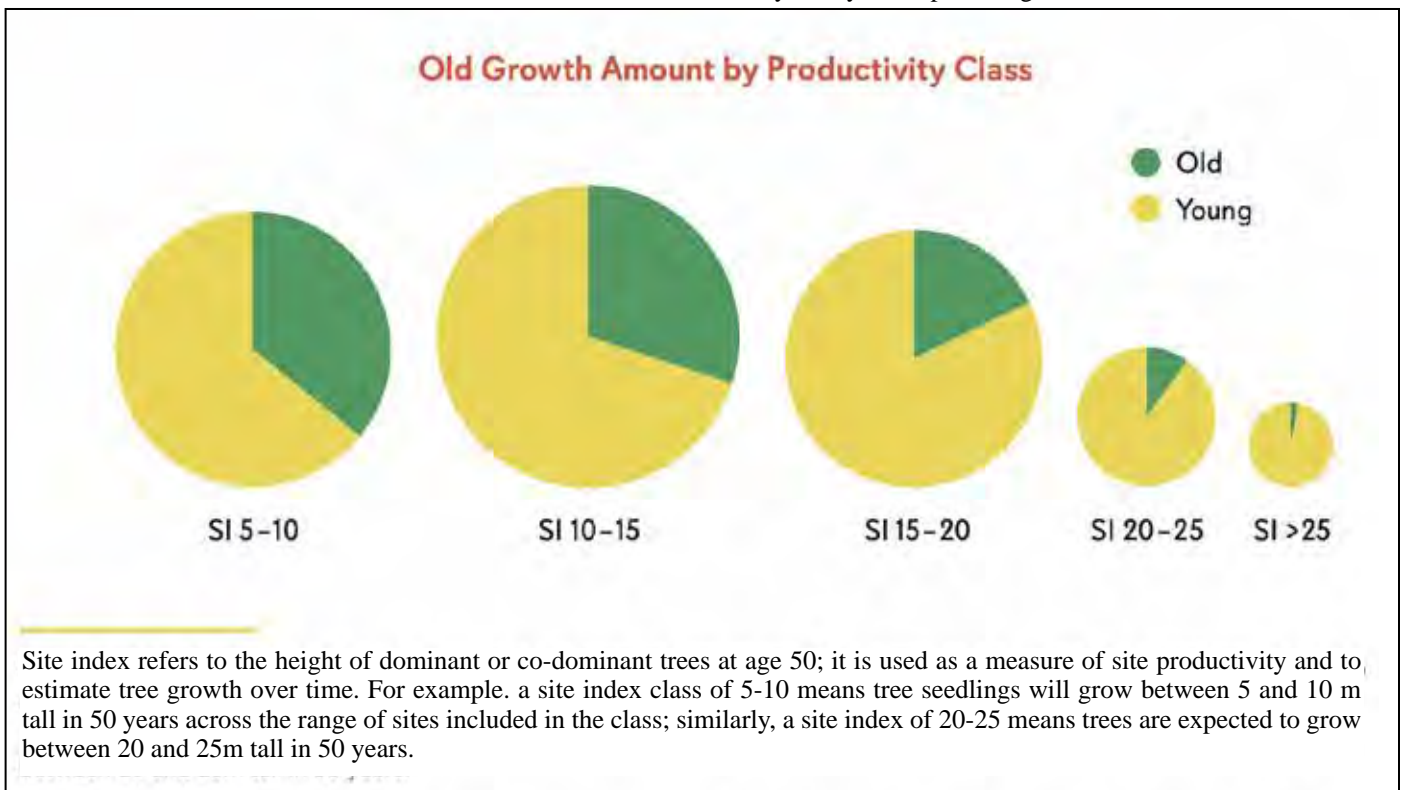


Figure 1: Site Index based graph of five kinds of old-growth forests remaining in BC (From Price et al. 2020. *Old Growth Forest: A Last Stand for Biodiversity*).

Minister Donaldson has already indicated that “the ministry isn’t considering a moratorium on old-growth logging.”¹¹ Government policy, therefore, is logging to the last tree and protests should be expected to continue. With a little historical insight it is clear that there has been no real change in government thinking since 1988. In an environment where international concern for biodiversity collapse is paramount, after three decades of studies and protests over the state of old growth, BC’s government has approved 312 new logging clearcuts in what little remains of endangered spotted owl (*Strix occidentalis*) habitat.¹² This level of destruction is not even financially warranted, since the government’s own accounts show that the forest industry has not been an economic driver over the past two decades. As is increasingly clear to analysts, forestry has been subsidized by taxpayers to the tune of \$365 million a year, essentially to destroy public forests.¹³

The fact now is that, just as BC has yet to see a long-awaited Species-at-Risk legislation, the government has released the Merkel and Gorley Old Growth Strategy report with enough calls for studies on socio-economic impacts and delays to allow the extirpation of productive lowland old-growth, before any actual implementation of protection comes into effect. There is no sense of political or ecological urgency. There is only electoral expediency. Old-growth logging has continued unabated all summer. At the rate at which the Horgan government is proceeding, a Species-at-Risk legislation may be moot if old-growth is irrevocably lost before legislation sees the light of day. As it should be expected, old-growth logging protests, supported by some of BC’s best-known biologists, have been given renewed impetus.¹⁴

The logging and mining environmental “mess” that Larkin saw in 1988 in a park, we see today unchanged in the whole province. Similarly, climate change, which Hansen saw in 1988, is unfolding today at a greater pace than we could imagine. The industrialization of wilderness keeps pace with the unabated progress of climate change. It does so because we erroneously treated a continuous process as a set of discrete events.

Today we witness the collapse of fisheries and the fishing industry as 2020 proves to be a year of unprecedented low salmon returns.¹⁵ This should come as no surprise. If National Geographic can tout temperate rain forests as “salmon forests,”¹⁶ the Minister of Forests and the logging industry seem not to see the link.

On the Fraser river, sockeye salmon returns are expected to be the lowest on record. While the Big Bar slide appears to have been partially cleared by higher water levels, sockeye returns are still expected to be a historic low of 283,000.¹⁷ At latest report, the collapse of sockeye is such that a complete shutdown of the fishery “for years to come”, including the native fishery, is being proposed.¹⁸ The social and ecological magnitude of this collapse is equivalent to that of the Atlantic cod. If the Salish Sea sockeye collapse this year, we should logically expect the Salish Sea’s emblematic southern resident killer whales to reach a point of no return. Discussions over Roberts Bank Terminal 2 and the Kinder Morgan pipeline will also be moot—and that will suit governments fine.

Few people understand, and even fewer will ever stop to consider, the exact extent of the ecological losses that BC’s forests and

ecosystems have incurred in the nineteenth and twentieth centuries. It is worth considering some ecological history.

As Daniel Marshall’s recent history of the Indian wars of 1858 details, the province was born out of the 1858 Fraser River gold rush. The Fraser Gold Rush was a direct continuation of American Indian wars furthering gold mining interests and a racist ethos. Within a single year, the gold fever brought into the peaceful world of about 150,000 First Nations and a handful of settlers of the Hudson Bay Company, an onslaught of 30,000 California miners, who brought a genocidal American Indian War into this province.¹⁹

These miners developed an extensive system of mines all along the Fraser River. There are detailed studies of the ecological impacts of the California Gold Rush and the Australian gold rush. There are no similar studies of the ecological impacts of British Columbia’s gold rushes.²⁰ In fact, until the publication of Daniel Marshall’s book, the Indian wars of 1858 were arcane knowledge known to very few people. This is not a coincidence. There are some unsavoury realities that national mythologies prefer to delete.

While the archaeological record confirms that we have collapsed the Salish sea ecosystem²¹, there are very few studies—if any—of the overall ecological impact of mining in this period of colonization. We erroneously proceed on the assumption that disease had already cleared the way, that First Nations were already “vanishing” or even absent, that colonization was a passive handover, and that our impact on the ecosystems was akin to agricultural settlement, that it was merely a gradual change rather than forceful logarithmic dislocation. This is, in fact, a perfect historical application of Daniel Pauly’s “vanishing database” principle: we assume that what we know today is consistent with what is normal, and when we eradicate a species, we forget that it was once abundant, and move on to the next.²²

What is well-known of the California Gold rush’s ecological impact is that it was “a complete re-organization of California’s ecosystems”. Gold mining was unlike agricultural displacement. It was not a passive linear population replacement advance. It is best described as a military “concussive event.” It did not just entail the arrival of a certain number of individuals to replace one way of life with another. Each of those individuals had multiplicative personal and industrial needs. It brought the rapid deforestation of timber needed for heat, housing, shaft and flume construction, the extermination of local game, the re-routing of streams and rivers, hydraulic extraction, resulting erosion and water contamination compounded by cinnabar mining and mercury/arsenic gold separation. Gold mining is not a localized event. It requires meeting the needs of an extensive workforce. As argued by Elliott West, the impact of gold mining, wherever it takes place, has vast and profound, even global, ramifications.²³

As a direct extension of the California Gold Rush, the Fraser Gold Rush cannot have avoided similar impacts. Not only would the 1858 Gold Rush inevitably have negative long-term impacts on the survival of native cultures, it could also only have long-term consequences on native salmon populations. It is therefore shocking to consider that not only have the unsavoury details of the 1858 Gold Rush been overlooked, but countless generations of British Columbians have been led to overlook the considerable

environmental impacts it represented. Forgetting this is part of BC's "supernatural BC" endless wilderness mythology.

It is in that context that we should take a second look at DFO's most complete dataset, the Fraser River sockeye returns, which has guided much of fisheries policy and strategy since the International Salmon Convention of 1930. For decades, this guided DFO's policy of restoring salmon to "historic highs." As **Figure 2** shows, the data start in 1893, when the state of the Fraser River is considered to be relatively "pristine" and the sockeye returns are "at their peak." The data start 35 years after the impact of the 1858 Gold Rush, and it starts with an unexplained "low".

Remarkably, the 1893 peak is similar to the "high" of the 1980s and between the 1942 and 1958 peaks which represent a "recovery". It is not clear if 1893 is itself a "historic high" or like 1942, a recovery. There are no data prior to 1893, and the reader is left to infer that the norm prior to 1893 and prior to 1858 would have been similar to the high returns at the start of the twentieth century, before the 1914 crash. The broad assumptions built-in to **Figure 2** are as follows:

1. that the Gold Rush was a small benign event, not worth taking into account;
2. that the impacts were minimal;
3. that if impacts did take place their effects were diluted by time and water flow, and mainly,
4. that business-as-usual can continue, and that somehow technology can override the reality of a complete re-organization of ecosystems.

If, on the other hand, we accept that there logically had to have been a major impact, as there were in the Californian and Australian gold rushes, then we are looking at a continuous process of environmental deterioration and mismanagement from 1858 onward.

That in BC, unlike California, the impact of the Gold Rush of 1858 has not been studied and is not included in considerations of the actual state of the environment in comparison with what

was found at the time of contact, is hardly a coincidence. The question to ask is: "What would have been the reaction of British Columbians if in 1925 the graph in **Figure 2** had included the memory of fisheries prior to 1858?" The question is neither idle nor speculative. The impacts of gold mining in California were amply discussed by Grove Karl Gilbert (1843–1917) before the First World War.²⁴ That question could not be asked because the people who had a knowledge and memory of the state of BC's ecosystems, and who had voiced concerns over mining operations on the Fraser, were dispossessed and treated as "hostile and unreliable witnesses" to be silenced. In fact, legislation was even enacted to deprive them of legal counsel.

Sadly, it is not that we did not know, but that we chose not to know. Even more disheartening, **Figure 2** shows that government science started on a faulty premise and was used as a subterfuge to bypass a problem rather than address it. The impact of the Hell's Gate slide, which was caused by the seismic repercussion of railway building along the Fraser River, was not the first major industrial impact of colonization on the Fraser River's ecosystems. It is part of an ongoing and unsustainable toll on the environment, which is the industrialization of wilderness. That seems to have been the problem from the beginning.

The mess is a process. It is not a series of fortuitous events. Just as the 1914 Hell's Gate slide is attributable to seismic work, the 2019 Big Bar Slide is attributable to climate change.²⁵ Both are part of a process of industrialization in the Anthropocene. The situation in which we find ourselves validates Greta Thunberg's conclusion that we have effectively "done nothing," and continue to do so.

Indeed, recent research in *The Cryosphere* indicates that climate change has outstripped all our predictive ability as well as our ability to respond.²⁶ The analysis of satellite surveys of total loss of ice across the whole planet on glaciers, ice caps, sea-ice, and ice sheets matches the IPCC's worst-case scenario, the "do-nothing" scenario. The loss of 28 trillion tonnes of ice over the past 30 years is expected to contribute not just to a rise of one metre, but to a loss of ocean productivity and terrestrial freshwater, and to diminished ability of the planet to reflect incoming heat. The implications of current policy were spelled out in some detail in an April article in *Nature* by Trisos et al.²⁷ They project that dislocation will be abrupt and is quite likely to become apparent by 2030, "because within any given ecological assemblage the exposure of most species to climate conditions beyond their realized niche limits occurs almost simultaneously."

We are witnessing an environmental collapse. Under these conditions, the value of our provincial and national parks as "biodiversity refugia" cannot be understated. In May 2018, BC's new government took great pride in setting aside six small parcels of "protected lands" totalling 166 hectares.²⁸ This achievement is an equivalent of 10 standard clearcuts, 10 out of the 312 approved in spotted owl habitat. It should stand in contrast with the clearcutting of entire valleys, or the "total

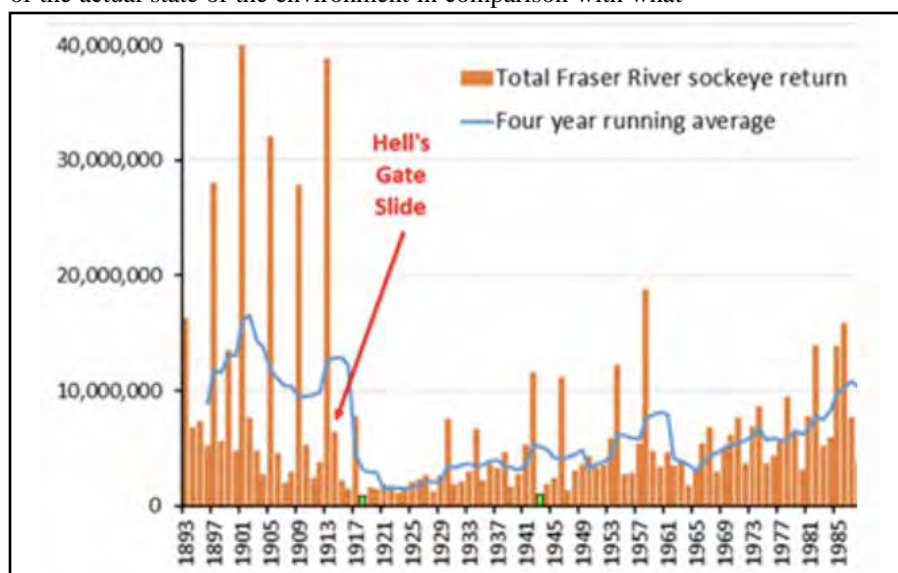


Figure 2 : Fraser River sockeye run sizes before and after the 1914 Hell's Gate rock slide.

Source: <https://www.psc.org/about-us/history-purpose/our-history/>

area logged in BC between 2005 and 2017 at 3,597,291 hectares, which included private land on Vancouver Island.²⁹ That should put in perspective the pre-election September 11 announcement of promises to save 353,000 hectares of old-growth forest.

Just as the urgency James Hansen's 1988 presentation to Senate was not really followed up with a necessary response, and climate change continues to develop unabated, the "mess" that Larkin observed has yet to be addressed, and has now spread to the whole province. The process begun in 1858 has continued unabated because we have refused to acknowledge it. The "transformational change" called for four years ago by the IPCC requires that we acknowledge the failure to act that now endangers future generations.

Since Dave Barrett expanded the park system in 1974, the population of BC has grown from 2.4 million to 5.6 million. The destructive process, that is, the industrialization of wilderness, has continued unabated as we have pretended to change and have continued business as usual. The unsustainability of that endeavour is there for anybody who cares to see.

BC's parks are at the forefront of the province's conservation strategy. They are, in fact, the last refuge. Yet, if they are prioritized as recreation areas, such as we have seen in the COVID summer of 2020, they are overwhelmed beyond carrying capacity as conservation areas. The values inherent in the conservation areas should be incorporated in indigenous-managed areas, since these are Canada's best managed areas where biodiversity has been found to be highest.³⁰ The parks are the last vestiges of spaces where a strategy of "no-net-biodiversity-loss" could be developed. To do that, their importance as conservation areas must be prioritized. Parks need to be expanded and adjacent areas currently logged or to be logged must be strategically incorporated as recreation areas to relieve pressure on relatively untouched conservation areas.

Priorities need to change from those of cosmetic conservation to further the interests of industrialization, to those of preservation, and their necessary incompatibility with industrialization acknowledged.

There is no sustainability without preservation, as John Muir noted 120 years ago.

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ALBERTA News

Submitted by Brian Free, CSEB Alberta Regional Director

Days are getting shorter and summer is sliding into fall. With the current limitations of the COVID pandemic, many Albertans vacationed close to home. This has led to a marked increase in visitation to our campgrounds and backcountry camping areas. Albertan's love their lakes and of course, there was lots of activity at our many lakes and reservoirs. As the summer progressed, Alberta Health Services began to issue blue-green algae advisories. This is not uncommon for Alberta's prairie and parkland lakes – these are not the cool, clear waters resting on the Canadian Shield (Note just a hint of jealousy....). From the end of June to the end of August, about 32 lakes were subject to these blue-green algae advisories.

An interesting bit of research on these algal blooms is underway. During the summer, a team from the Alberta Lake Management Society collected water samples from one of the affected lakes,

Pigeon Lake, southwest of Edmonton, for pigment analysis. Collections were taken at the precise moments the Copernicus Sentinel-2 and Sentinel-3 satellites were in orbit overhead. Together, these data will be used to build and calibrate a model to track near-real-time algal bloom pigments in Pigeon Lake, and possibly other lakes in Alberta. Others involved in this research include the Alberta Biodiversity Monitoring Institute, the University of Alberta, the Pigeon Lake community, and Alberta Environment and Parks.

On another note, changes in Alberta wildlife regulations have created a hunting season for sandhill cranes, starting on September 1 in southern and east-central Alberta. The Alberta sandhill crane hunt will be similar to hunts in Saskatchewan and Manitoba, with Alberta taking additional precautions by limiting sandhill crane hunting season to areas that are not known to overlap with the whooping crane migration or breeding range.

Changes to the mule deer hunt may also be coming. Many factors have changed since the current management plan was prepared in 1989. Some areas of Alberta are seeing a decline in mule deer populations and other areas have an overpopulation, causing issues with human-wildlife conflicts. And then there is Chronic Wasting Disease. The recently appointed Alberta Mule Deer Management Plan Advisory Committee includes a variety of stakeholders, including the Alberta Professional Outfitters Society, Alberta Fish and Game Association, Alberta Bowhunters Association, Alberta Beef Producers, and the Alberta Conservation Association. The committee will examine the sustainable use of the mule deer population. The spiritual and cultural importance of mule deer to Indigenous Peoples will also influence the committee's work.

Rabbit Colony at Edmonton Cemetery Threatened by Syphilis

A population of domesticated rabbits, that were originally released from a nearby farm, has developed a large colony on the grounds of the Holy Cross Cemetery on the north edge of Edmonton. After decades of outdoor living through harsh winters, predators, and struggle between landowners and rescue groups over what to do with them, the colony now could be subject to collapse under the threat of a deadly venereal disease.

It appears that disease may have been introduced six to eight months ago after some purebred rabbits were abandoned at the colony, and it spread as the rabbits bred. It is believed that most of the colony is now infected and could die without treatment.

Blane Klack, who runs All Sizes Animal Rescue, indicated that the youngest baby caught was six weeks old, and its eyes were crusted shut, born from a very sick mother. He feels that if the sick bunnies are not caught soon, they will die a slow, painful death. So the options are to rescue them, treat them hopefully to cure them, or humanely put them down.

Edmonton isn't the only city in Alberta with feral rabbits. Canmore, located in south-west Alberta, spent over \$400,000 on a feral rabbit management program in 2018, and Airdrie (just north of Calgary) hired a contractor to assess the town's feral rabbit issue the same year.

Source: Information adapted from Edmonton Journal article 8 September 2020.

SASKATCHEWAN News

Submitted by Curt Schroeder, CSEB President

Agricultural Practices in Saskatchewan Take a Step Toward Sustainability.

Autonomous drones are now flying over croplands, spraying biocides with far greater precision and efficiency than any previous spraying application. With consumers demanding more environmentally friendly foods, local farmers are turning to meet that demand while greatly reducing the amount of chemical waste in the process.

A Regina-based company ([Precision.ai](https://www.precision.ai) Inc.) had already developed an artificial intelligence technology for a project and found that it also was amazingly good at recognizing plants. Autonomous drones will survey a field and can discriminate between plant types and target spraying only weeds. In some cases, chemical usage drops by 95%. While providing savings for farmers with reduced costs and thereby benefiting consumers with lower food prices, there is substantially less cost to the environment in terms of residual biocides and tainted water runoff and other downstream effects. If this technology proves itself and becomes widespread, it will significantly reduce environmental impacts especially in a province that contains 49% of Canada's agricultural land.

Chronic Wasting Disease in Saskatchewan

The Saskatchewan government wants hunters to help slow the spread of chronic wasting disease (CWD). To do this, they are asking hunters to test their animals for CWD before consuming them. The call follows a bump in recorded case counts, from 328 positive cases out of 2,000 samples in 2018 to 528 positive cases out of 3,299 samples last year. That accounts for 55 of Saskatchewan's 83 wildlife management zones.

The bump in recorded cases was due to more samples being collected, and actual prevalence among animals is likely stable, although the prevalence has crept up since the year 2000.

CWD is a fatal nervous system disease. An animal can appear normal for years before warning signs like weight loss and poor coordination take effect, followed by death.

The cases of CWD tend to be concentrated among mule deer in the southern part of Saskatchewan. Last year, about seven per cent of white tail deer, three per cent of elk and one moose out of 120 tested positive. About 30 per cent of mule deer tested positive.

To slow the spread, the province has hired more technicians to test animals. It has also introduced dumpsters to dispose of animal carcasses, because leaving bodies out or moving them to another location could increase the risk of spread.

The province further aims to reduce animal populations in given areas to limit the spread, in addition to the focus on testing.

Source: Information adapted from Saskatoon StarPhoenix article 25 August 2020

MANITOBA News

Submitted by Robert Stedwill, CSEB Member

Provincial Park Land Use Changes

Two provincial parks in Manitoba have undergone a change in land use category: Duck Mountain Provincial Park and Turtle Mountain Provincial Park. This will protect and sustain a combined total of 6065 hectares of natural habitat and rare species, or those at risk.

These changes in land use were done in consultation with local residents, affected stakeholders, and indigenous communities.

Nine hundred fifty-one (951) hectares in Duck Mountain Provincial Park changed from a resource management to back-country land-use category. This change will address specific rare plant species that have been identified. Moose populations should be helped in Turtle Mountain Provincial Park, with over 5114 hectares changed from a recreational development, resource management and access, to a back-country land use category. This latter change was made possible when Tundra Oil and Gas voluntarily gave up and rehabilitated their lease sites.

The addition of these new protected areas to Manitoba's network of protected and conserved areas has increased the area the province has set aside for biodiversity conservation to 11.1 percent.

Zebra Mussel Update

It appears that another water body has now been infested with zebra mussels (*Dreissena polymorpha*). Sipiwesk Lake, downstream of Cross Lake on the Nelson River, was identified on July 10 as the most recent addition to the list of affected lakes.

The Nelson River was identified as having zebra mussels in August, 2019, six years after they were first discovered in the south basin of Lake Winnipeg. As the mussels were expected to move down the Nelson River naturally, the whole system was identified as a designated aquatic invasive species (AIS) control zone in 2015.

The province continues to try and halt the spread to other bodies of water outside of the Nelson River with water craft inspection and decontamination stations, which are free of charge to use, or come with a fine of \$672 for failing to do so.

Quagga mussels (*Dreissena rostriformis bugensis*) are currently not known to be in any Manitoba lakes. Quagga mussels are known to be able to take over zebra mussels, and can be far more destructive as they can colonize soft substrates as well, and can reproduce in much colder water than their polymorpha cohorts.

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

ONTARIO News

By Michael Finley, Associate at Gowling WLG, Toronto

Checking In On The State Of The Great Lakes



The Great Lakes are a wonderful, powerful, and critical natural heritage resource. Containing 20% of the world's total fresh water, the Great Lakes offer a supply of clean drinking water, facilitate ship-borne trade, offer a multitude of recreational opportunities, and are an important fishery. They also represent an essential part of indigenous peoples' heritage and customs. Speaking about the Great Lakes, former Ontario Regional Chief Isadore Day described the "infinite connection" indigenous peoples have to water through ceremony, harvesting, and trade.

This Spring, the Governments of Canada and the United States released their State of the [Great Lakes 2019 Highlight Report](#) summarizing the overall health of the Great Lakes. This report, which is released every 10 years, serves as an important "check-in", itself drawing upon many more specific reports. The 45 sub-indicator reports are included in the State of the Great Lakes 2019 Technical Report. However, this report does not yet appear to be available online.

The Good News

Water quality, overall, is generally good and not declining. Municipally treated drinking water met the relevant quality standards 99.8% of the time in Canada and 95% of the time in the U.S. between 2015 and 2017. Further, monitored beaches in Canada were safe for swimming 82% of the days tested and, in the U.S., for 93% of the days tested between 2015 and 2017. *E. coli* contamination is the primary reason swimming is declared unsafe. *E. coli* may be caused by precipitation overflow from wastewater treatment plants, runoff from land after rainfall, improper septic systems, and large flocks of birds.

Fish can be safely eaten (to an extent). PCB levels in fish fillets have decreased in some species in some lakes (Michigan and Ontario) while remaining stable in the others. Mercury levels have also generally declined in many species. Nevertheless, fish are still subject to consumption limits. For example, Walleye (a.k.a. pickerel) are commercially fished in Lake Erie and are currently in season. Because of contamination risk, Ontario advises the general population should not have more than 16 meals per month of Walleye fillets from fish between 30 and 35 cm long, caught in Lake Erie's central basin.

Aquatic Habitat Connectivity, while only rated as “fair” or “poor”, is improving. Aquatic habitat in the great lakes has been fragmented by dams, weirs, stream crossings and other human-built structures that limit water flow and hamper animal movement between the lakes and the rivers that drain into them. This improvement in connectivity is occurring across all of the lakes through habitat improvement work, dam removal, and crossing replacement.

Toxic chemical loads in wildlife are either unchanging or improving. There has been a notable decline in toxic chemicals like polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), and mercury in fish tissue and Herring Gull eggs since the 1970s. Unfortunately, the decline in such chemicals appears to have ceased and amounts have remained relatively stable, but still above target levels, for the past decade.

The Bad News

Invasive species present a serious environmental threat. Invasive plants and animals are disrupting biotic communities in the Great Lakes. For example, native fish remain subject to Sea Lamprey predation (though Lamprey populations have been cut through basin-wide control measures such as lampricide application). Invasive plant species like Phragmites, Purple Loosestrife and Garlic Mustard are now widely distributed and causing detrimental impacts. Phragmites, for example, colonizes wetlands and creates a mat of root material which drives out native plants and creates vast monocultures.

Plant and animal habitat is not generally improving. In general, the Report indicates that coastal wetland habitats and offshore aquatic food webs are in fair and unchanging condition. While the condition varies depending on the lake and wildlife community being assessed, a lack of overall improvement is a matter of concern. Improvement has been seen in the coastal wetlands of Lake Superior, and the northern shorelines of Lake Michigan and Lake Huron. Degrading conditions in the sedimentation and nutrient loads have led to declines in the conditions of coastal wetlands in Lakes Erie and Ontario. Aquatic food webs in the Great Lakes are all in either an unchanging or in a declining state due to increases in harmful bacteria and invasive mussel species. However, native Lake Sturgeon populations have improved throughout the Great Lakes thanks to habitat improvements, dam removals, and government regulation.

Nutrient loads are up again. Efforts in the 1980s and 1990's reduced the high levels of nutrients, particularly phosphorus, that enter the lakes due to agricultural operations, urban runoff, and point sources such as sewage treatments plants. Excess nutrient levels can cause harmful algal blooms, nuisance algae and hypoxic (low oxygen) areas, all of which can be detrimental to water quality and to aquatic life. The report indicates that this ground has been lost, noting a “resurgence” in nutrient-related adverse effects caused by changes in land use, invasive species, and climate. Conditions are worst in Lake Erie, because it is the shallowest and warmest lake and because its shores are densely populated. For, example, record-setting algal blooms were recorded in 2011 and 2015. Total phosphorous load in 2011 was over 10,000 tons for the lake as a whole, almost as much as was recorded in 1974. Lake Erie is now subject to a [Binational Phosphorous Reduction Strategy](#).

Most ecological indicators are rated as “fair” or “poor”. While the Report notes that drinking water and beaches are generally in “good” condition, six of the other indicators (Fish consumption, Toxics, Habitat and Species, Nutrients and Algae, Groundwater and Watershed Impacts) are rated as “fair” and “unchanging”. Invasive species was rated as “Poor” with the situation “deteriorating”.

The Unknown

A significant “question mark” in this report is the impact of climate change on the Great Lakes. The Report notes that the long-term data show basin-wide increases in precipitation, surface temperature increases (in Lakes Huron, Superior, and Michigan) and an overall reduction in ice cover in all lakes. However, the report acknowledges the difficulty of establishing whether these changes are part of natural year-to-year variability or represent a long-term trend. Nevertheless, the report makes clear that these changes can impact fish spawning, coastal wetlands, water quality, and species migration. Indicators, such as rainfall, water levels, ice cover, and water temperature, will continue to be monitored.

Bottom Line

There has been improvement in the Great Lakes since the 1970s because of deliberate, regulation-based, pollution control underpinned by careful environmental monitoring and improvement work. All of this effort is supported by international co-operation between national, state, and provincial governments. The Binational Phosphorous Reduction Strategy mentioned above is an excellent example of such cooperation.

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CSEB Regional Directors Needed

CSEB has Regional Director vacancies as follows:

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

If you are interested in taking on one of these positions, please contact Curt Schroeder at President@cseb-scbe.org.

It is not an onerous task, and will greatly help strengthen the organization. Your help would be greatly appreciated.

ATLANTIC News

By Peter Wells, CSEB Atlantic Member

Atlantic Canada - Nova Scotia Update

This is a brief update on environmental issues of concern in Nova Scotia, plus some positive events of interest to CSEB members and other readers of the Bulletin.

In the local news continually are the usual environmental issues, ongoing and seemingly unresolvable. They include the following:

1. Clear-cutting of our forests continue on crown land, and the promotion of mono-culture forests, despite the impacts on wildlife, soil health, water retention, etc. (Guderley 2020; Bancroft 2020). The sad truth is that the provincial government's Department of Lands and Forestry (not forests!) is blatantly ignoring the extensive Lahey report of two years ago (Lahey 2018), a report that recommended ecological forestry be practised in the province. The province is being clear cut from one end to the other, using industrial cutting techniques—a national disgrace! The effects on wildlife, especially migratory birds, must be enormous but goes largely unmonitored. And we, as environmental biologists, worry about the plight of song birds in North America, without more strongly demanding meaningful action!
2. Damming of rivers by causeways and effects on fish migration are back in the news. This is due to concerns about the impacts of twinning Highway 101 at Windsor, across a mudflat with a healthy saltmarsh and the Avon River, and requiring new fishways for the migratory fish in the Avon estuary (Beswick 2020). Local First Nation groups are very concerned and are leading the discussion to ensure that fish movement is being adequately considered during construction of the highway and the required fishways.
3. Open-pen salmon aquaculture and its impacts are a never ending discussion and concern, with opposition quite often being led by local lobster fishermen and their associations. The industry is fighting back with articles, claiming all is well in coastal waters, that the many concerned non-government organizations are spreading misinformation, and that “Nova Scotia marine fish farming is one of the most sustainable ways to grow protein in the world” (Smith 2020).
4. There is continued opposition by First Nations groups to the construction of caverns for the storage of natural gas by Alton Gas, and the discharge of salty brines into the Shubenacadie River and its estuary.
5. The North Atlantic Right whale “is now one step away from extinction” and still impacted by fishing gear and ship strikes. “Lawmakers have been trying to keep up, with the Canadian Department of Fisheries and Oceans introducing protection measures like fisheries closures, reducing vessel speed in certain areas, and removing abandoned “ghost” gear from the water, but it hasn't been enough to change the trajectory of the species” (Gunn 2020). The whale, when in Canadian waters, has apparently largely moved from its traditional summer feeding grounds in the upper Gulf of Maine and lower Bay of Fundy, to the southern Gulf of St. Lawrence, a much busier place for shipping.

These concerns notwithstanding, there are several positive developments:

1. Following from the concern about lost fishing gear and its impacts on marine animals such as whales and turtles, there is a new major project funded by Fisheries and Oceans, the mission being “to hunt down and exterminate (their words!) lost fishing gear in Canadian waters” (Dean-Simmons 2020). Funding supports various organizations and businesses to “go fishing for lost ropes, nets, and shellfish (the author meant crustacean) traps, and recycle or dispose of the items they find”. This project covers all of Atlantic Canada.
2. The Cliffs of Fundy UNESCO Global Geopark was formerly opened early in August (Campbell 2020a). Its focus is on highlighting the significant geology and paleontology of the upper Minas Basin in the Bay of Fundy, to enhance science (especially geology and paleontology), tourism, and ocean education and literacy in that region of Nova Scotia. This is the third UNESCO special designation for the Bay of Fundy in the past twenty years.
3. Closer to Halifax, the Halifax Regional Municipality has donated \$750,000 towards preserving 232 hectares of wilderness lands as part of the growing Blue Mountain-Birch Cove Lake Wilderness reserve system, in association with the NS Nature Trust (Campbell 2020b). Many groups in the metro area have been active for decades in getting nearby wilderness and wild areas preserved as parkland for the benefit of the growing urban population.
4. As well, perhaps as a reflection of the much cleaner harbour in Halifax, sightings of whales, porpoise and seals are now common in the summer months in harbour and nearby waters (a Minke whale and a porpoise swam along the waterfront as I lunched there the other day!). Controlling land-based pollution, especially municipal waste, benefits both local wildlife and human health, a message that should be made continuously, loud and clear, from coast to coast to coast. Victoria, take note!
5. It is also the 25th anniversary of the start-up of an initiative on Fundy environmental issues, that became the Bay of Fundy Ecosystem Partnership (BoFEP, see www.bofep.org). Running a website, newsletter, working groups, and biennial workshops, among other activities, BoFEP has brought attention to the issues, information and solutions for the marine ecosystems of Fundy.

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A Nature Book Worth Noting

I highly recommend a nature book for your young children or grandchildren – “*The Lost Words*”, by the writer Robert Macfarlane and the artist, Jackie Morris, published in 2017. It is a beautifully illustrated book “connecting everyday nature words, from acorn to wren, to a celebration of nature and wildness” (Penguin Books website 2020). The book has won several awards and is considered a cultural phenomenon in the UK. The illustrations are wonderful and superbly coloured. You may enjoy the other books by Robert Macfarlane too; his expressive writing about nature and wildness is thoughtful and inspirational. I trekked in Nepal a few years ago with one of his books, *The Old Ways*, in my pack, and it quickly became a memorable part of the whole venture. Check them both out for a welcome relief from the stresses of this era of COVID 19.

The Alpine Club of Canada State of the Mountains Report



First published in 2011, the State of the Mountains Report is now established as an important annual contribution to the Alpine Club of Canada's commitment to provide accessible, current, and accurate information about the forces that affect Canadian mountain places, ecosystems, and communities.

The Report is developed in collaboration with mountain researchers, community members, and partner organizations and its contributors have, in one way or another, dedicated their lives to mountains. Through the Report, they offer first-hand experiences, expertise and photographs to tell the stories of how change in Canadian mountain environments is affecting people and ecosystems.

The 2020 edition includes the following essays and topics:

- “The Canadian Mountain Network (CMN): Training Youth as Stewards for an Uncertain Future” by CMN Co-Research Director, Norma Kassi.

- “Moving Mountains,” this year’s feature essay highlighting the impacts of a changing climate interacting with the risks and hazards associated with landslides, volcanic activity, and melting glaciers.
- People and mountains: youth activism, mountain guides and avalanches.
- Physical mountains: underwater and underground geology.
- Life in the mountains: arctic change, the effects of mining and monitoring mountain biodiversity.

The full 2020 Report, as well as the previous volumes, are freely available online at www.stateofthemountains.ca.

TERRITORIES News

Submitted by Anne Wilson CSEB Territories Director

The global pandemic has taken some of the focus away from the effects of climate change in the North, but effects are still ramping up. In early summer, temperature records were smashed in Nunavut, and the fall forecast is predicting 80-100% probability of above normal temperatures for September to November. Some work is still going on at a program level to combat climate change in the North, which has high per-capita carbon emissions because of the reliance on heating oil. On August 20th, 2020, Environment and Climate Change Canada provided a news release acknowledging the escalating effects of climate change on the North, and announcing investment in energy management improvements to effect significant reductions in carbon emissions. The focus of this will be improving energy efficiency in buildings. See <https://www.newswire.ca/news-releases/government-of-canada-partners-with-nunavut-for-renewable-and-energy-efficiency-projects-884577430.html>.

In the NWT, 2020 has been an unusually quiet fire season; as of early September, the total fires were 69 affecting 21136 hectares, and all are out. Compared to the record season in 2014, where 385 fires burned 3.4 million hectares, this year’s fire season has thankfully been a non-event! A recent study looked at what is being called the “fire paradox”. In May, NRCAN published research in the journal *Nature Communications* that reviewed susceptibility to fires related to the presence of older forests, which surround the communities because of fire suppression. The researchers noted that as climate change warms up the North, fires are expected to increase, and that in some parts of the NWT, the fire season is now two weeks longer than it was 50 or 60 years ago. <https://www.cbc.ca/news/canada/north/the-fire-paradox-study-suggests-ways-we-fight-northern-wildfires-could-be-increasing-fire-risk-1.5707176>.

Development activity in the North is still underway, albeit with additional protocols and limitations on people entering the territories. Boards and agencies have worked hard to make virtual platforms available for technical meeting and hearings, as there is no expectation of “business as usual” resuming soon. Participants from outside of the territories can’t attend in person due to border restrictions, so environmental assessments and

regulatory activity continue in Nunavut and the NWT, with virtual meetings or written processes where possible.

Some of the current reviews include the following:

- The Environmental Assessment process for Baffinland Iron Mine’s proposed Phase 2 expansion has proceeded to technical meetings that were held Sept. 14 - 18; public hearings will be scheduled at a later time. The Phase 2 Water Licence amendment process is on hold.
- Agnico Eagle’s Meliadine Gold Mine is dealing with higher volumes of saline water than predicted, and has applied to increase the discharge limits for total dissolved solids into a freshwater lake, as well as to construct a water line for marine discharge of saline effluent. The line is undergoing environmental assessment, with concerns around wildlife dominating.
- In the diamond mining sector, De Beers’ Gahcho Kué mine application for an expansion for extraction of additional resource has gone through technical meetings, and will be going to public hearings at the end of September.
- The Diavik Diamond mine is proceeding with the Water Licence amendment to dispose of processed kimberlite into mined-out pits and mine workings. These will ultimately be

connected at closure to Lac de Gras, a pristine and highly valued large lake, so this is receiving considerable scrutiny.

- The Giant Mine water licence has been issued, and remediation is underway with extensive involvement of rights holders and stakeholders.
- Municipal wastewater management continues to be a challenge in the North, and work continues on the development of effluent quality standards, similar to the Wastewater System Effluent Regulations that apply south of 60. Consultation has been carried out in the NWT and Nunavut, and the Northern version of the regulations may be released in 2021 for public comment.

Closing

If you are connected to activities in the Yukon, Northwest Territories, or Nunavut, doing work north of 60° that you would like to highlight in the Bulletin, or running some seminars or other training opportunities, please let us know. The CSEB provides a valuable networking and communication forum, and a voice for biologists if there are any issues to be raised. There is also the option of instigating other CSEB activities – both of the fun and/or of the educational variety – with colleagues in the North. Please email your thoughts to Anne Wilson at anne.wilson2@canada.ca or Sharleen Hamm at sharleen@sharleenhamm.com.

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BOOK Review

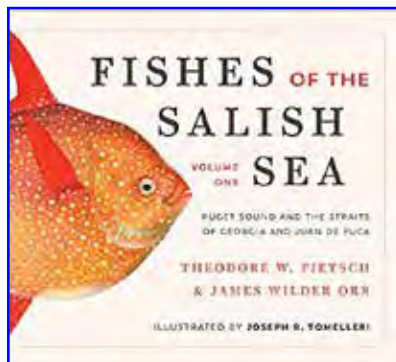
Submitted by Sean Mitchell, CSEB BC Director

Fishes of the Salish Sea. Puget Sound and the Straits of Georgia and Juan de Fuca

By Pietsch, T.W., J.W. Orr, and J.R. Tomelleri, 2019

Three Volumes. Heritage House Publishing Company Ltd (Canada) and University of Washington Press (US). 1048 p.

Available from [Amazon.ca](https://www.amazon.ca) \$154.12 CDN



The Salish Sea, an 18,000 km² area of the Pacific coastline around southern Vancouver Island and northwestern Washington State, was formally recognized in 2010 by both Canadian and US governments. It is comprised of the three interconnected oceanographic features—Strait of Georgia, Juan de

Fuca Strait, and Puget Sound—and recognized for its protected waters and unusual hydrological environment. It is not a naturally demarcated area but rather open at the western end, blending into the open Pacific, and the northern end where it joins the island-choked passages of Johnstone Strait. This environment has received a great deal of attention due to its inherent beauty and productivity, while lying in disjunction with the two metropolises of Seattle and Vancouver as well as numerous other smaller cities; there has long been concern of impacts of these high density urban settings with the natural and highly productive ocean. Its value to the people of the area and the impetus to protect and appreciate what we have may be indicated by the publication of a multi-volume scientific treatise on the marine fish of the area within a decade of its official recognition.

Fishes of the Salish Sea is a recent publication and addition to regional marine fish books. The collection is comprised of a boxed set of three volumes, with Volume 1 (214 pages) providing an introduction to the Salish Sea and historical ichthyological work of the area. Volumes 2 and 3 form the bulk of the work and are species accounts for 260 species in 80 families. The publication is an impressive amount of work and research, providing up to date information and references on those species inhabiting the waters shared by British Columbia and Washington State.

The outstanding feature of the books, however, is less the science presented but instead the beautiful, accurate, and detailed artwork of each species. The artist, Joseph Tomelleri, is well known for his ichthyological illustrations and this is an impressive collection for the reader; it represents a tremendous amount of labour by the artist. These books will be equally at home on a coffee table as on an academic bookshelf.

The greatest values to the practicing fish biologist are the two volumes of species accounts. The authors have structured these accounts very similar to classic works of fish of the Pacific coast, such as Clemens and Wilby (1961) and Hart (1973) but provide current information to augment these dated texts. They provide, further, three additional categories in each account, which I found valuable and interesting. The first of these is a section they call “Recognition” in which they highlight the distinguishing characteristics of the species. A full standard description follows, but this short section of Recognition helps the user to look for the correct features to assist in identification. The second section is “Etymology” in which they go into greater depth than past books on the derivations of the names. Essential? No. Interesting and valuable to those of us curious about such things? Yes. The final new section within each account is “Key References,” where the authors highlight current references for that species and include the subject of that reference. This is very valuable to guide the interested reader to further reading and a useful addition for the research biologist. At the end of each of these volumes are 75-80 full page plates of the fish previously described. These plates are simply, in full page format, the illustrations that accompany in smaller form the account, but it is a great addition as it allows the reader to see greater detail in the larger drawing.

While Volumes 2 and 3 are likely to be heavily used as reference material by those of us working on the Pacific Coast, Volume 1 suffered, I felt, from a bit of a uncertainty of what it was trying to be. Parts of it feel like a field guide (silhouettes of fish families) and other parts like a homage to previous fish researchers. Treatments of some subjects—the history of research in the Salish Sea—is very uneven with a great emphasis on American work and near-oversight of Canadian contributions. For example, five pages are dedicated to the University of Washington, yet 100 years of Canada’s Pacific Biological Station is covered in less than three pages (the Royal BC Museum gets a paragraph). The section on “Describers of Salish Sea Fishes” is unfocused and includes all scientists with any attachment to the naming of species ultimately found here. So we get biographies on Pallas, Linnaeus, Richardson, and Pennant—important figures in ichthyological research but not relevant to the Salish Sea; they were never near it. In addition, details and concepts are repeated a great deal (in one case the birth and death dates of Charles Henry Gilbert are provided five times). The authors appear to struggle with determining what is relevant and necessary information and frequently include unnecessary detail that detracts from the reading. The level of detail of the information would fit well in a history of ichthyological research on the Pacific Coast, and aimed at a historical minded audience, but I do not believe it serves the purpose of the book well.

These three volumes represent a tremendous amount of work to generate books of such a regional interest and the authors are to be congratulated on that. The species accounts and references therein will apply outside of the boundaries of the Salish Sea—I anticipate using these volumes in work I do on the north coast of BC but ultimately I think these will remain a small readership. These books will, however, also appeal to the artist, particularly the aficionado of natural history art.

References

Clemens, W.A., and G.V. Wilby. 1961. Fishes of the Pacific Coast of Canada. Fisheries Research Board of Canada. Bulletin 68 (second edition). 443 p.
 Hart, J.L. 1973. Pacific fishes of Canada. Fisheries Research Board of Canada. Bulletin 180. 740 p.

OPINION

Submitted by Bob Gainer, CSEB Alberta Member

Art Review: Hanky Panky by Kent Monkman

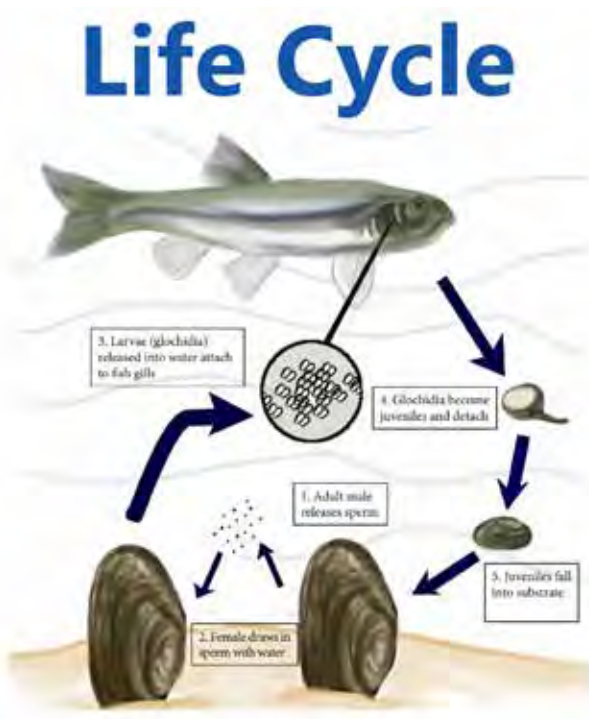
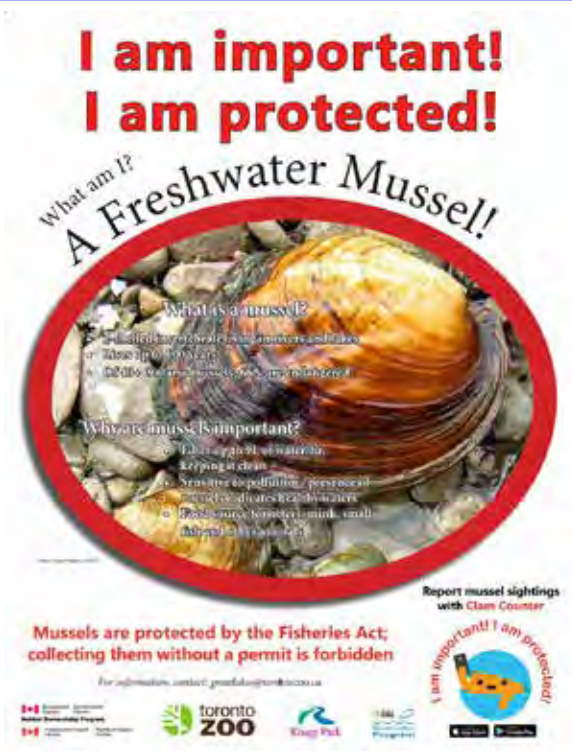
My Grade 12 English teacher, Ms, Molloy bless her soul, told me never to write. My Dean of Agriculture, Fred Bentley, who taught the Ag 101 course on public speaking and writing, told me never to stand up for what I believe in and express my own thoughts. If I had an Arts teacher I'm sure she would have said the same about me and art. I know absolutely nothing about art. Why do people find some of it worth so much money and others not? Why do I like some and not others? I'll try and explain.

I worked for almost four years in East Africa in the early 1970s as a CUSO/CIDA veterinarian, agrologist, biologist, and teacher. East Africa had recently been several British colonies, when the British Empire, the greatest of all times, from "sea to shining sea," used its colonies to supply its relatively tiny Island base with raw materials. In return, Britain supplied the colony with employment, British manufactured goods (of suspect quality and inflated prices), and their administration, their "handmaidens", the "Colonial Service". Every "colonial type" (white, male, British with little education, questionable character, and worth) was provided with a position of power over the lesser blessed - Africans, Asians, non British expatriates like myself (munts), etc., which allowed him to take himself very seriously indeed (and elevate his position in British society considerably).

It seemed every last one of these colonials had a framed print of Canada's Robert Bateman's painting of an enormous old, grey elephant beside an enormous old, grey baobab tree. It was a symbol to him of the African outdoors. Every evening he would park his often-substantial butt down in front of this painting and drink his medicine, his sun downer, a mix of quinine tonic (for malaria) and Er Gin (tax free). Usually he was feeling some of what he felt were the symptoms of malaria so would require several doses. Rarely would he ever leave his office into the uncomfortable "field", but that painting meant he didn't have to. Bateman did quite well from that painting, Britain did exceedingly well by its colonies, and the colonials did the best, retiring with a pension, a status far exceeding their expectations before the Service, and their children educated in the finest British schools. The colonial system was like a swampland, it benefited those inside the swamp but not those outside it.

Canada's most celebrated painter today is Kent Monkman. His paintings command the highest prices, six figures, and his latest "Hanky Panky" has just been bought by Howard Levitt, a lawyer who specialized in defending artists that upset conventional Canadian wisdom: "against mobs of cancel-culture warriors, pious nobodies trying to take them down". He and Farley must have had a professional relationship. The New York Times commented (happily after Mr. Levitt's purchase): "If Mr. Monkman had previously been on the margins of the country's culture wars, his latest painting has tugged him into its center."

Monkman's style is to use provocative, violent, and sexually explicit scenes as shock value to depict colonial and aboriginal relations. In this particular case, it must express Monkman's



thoughts on the federal governments recent resolution of the Missing and Murdered Aboriginal Women and Girls Commission to which our Prime Minister apologized to them and admitted that Canadians were guilty of genocide. I don't think Monkman thought well of the results of this Commission, as his depiction is of about 50 aboriginal women delighting in the pending rape of our Prime Minister by Monkman's alter ego "Miss Chief Eagle Testicle" (with what appears to be a strapped on appendage but without the original painting or a good print it is hard to say). Supposedly the present Prime Minister has a consensual look on his face but the collection of former Prime Ministers standing nearby all look appalled; we don't see the look on the RCMP officer's face nearby as he is prone, face-down with his pants down after being raped, but he looks devastated.

Senator Murray Sinclair noted "Kent Monkman has produced another monumental testament to the treatment of Indigenous women and the public's lack of caring." It is possible he indicated that every Prime Minister since Confederation was waiting their turn to be raped as the "trickery and deceit" was continuous, regardless of the Party or Person. They have all set aside budgets to deal with the Indigenous problems and proceeded to spend it on themselves and their handmaidens (swamp dwellers) and as little as possible on the natives.

My last CSEB book review, on "The Arctic Prairies", mentioned the original Treaty 8 and the Federal Government's lack of respect for native rights as compared to the renegotiated Treaties about 20 years ago. This new deal is much more satisfactory as regards Natives' rights in the Park: they are paid compensation for expropriated lands and all the impacted communities benefit preferentially from work and investments in the Oilsands. They are now doing quite well economically, sociologically, educationally, and have an improved standard of living in general compared to the previous negligence that the Federal Government allowed itself to get away with.

Mr. Monkman is Cree from Ontario, the same "Woods" Cree that had migrated to the Wood Buffalo Park area with the Fur Trade several generations ago and are the dominant people in the northern prairie provinces today. The original "Plains" Cree territory at the time of the fur trade was farther south approximated by the North Saskatchewan River drainage.

Treaty 8 was signed in northern Alberta about 1900, and in 1905, Alberta and Saskatchewan were divided into separate Provinces. They were by far the poorest provinces in Confederation and their creation was primarily to prevent the Americans from laying claim to southern Alberta and Saskatchewan on the basis of occupancy. The land that the Federal Government took (negotiated) from the natives, they then sold to settlers. The land was advertised far and wide in Europe (especially Russia and the Ukraine) as having excellent potential that it did not. Several surveyors, starting with Palliser in 1860, said the land was too dry and not fit for agriculture. The dirty thirties and the dust bowl resulted. The Federal Government made money from the sale of the land, what was produced was shipped by rail to the East, and in return the East shipped by rail the farmers' machinery and the rest of their needs - the colonial system.

In 1930, they got around to allowing these two provinces their mineral rights that they should have been given in the beginning,

but by now, even the Americans weren't interested in the Canadian prairies anymore. Pierre Berton, in his book "The Great Depression", calls this Canada's greatest shame of all times. North America suffered more than any other place in the world during this time, mostly because the Smoot-Hawley trade bill passed by the American Congress cut off trade between Canada and the United States. As bad as it was for the United States, it was even worse for Canada. In the whole world, the country that suffered the most during the Depression was Canada.

In the Prairie Provinces, they estimated there were 1.5 million homeless unmarried men without work. They lived wherever they could find shelter from the elements: soup kitchens, local charities, and a type of local currency called "relief scrip" for doing odd jobs for just basic food to keep alive. No Federal support! On top of this, the conventional wisdom of World Governments at that time was for Governments not to borrow money because it would devalue a country's currency. Mackenzie-King was a good economist, and it was made easier "to not spend one red five cent piece in an area that did not help him get elected!" Berton thought this was Canada's most shameful moment in its history.

And then along came World War II. Conscription was automatic on the prairies, optional elsewhere, and voluntary in Quebec; "Conscription was necessary, but not necessarily conscription". Government borrowing went through the roof, and everybody was happily employed working for the war effort (and Britain; Canada recently being a colony/Dominion). The prairie boys went to Dieppe, Italy, Normandy, etc., hopefully to never return. Farley Mowat wrote several books on this theme as well. Funny though when Mackenzie-King would inspect his troops, there was always a low booing sound came from within the ranks. The Brits wondered why. King judiciously stopped inspecting his troops. My parents were both in the military, and four of their six siblings (one at University and one too young for service but worked as a cook's helper on the construction of the ALCAN Highway). One returned with shell shock (PTSD), so went on to become a professor of economics (yikes, economics was one of my best courses).

After the war, Alberta was still the poorest and Saskatchewan the second poorest province until the 1960s. Oil and other natural resources with mineral rights helped the Provincial Government's coffers. The prairies started to feel proud about being prairie. People moved there from all over the Country and the world. Then in 1980, Pierre Trudeau based his defeat of Joe Clark on the slogan "Make Alberta Pay", and later that year he helped win the Quebec election from the "Separatistes" by promising to take Alberta's money and give it to Quebec. In 1981, his NEP program didn't actually take away Alberta's mineral rights, it just added a "wellhead tax". This forced Alberta to reduce its mineral rights in order for there to be enough left for the oil and gas companies to operate. Afterwards, Marc Lalonde admitted that the NEP was mostly to put Alberta in its place, it was getting too big for its britches (the basis for this paragraph is Link Byfield's "Canada in the 21st Century").

It took 10 years for Alberta to recover from the NEP but people had kept coming to Alberta looking for opportunities and work. It had a good investment climate and was open to anyone that wanted to work. The Province had its ups and downs, but grew steadily until 2014 when the price of oil tanked, and then Justin

Trudeau complicated it further, still taking \$25 billion a year in transfer payments though. This is from a Province that for over six years has been economically in trouble, unemployment (not officially from Federal statistics) is staggering, and homeless men are everywhere. After six years, a recession is called a depression; this is what Alberta is going through again, and again the Federal Government seems to want to punish us for electioneering purposes.

Over \$600 billion in transfer payments during the past 50 years, our wartime effort, settling the West to maintain sovereignty, etc.; we cannot prove that we are good enough to be Canadian? Thomas King (Massey Lecture 2003; "You're Not the Indian I had In Mind") says being an Indian is like being a duck. When you are being shot at, the ducks must wonder "What did I do to make them hate me so much?" Being on the prairies, we are starting to think like ducks too. If we're not good enough Canadians why not just kick us out?

"I never made it as a wise man" is the opening line to Nickleback's song, "How you remind me". That line describes me as well. The accident of this group's birth was Hanna, AB, near where I live. The accident of my mother's birth was nearby as well. As a young girl, her family got a boxcar from CN rail and a kick in the pants out of there from the Canadian governments to eventually end up in Edmonton, where my father's (and eventually mine) accidents of our births occurred (her words, not mine). She died bitter about how she was treated during the '30s, and the war (she was a nurse). I had to go to Siberia to realize that the Canadian prairies are the Siberia of this continent.

The second of my three trips to Northern Siberia and their reindeer and livestock herders (two trips to Salekhard and one to Yakutsk areas) was an invitation in November 2016 to a conference on anthrax in reindeer and reindeer herders (after my first trip there, I had written an article "Yamal and Anthrax" for the Canadian Veterinary Journal 57:985-987). The Governor of the Yamalo-nenets Okrug (like our Premier of a Province) took an active part because the welfare of these people were his responsibility. The people most impacted were the Nenets, a native tribe that lived out on the tundra. Partly because it was his job description, partly because it was receiving negative press in British papers, partly because a lot of natural gas left the region for Europe, and the country did not want that flow of revenue interrupted, the Governor took his job very seriously. His level would be like our provincial Premier. At the municipal level, all the Indigenous groups in the area had council chambers, a large, modern well built place (in Salekhard, the capital city of the Okrug) for native issues to be discussed and represented. This seemed to be working very well, as all parties seemed to negotiate in good faith. It did not have the baggage of a far off Federal, colonial style overload with all its regional divisiveness that comes from hidden agendas, electioneering, feeding its swamp, etc.

Maybe this is what Canada needs to try? Instead of a Federal government that is state of the art when it comes to collecting taxes, state of the art when it comes to looking after its swampland needs, but of no accountability to the interests at the local level. Instead of Indian Affairs doing the negotiating, let the Provincial and Municipal levels do it? They sure can't make a worse mess than what the Federal level has done this past 150 years.

South of the border, 250 years ago, the Americans said no to the British colonial system and specifically created one based on it not being colonial style. No taxation without representation. The first two Amendments are meant to specifically protect the people from the government. An electoral college, a Senate, and a President, all checks and balances as added measures to protect a region or a race or a people or a person from the Government. It may not be perfect, but at least they didn't stick with the political system they had been handed.

Monkman's "Hanky Panky" is his way of saying no to negotiating British style. The Bands around Wood Buffalo and environs negotiated but not British style. Since Riel, the prairie Provinces have tried to negotiate British style, but it was never good for the natives so why would it be for the prairies. Like I said, I am no art critic and not a wise man, but I hope Monkman keeps up the good work.

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

The recipients since 2008 have been as follows:

Year of Award	Name of Student
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2010	Zhang, Daiwei
2011	Jacklin, Meghan Lynn
2012	Cherlet, Erin Alexandra
2013	O'Neill, Megan Nicole
2014	Wheatley, Melissa
2015	Suhertan, Ellis
2016	Huang, Rebecca
2017 (2)	Moir, Anthony and Thomasson, Charlotte
2018 (2)	Griffith, Conor and Qwtrim, Kevin
2019 (2)	Rehlau, Abigail and Hermary, Jessica

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