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THE CANADIAN SOCIETY OF ENVIRONMENTAL BIOLOGISTS Newsletter / Bulletin

In this Issue:

CSEB Newsletter Bulletin SCBE

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In this issue

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Front Cover: Grade 6 student at Chief T'Selehye School (Fort Good Hope, NT) demonstrating awesome skills in environmental biology, collecting a water sample as part of a school field trip to raise awareness about local wetlands. Photo Credit: Kirsty Gurney, Environment and Climate Change Canada.

Back Cover: Top: Measuring the wing cord of a juvenile semipalmated plover (*Charadrius semipalmatus*), trapped this summer on Miscou Island, NB as part of a study of habitat use by fall-migrating shorebirds. Bottom: Female surf scoter (*Melanitta perspicillata*) cruising a pond in the Ramparts wetland complex, NWT. Photo credits: Kirsty Gurney, Environment and Climate Change Canada.

CSEB NEWSLETTER 2017

Vol. 74, Number 3 Fall 2017

The Canadian Society of Environmental Biologists Newsletter is a quarterly publication. The Newsletter 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 newsletter 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 2017

Vol. 74, Numéro 3 Automne 2017

Le Bulletin de la SCBE est une publication trimestriel de la Société Canadienne des Biologistes de l'Environnement. Le Bulletin informe les membres des activité de la Société sur événements courant ainsi que les progrès qui font en sciences de l'environnement. Par un échange d'idées au niveau national, cette publication intéresse un groupe très diverssifié d'environnementalistes Canadien. Les membres sont invités a contribuer des articles, photos (noir et blanc) ou des messages qui sont d'intérêt nationale en sciences biologiques et environnementales. Les lettres à l'editeur sont bienvenues.

Tout la correspondence d'affaires, y compris les abonnements, les changements d'adresse, les exemplaires retournés et les formulaires: CSEB National Office, P.O.Box 962, Station F, Toronto, ON, M4Y 2N9. **Les lettres à l'editeur: Gary Ash, Editor, courriel:** garyash@shaw.ca

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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 so as 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 Anne Wilson, CSEB President

Summer has flown by, with CSEB activity slowing down while folks took part in summer activities. These ranged from holidays and travel, to extended field work – my office has been a ghost town for most of the season!

I recently had the pleasure of meeting Peter Wells, a long-time CSEB member and supporter. Gary Ash, Peter, and I met informally over lunch, and talked about how we could revitalize the CSEB. Areas and ideas that we discussed included the following:

From left to right - Gary Ash, Anne Wilson, and Peter Wells meeting over lunch in St. Albert, AB

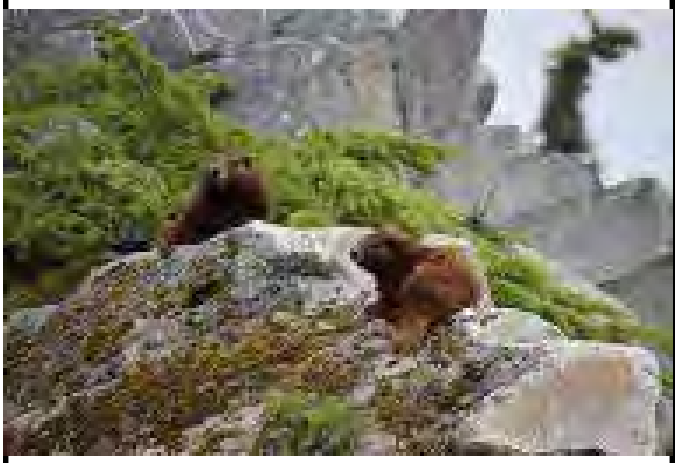
- Optimizing use of the CSEB website – members' opinions are needed on content and presentation. The website is the face of the organization and the first place people go for information and potential membership.
- Updating the name of the CSEB Newsletter – by renaming it as a Bulletin, it could be considered more like a regular journal and might attract more submissions and readership with a name change. Also, a request should go to all members for articles when there is a call for them. We could solicit articles directly from members, on specific topics and current issues.
- Membership has been declining for years. Why? We need to get current members more engaged and help attract members, including a focus on graduate schools across the country (biology and environment departments and institutes).
- Although there are challenges with organizing a conference with small number of members spread across a large area, conferences have boosted membership in the past, forged relationships, and facilitated networking. The most practical approach could be doing it as a full session associated with another conference, e.g., Canadian Ecotoxicity Workshop (CEW), Bay of Fundy Ecosystem Partnership (BoFEP), to save costs and improve attendance. Do you know of any upcoming opportunities?
- The webinars have been successful so far, but need more attendees and more topics. Please consider sharing your science and reaching out to others working on topics of interest!

Please contact me with your thoughts and ideas – an organization relies on its membership to find momentum and relevance. The CSEB provides a vehicle to raise issues on a national level, and we can take better advantage of that. Let me know if there are issues on your mind that the CSEB can provide a voice to take forward. Also, if you would like to help address issues, let me know. We all should be more active in addressing important environmental issues.

As we move into fall, we will be resuming regular teleconferences and webinars. I hope you have had an enjoyable and rejuvenating summer, and look forward to reconnecting with fellow biologists!

Upcoming CSEB Research Webinar

Groundhog Days: Vancouver Island Marmot Decline and Recovery



Join us for a webinar on Oct 03, 2017 at 10:00 AM PDT.

Register now!

https://attendee.gotowebinar.com/register/2706130495047250177

Learn about the natural history of the Vancouver Island marmot (*Marmota vancouverensis*) and efforts to recover this critically endangered species from the brink of extinction. Once, the marmot numbered fewer than 30 individuals in the wild. Today, the population has recovered to over 150 animals, but challenges remain before this Canadian endemic has secured its place in the wild.

After registering, you will receive a confirmation email containing information about joining the webinar.

REGIONAL News

BRITISH COLUMBIA News

By Loys Maingon, CSEB BC Director

A Possible Change in Direction

In BC the summer 2017 has been marked by political and climatic turnovers. The May provincial election has heralded a razor-thin Green/NDP government, which replaces 16 years of BC Liberal rule, setting new directions in government environmental policies. Climatically, 2017 is already shaping up to be yet another record year, with a prolonged drought creating conditions in which forest fires grow every day, river flows are either too warm or reach new low levels, and sockeye returns reach new lows.[1] With 60 days still left in BC's fire season, 2017 is already shaping up to be the worst fire season on record, surpassing the landmark 1958, which resulted in a watershed moment in forestry management in BC.

2017 may also herald some new landmark changes, in keeping with the needs of the province to adapt to what seems to be an irreversible deteriorating climate change situation. The new minister of environment, George Heyman, was head of the BC Government and Service Employees Union from 1998 to 2008, as well as a director of BC's Sierra Club, and is best known for his ability to bring labour and environmental interests together. Heyman has already laid out, at the directive of the John Horgan government, the key objectives of his administration, in an August 18, 2017 letter circulated to all professional and environmental organizations. The core objectives of the new government are worth quoting as they have bearing on both the management of the province's natural resources and of professional standards:

- Renew BC's Climate Leadership Team within the first 100 days of my mandate;
- Implement a comprehensive climate action strategy, including setting a new legislated 2030 reduction target and establishing separate sectoral reduction targets and plans, while providing a pathway for BC to prosper economically;
- Work with BC's Minister of Finance to implement an increase of BC's carbon tax by $5 per tonne per year, beginning April 1, 2018 to meet the federal government's carbon-pricing mandate. Work with the Minister of Finance to take measures to expand the carbon tax to fugitive emissions and to slash-pile burning;
- Revitalize BC's Environmental Assessment process and review the professional reliance model to ensure that the legal rights of First Nations are respected, and that British Columbians' expectation of a strong, transparent process is met;
- Employ every tool available to defend BC's interests in the face of the expansion of the Kinder Morgan pipeline, and the threat of a seven-fold increase in tanker traffic on our coast; and
- Enact an endangered species law and harmonize other laws to ensure they are all working towards the goal of protecting BC.

As the minister's letter indicates, the new government intends to renew the climate leadership, which was a key objective of the 2008 Gordon Campbell government, but which the Christy Clark government mothballed as of 2012. We should, therefore, expect the Horgan government to move aggressively to meet the 2030 targets set out November 27, 2015 by the Climate Leadership Change Team appointed by Christy Clark, but effectively opposed and dismantled by the same government.[2] It is important to note that the "Climate Leadership's Team's" plan, was itself, from the outset even before it was discarded by the Christy Clark government, seen by most environmental scientists to be highly unsatisfactory,[3] given that it was build around a mandate to include an economic plan largely dependent on the development and export of LNG. The climate change target set out in the 32 recommendations had to accommodate the impacts of LNG development which made it impossible for BC to meet 2017 targets. The original 2020 targets had to be re-adjusted to 2030. Shortly after the fall of the Christy Clark government (July 28), one of the main corporate partners in the development of BC LNG Petronas pulled out, effectively killing LNG development in BC[4] and thereby removing an important constraint on the BC Climate Action Plan.

Until now the opposition has consistently supported and advocated the implementation of the 32 recommendations of the November 2015 report. Nobody is yet discussing the implications of the change in the province's economic plan, and what the absence of the LNG constraint on the province's carbon footprint scenarios implies. With LNG development no longer a viable economic consideration, it is now unclear what the minister means in renewing the "Climate Leadership Team" and implementing "a climate action strategy." To go back to the compromises proposed in the November 2015 Climate Leadership Report might satisfy political demands and appearances, but in practical terms, this would be largely out of step with the current environmental and economic reality, in which LNG no longer plays a role.

This comes at a critical point in the global outlook for climate change action. The release this month in *Nature Climate Change* of yet another report indicating that even under the best scenarios (not "business-as usual"), there is a less than 5% chance that the world will achieve a two degree Celsius warming target by 2100, which puts renewed impetus on seriously implementing climate action and developing an adaptation strategy.[5]

In point of fact, while discussion shifts towards the need to adapt, given our two to three decade failure to address the sources of climate change, concerns over our ability to adapt to the changes are increasing. Modelling experiments indicate that while politicians may be shifting the discussion towards "adaptation", the increasing violence of natural events driven by a relatively infinitesimal ocean warming, epitomized by hurricanes Harvey and Irma, suggests that even adaptation is not realistic if heat stress exceeds mammalian tolerance.[6] The recent publication

of Peter Brannen's recent book *Ends of the World* (2017), One World Publications, is largely based on Lee Kamp and Michel Mann *Dire Predictions* and makes worthy, if sobering, reading.[7]

The problem we have been consistently avoiding to face, is ably summarized by Steven Sherwood, as quoted by Peter Brannen:

> *"The problem is that humans can't even handle a hot week today without the power grid failing on a regular basis," he said, noting that the ageing patchwork power grid in the United States is built with components that are allowed to languish for more than a century before being replaced. "What makes people think it's going to be any better when the average summer temperature will be what, today, is the hottest week of the year in a five-year period and the hottest temperatures will be in the range that no one has ever experienced before in the United States? That's 2050."*[7]

Given the current drift in climate concern, as Heyman's letter indicates, if this government lasts, the next four years should not be auspicious for fossil fuel development in BC. In keeping with popular perception, the new government is inheriting and moving to address a number of controversies that emerged from the previous government's pro-development approach to natural resources.

A major irritant in public perception over the past 16 years has been the lack of meaningful public consultation and fully transparent environmental assessments. As with all pro-business governments, the BC government attempted to streamline and accelerate the assessment process. In so doing, it removed a number of checks and balances. It did so in two ways. First, it cut back on government oversight by downsizing staff and introducing a "professional reliance" model, which put the onus on independent and corporate environmental professionals, rather than government staff. Second. the Campbell government streamlined the assessment process by removing anything that could be deemed to be "a duplication." From this logic, which was in keeping with that of the Harper government in Ottawa, the provincial environment assessment was felt to duplicate the federal assessment process, and the work of private environmental scientists duplicated government work. The government, therefore, slashed provincial environmental positions and virtually did away with provincial assessment by "harmonizing" with the federal assessment, even allowing private corporate assessments to form the basis of the scientific reporting that was informing the decision process.

The implications of the "professional reliance model" were reviewed in 2015 by Mark Haddock, legal counsel for the BC Forest Practices Board. His review found that in practice "professional reliance" appeared to be fraught with conflict of interest and little more than a glib metaphor for "deregulation and privatization". Without taking the position advocated by Dr. Brionny Penn in two excellent recent articles that portray, with cause, professionals as "trusted criminals" or "professional vandals", there can be no doubt that the excesses of corporate greed have undermined both the credibility of environmental professionals and the state of BC's environment.[8]

The current state of BC's forests and fisheries is a testimony to these excesses. The blame, however, does not lie uniquely with the poor stewardship and general veniality of the provincial government. Federal responsibility for the stocks cannot be shirked. In BC, the over-arching indicator species of the state of the environment are our wild salmon. Nowhere is the calamitous state of salmon mismanagement more clear than in Michael Price et al. recent review of the Wild Salmon Policy and analysis of the state of the stocks.[9] No matter how brave a face one might wish to put on this, the findings indicate a sharp decline in monitoring effort and a 50% decline in the numbers of wild salmon since the "implementation" of the Wild Salmon Policy in 2005. The fact is that, while lip service has been paid to the policy, there has been a failure to truly implement the same policy. In this respect, the public interest in the environment has been neglected by the federal government to the same extent that it has by the provincial government. While Price et al. may take comfort in the certainty that if the policy were implemented, and monitoring conducted as rigorously as the policy mandates, recovery would ensue – the actual track record does not substantiate that hope, and will not do so until somebody funds boots on the ground. One cannot rely on industry monitoring and stewardship groups – one needs to fund and employ the qualified environmental graduates who form a professional body of expertise needed to oversee and regulate policy implementation.

In this respect, there is a need to move away from "industry leadership." The recent accidental release of some 305,000 Atlantic salmon in Puget Sound accentuates that concern.[10] In spite of the success of the industry, the most shocking part of the news is that whatever actual numbers we have on the annual number of escapees, we owe to the diligence of the industry, therefore, we have no source of independent monitoring to verify the figures that we rely on. Once again, the public interest is asked to trust the industry's own professionals. As Dr. Joe Volpe of the University of Victoria, one of the few researchers who has worked on the problem of Atlantic salmon escapees, has pointed out, there is no funding to independently investigate farm escapes, Atlantic salmon success and viability, and colonization of West coast ecosystems:

> *"He pointed to research he had done more than a decade ago which suggested that Atlantic salmon was capable of surviving, spawning and producing viable offspring in Pacific waters. But a dearth of research in recent years meant little was known about how well the fish had managed to establish themselves in the wild."* [11]

The implications of these cutbacks are borne out by the process that led up to the Mount Polley disaster, and the ensuing abdication of both provincial and federal government responsibility and oversight. Three years after the disaster, which threatens the future viability of one of the province's major salmon runs, in spite of notable public outrage, the province has laid no charges. Even the current government has shifted responsibility to the federal government, notwithstanding the fact that the federal government has, for three years, quashed all efforts to sue Imperial Metals.[12]

From a professional point of view, the concerns raised by events such as Mount Polley go to the heart of the "professional reliance model" on which the province has relied to harmonize development interests. Under the professional reliance model, direct government oversight was diminished, and, as a direct

consequence, obligations to First Nations rights and public participation were disenfranchised. It is certain that we are going to see a shift in the approach, as the government's position on the Kinder Morgan pipeline issue indicates. The immediate appointment of Justice Thomas Berger, who was the driving force behind the termination of the Mackenzie Valley gas pipeline in the early 1970s, and went on to be instrumental in the development of most of the jurisprudence that currently governs BC First Nations' treaty legislation signals the direction that the NDP government intends to take.[13] While the current government cannot overrule federal jurisdiction over Kinder Morgan, it is committed to using all legal tools available to it to block this project, and First Nations rights are sure to be pivotal in the future of both the Kinder Morgan pipeline and the Site C dam.

The extent to which BC may be shifting directions is perhaps best represented by the public reaction to the last government's plans to manage wildlife by creating an independent agency in consultation only with hunter/trapper/outfitters. The response has been a proposal made by BC Nature together with 17 other organizations and the Association of Professional Biologists of BC, to initiate a comprehensive review of BC's management of wildlife and ecosystems. The proposal drafted by Dr. Allen Burger has gained broad professional support and is likely to be implemented in the coming months.[14] The proposal is notable in as much as it focuses on and prioritizes "non-consumptive uses" of natural resources, and takes a comprehensive ecosystem approach guided by a panel of experts.

The proposal complements the long-standing need for BC to develop legislation for the protection of "species-at- risk," which Heyman's letter places as an urgent priority. If enacted, such legislation would have huge implications for the protection of critical habitat to be protected from adverse development, and would represent a quantum shift in BC's management of natural resources.

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PRECIOUS LICHEN COLLECTION EVACUATED FROM BRITISH COLUMBIA WILDFIRE ZONE

Submitted by Linda Jennings, Herbarium Manager, Assistant Curator Vascular Plants & Algae on July 25, 2017

This summer's BC wildfire season is likely to go on record as among the worst in recent history. We are hearing every day about the impacts to many interior communities, and this past week brought the impacts to the museum community as well.

Trevor Goward and Curtis Bjork, Co-Curators of the lichen collection at the Beaty Biodiversity Museum's Herbarium contacted the Director, Dr. Jeannette Whitton, to ask for help in evacuating their collection, located near Clearwater, BC. Their community has been told to be ready to evacuate at a moment's notice.

Trevor and Curtis maintain one of the largest and certainly most important personal lichen collections in North America at their Edgewood Herbarium, with over 20,000 specimens, including more than 100 species new to science. Trevor began this collection more than 40 years ago, and it has grown to the most comprehensive personal lichen collection in Canada.

They knew they needed to get the specimens out before the roads were closed, knowing their life's work could be lost. Plenty of ideas and offers came from concerned people offering their help. Our most gallant saviour UBC alumnus Derek Woods, a past collaborator of Trevor and Curtis, along with his friend Evan Morson-Glabik came to the rescue. Derek and Evan rented a U-haul in Vancouver, drove it to Upper Clearwater to pick up the specimens, and then turned around to deliver them to the Beaty Museum. With the specimens now safely away from the threat of fire, Trevor and Curtis can focus on protecting their house and property.

A team of volunteers met Derek at the museum to help unload the collection last Saturday including the Head of the Botany Department, Dr. Sean Graham, and the Herbarium Director. By Monday morning, the herbarium team — Olivia Lee, Erin

Fenneman, Barbara Nato-Bradley and Linda Jennings — were in place to prepare the specimens for freezing, so that they can safely be worked on. Freezing is a chemical-free way of killing any unwanted pests that might be hiding among the specimens, and could damage these and other collections. The specimens were evacuated just in time - on the following Tuesday, there was an evacuation order for parts of Clearwater.

We are glad to have been able to move quickly to protect this national treasure and are so thankful for all the help to get these collections here safely.

We are hoping for rain without lightning and no winds to come through BC to give all those who live and work in these regions a much needed break from this horrible disaster.

UPDATE by Linda Jennings: August 6th, 2017

The lichen collection has now been removed from our freezer, and distributed to offices and lab spaces within the Museum that were volunteered for interim storage, since the collection is too large to fit in any one room. Our Museum lichen collection has 50,000 specimens, so this collection is nearly half our collection size. We know emergency's can happen, but this is a large personal collection and no one anticipated such a sizable collection arriving in mass so quickly.

Derek Woods picking up specimens in Upper Clearwater, BC.

Since many people have asked what will happen to the collection next, we will make updates available on our Herbarium Instagram site that is open to the public https://www.instagram.com/pressedplants/, as the collection progress forward. Our curators, Curtis and Trevor still need to stay in Clearwater to protect their home, as there is no relief of rain in sight. We will store the collection and wait for their curators to be out of harms way, so that they can come to the museum to properly work through the collection, to sort and organize the next stages of this precious collection.

Specimens at the Beaty Biodiversity Museum loading dock.

Specimens tucked away in Beaty Biodiversity Museum freezer.

Lichen Collection Manager, Olivia Lee, moving specimens to offices for short term storage.

ALBERTA News

By Brian Free, CSEB Member

This is not a late, breaking news story. The mountain pine bark beetle is taking over our mountain national parks! Actually, the expanding tracts of beetle-killed trees have been observed for the last decade or more. It just hit home for me, as I was driving through Jasper National Park on my return from a family holiday in British Columbia. We saw large swaths of red-brown forests on the mountainsides, evidence of mountain pine bark beetle infestation. With the warming climate allowing the beetle to move farther north and to higher altitudes and with the vast mature pine forests in the mountain national parks, the stage is set for dying forests and potential wildfires. Of course the forests will not "die", as any ecologist will know, but change is imminent and the park flora and fauna will likely change quite noticeably over the next few decades.

Continuing on the "pest" theme, an agricultural species gone wild has left some north-central Alberta ranchers, farmers, and acreage owners asking for help. Wild boars have been an issue in Alberta since they arrived in the province in the 1980s and '90s as livestock. Since then, some have escaped and these hairy pigs have established wild populations. Wild boar can damage agricultural crops and hay bales, and their propensity to root up the ground and wallow in rivers and ponds make them an unwelcome visitor.

Alberta has a "wild boar at-large eradication team" that is working on wild boar population estimates and is welcoming animal sightings, road kills and evidence of rooting or wallowing. Contact Alberta Agriculture and Forestry if you have a sighting to report.

For more information, see http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/bus16299.

SASKATCHEWAN News

By Robert Stedwill,, CSEB Saskatchewan Chapter Chair

Gleanings from Saskatchewan Press Clippings

Having been away from the province for a good part of the summer, I have not been privy to what has been going on from an environmental perspective, especially when it comes to issues of interest to the CSEB. However, as I have been known to do to catch up, press clippings are revealing.

The continuing saga of the Husky Oil spill which occurred on July 20, 2016 has now had the addition of a lawsuit filed by the James Smith First Nation against the provincial and federal governments, saying that pipeline safety recommendations made by the provincial auditor four years prior to the spill were ignored.

"The report concluded that such failure to effectively regulate pipelines could result in foreseeable harm to people or to the environment, and made recommendations as to how the provincial Crown could take action to ensure compliance with its statutory requirements."

Further, the lawsuit claims the federal government failed to protect the First Nation's treaty rights, particularly when it comes to fisheries, and specifically the river sturgeon's ability to spawn. To my knowledge, this has not been confirmed through scientific study, so it is open to debate in court. Included in the lawsuit is the allegation by the First Nation that there are still remnants of the spill along the shore of the river, and there has been damage to wildlife habitat, particularly habitats used by animals hunted by First Nation members.

The provincial environment department confirms that oil deposits remain in woody debris along the shoreline and buried in river sediments. According to the provincial government, drinking water standards are now not exceeded, and that fish are safe to eat.

None of the James Smith First Nation's allegations have been proven in court, and although the allegations suggest that most of the auditor's recommendations were still outstanding, the provincial auditor this past March reiterated her earlier concerns of 2012. The concerns relate to the government's lack of policies and procedures to evaluate existing pipelines.

Husky repairs to the line now include thicker walls, and equipment to monitor ground movement and water levels, as well as strain on the line. Even with these improvements, Husky possibly faces provincial and federal charges over and above the lawsuit.

Check out the CSEB Video at
http://youtu.be/J7cOuDbBf9c

MANITOBA News

Submitted by Robert Stedwill, CSEB Past President.

When all else fails – undertake public consultation when you don't know what to do next.

On August 22, the government of Manitoba launched public consultations to develop management plans which will address water management and watershed planning. Hopefully this will result in improved water management and a modernized method of watershed planning. Three public consultations have been identified.

"Manitobans will be asked for input on a made-in-Manitoba program called GRowing Outcomes in Watersheds (GROW), a new partnership with farmers to create ecological goods and services on the agricultural landscape. It is based on the alternative land-use services model, originally developed in the province by Keystone Agricultural Producers and Delta Waterfowl Foundation. It would encourage beneficial management practices like water retention, grassland restoration, wetland restoration or improved riparian area management by providing incentives to farmers to create new environmental improvements in these areas."

One only needs to look at the flooding in Texas, and specifically in the Houston area following hurricane Harvey where little consideration has been given to water management, specifically with respect to the land's ability to absorb and retain water, as opposed to that provided by concrete.

"The Manitoba government is also seeking input on watershed-based drainage and water resource management. It proposes a new sustainable and balanced approach to drainage and water control works licensing to reduce red tape, to protect important wetlands and watershed retention, and to protect water quality through enhanced drainage inspection and enforcement."

The conservation districts in Manitoba appear to be onside with the Province's approach and welcome the implementation of GROW. Having improved watershed programs and water management strategies articulated by the province is seen positively by the districts in providing additional tools and strategies to address Manitoba's climate change efforts.

Indeed, farmers are the largest group of landowners in the province, and have a unique role in how these improvements are implemented. Having said that, the improvements will affect all Manitobans, and hence, all Manitobans are being asked to input during the public consultation period, ending October 6th.

A third component of the public consultation program will address "modernizing Manitoba's conservation districts program, setting out a road-map to strengthen watershed planning, better support partnerships with Indigenous communities and deliver measurable outcomes in the health and resiliency of watersheds."

Consultation documents are available at www.gov.mb.ca/sd; and alas, only Manitobans are allowed to input their views and suggestions. However, reviewing the documents may provide some insight as to the direction the government of Manitoba might be taking, which could be implemented elsewhere; or at least provide useful information for use in other jurisdictions.

ONTARIO News

Submitted by Derrick Moggy, CSEB Ontario Director

The Province of Ontario made two key announcements over the summer. First, Ontario announced a number of new investments in programs, to combat invasive plants and animals and protect the environment and allow people across the province to continue to enjoy rivers, lakes, parks and other green spaces. The new investments include the following:

- Support for the Invasive Species Centre's work to further research into new biological control agents for phragmites and dog-strangling vine;
- Additional support for the Ontario Federation of Anglers and Hunters (OFAH) Invading Species Awareness Program to strengthen the reporting invading species hotline, online tracking system and mobile application, management and eradication of water soldier in the Trent-Severn Waterway as well as public outreach initiatives;
- New funding for the Ontario Invasive Plant Council to allow them to engage municipalities in the development of municipal invasive plant management strategies; and
- Support for the Federation of Ontario Cottagers' Associations and their work with lake front property owners to prevent the spread of aquatic invasive species, including A Shoreline Owner's Guide to Invasive Species.

Ontario also announced several initiatives as part of the Climate Change Action Plan. A new not-for-profit provincial agency, the Green Ontario Fund, will deliver programs and rebates to help reduce energy costs in homes and businesses are helping people. Secondly, Ontario announced it is investing in local projects that will help to reduce greenhouse gas (GHG) pollution by launching a new program for municipalities across the province. Both initiatives will be funded by proceeds from the Province's cap on pollution and carbon market.

Over the summer, the Canadian Environmental Assessment Agency commenced the technical review of two final environmental impact statements for proposed open-pit gold mines in Ontario. Prodigy Gold Incorporated has proposed the Magino Gold Project located near Dubreuilville, ON and Greenstone Gold Mines has proposed the Hardrock Gold Project located south of Geraldton, ON.

Also noteworthy, the federal Minister of the Environment and Climate Change issued an information request to Ontario Power Generation for the environmental review of the Deep Geologic Repository for Low and Intermediate Level Radioactive Waste Project for an updated cumulative effects analysis in order to address the Saugeen Ojibway Nation concerns. In her letter, the Minister re-iterated the federal government's commitment to developing creative and innovative mechanisms to help build deeper collaboration, consensus and new ways of working with Indigenous communities.

QUEBEC News

Submitted by Eloise Boileau, CSEB Quebec Director.

The Asian Carp has Reached the St. Lawrence River

What was a fear has now become reality: the Asian Carp has been found in the Saint-Lawrence River, which means that all major rivers in Quebec could potentially be invaded by the Asian Carp soon. The Ministry of Forest, Wildlife and Parks confirmed, back in March, that one of the four species of Asian Carp has been found at 16 locations along the St. Lawrence River. The fluvial section of the St. Lawrence River is very similar to those of the carp's original habitat, the Great rivers of Asia, which reinforces the idea that those populations will thrive and be a problem in Quebec.

For more information on the Asian Carp in Quebec, or on the damage caused by the introduction of the Asian Carp in the Mississippi River System, see: http://www.ledevoir.com/environnement/actualites-sur-l-environnement/492832/la-carpe-asiatique-est-arrivee-au-quebec.

ATLANTIC News

Submitted by Patrick Stewart, CSEB Atlantic Director

Summer in the Atlantic Region continues to be a busy time biologically, with botanists and wetland specialists in particular busy at the critical times of year in a quest for flowering plants; and bird specialists hard to reach due to fieldwork through the breeding season in Eastern Canada. Luckily the year has been relatively wet, and the water tables in many areas, at least here in Nova Scotia, have rebounded. Those getting out in the environment have a chance to experience the reasons why they adopted biology as a profession.

The reason for being in the field is often that industrial activity is taking place in it, and it is one of the big paradoxes in the profession—the act of trying to protect the environment while in many cases the environment we witness ends up destroyed. It's a process of triage, trying to minimize damaging outcomes. Not so much for biologists in provincial and federal governments who are working to establish conservation areas, to protect lands and wildlife in a near natural state. There's a lot of that going on if you have a chance to see it. And it's a positive side of our busy world of today.

There's a lot going on in Atlantic Canada because it's an active place, biologically. In environmental management, the aggregate industry is particularly active in the region, with many aggregate quarries expanding and some new, major quarries like the Black Point Quarry on Chedabucto Bay in northern Nova Scotia being developed—whose aggregate product is destined for points outside the province—working through the environmental approval process and into construction. Gold-mining is also big in Atlantic Canada—the high price of gold currently making it feasible to develop once marginal reserves that were perhaps abandoned at earlier times. Activities for biological consultants also include participating in the cycle of environmental monitoring programs for several metal mining projects in different parts of the Atlantic Region.

Decommissioning of the offshore Sable Offshore Energy Project facilities—the natural gas and light oil project in offshore Nova Scotia, which came to the end of its life a few years ago, is currently underway, although the proponents are keeping a low profile. One LNG terminal developer has approvals for its facility on the Strait of Canso, between Cape Breton Island and the Mainland of the province. And offshore development off Newfoundland continues, with the recent emplacement of the Hebron gravity-based oil production structure. Newfoundland and Labrador's Muskrat Falls hydroelectric development has its ups and downs, going over budget and challenged by environmentalists and locals, but the undersea cable that links it with Nova Scotia, coupled with wind electricity generation in the Atlantic Region and particularly Nova Scotia, has provided the impetus for placement of an undersea cable to channel the electricity along the seabed to New England, a project which is now in the development stage.

Tidal energy development continues to have a high profile in Nova Scotia, with developers joining the action, and projects being proposed for different parts of Nova Scotia, extending from the extreme southwest all the way north to northern Cape Breton. The only fully generating 'grid-connected' project—a partnership of the Nova Scotia provincial electricity utility Emera with turbine producer OpenHydro of Ireland—however, was installed and generating last November in the Bay of Fundy, but pulled for system upgrades in June. Meanwhile, and coincidentally, acoustic tagging of fish through a scientific program sponsored by the international Ocean Tracking Network, based at Dalhousie University in Halifax, has been detecting acoustic tags of exotic species such as Great White Shark which has shown up along the Atlantic Coast of Nova Scotia, in particular showing that it had passed through the narrow strait where most tidal energy turbines are proposed to be installed, on its way into the inner Bay of Fundy.

The deaths of Right Whales, an endangered species on the Atlantic Coast, has worried biologists who study the species. Areas of summer feeding, off southwest Nova Scotia and off the Atlantic Coast south of Halifax, have protected the whales to a degree in past by designating these areas as special traffic zones for ships passing through the area. Movements of the whales, only 500 some are left, north into the Gulf of St. Lawrence, and their deaths, both troubling and surprising, and have led to temporary traffic zones and shortening of the snow crab fishing season there, and reducing its attendant potential to snare whales.

Our activities in CSEB in Atlantic Region have been subdued, partially because of local activity, generally because of work commitments. Both myself as a CSEB Regional Director, and National Secretary-Treasurer Karen March, are located here and have been supporting CSEB National initiatives. In particular, we promoted the webinar series launched by the National Office last fall and continued through the spring. CSEB webinars are a great opportunity to receive and share information at the leading edge of important environmental topics. They're also a chance to share what you know with others in Canada and even around the world, cheaply and with only a small time commitment. So if you're an

expert in your field and have a Powerpoint or other presentation prepared, consider offering for a webinar presentation.

Another of our objectives in the Atlantic Region is to encourage the discussion and responses to environmental issues which members and even non-members in the area—which includes New Brunswick, PEI, Nova Scotia and Newfoundland and Labrador—can identify and approach us with, for national consideration. We can help to marshal support for your topic and use our resources, such as the website, to solicit support and discussion.

New members in the Atlantic Provinces are always welcome to come up with ideas for, and get involved in setting up meetings and speakers. We'd like to reinvigorate local chapters in major cities and university campuses, and help of all kinds is welcome.

Saga of Boat Harbour – Environmental Lessons Learned and Maybe Not So Much

In the1960s, Pictou Harbour and the three coastal rivers and their estuaries that met there were seen as a perfect location to apply environmental engineering to bring needed economic development to rural areas of Nova Scotia. The harbour has not only accessible sea ports—in Pictou, Trenton, and New Glasgow—used for a couple of centuries for trade and fishing, but its hinterland offered extensive mixed forests and important coal reserves, which could fuel industry, and the potential for agriculture and settlement. The three rivers and their estuaries, named simply East, Middle and West Rivers and located in that same logical order—brought freshwater, which was a valuable commodity for various industries.

That said, at the time, the natural coastal environment these features provided, was re-engineered by the Province of Nova Scotia to be even better—to attract and accommodate modern industrial development. The estuary at the mouth of Middle River was turned into a freshwater impoundment—the Middle River Impoundment—which for years has supplied water to industries in the area, including a pulp mill and a major tire manufacturing facility operated by Michelin. The tire maker was lured to Nova Scotia by government promises and concessions, one of which was to provide a dependable source of freshwater in the area. The company continues to operate facilities in Nova Scotia, although the one tire plant originally set up in the Pictou area recently closed. A pulp mill was also attracted at the time, and continues to operate today, relying on water supplies the impoundment made available.

Causeways for rail and the highway were also constructed, crossing the harbour to join Pictou with the population and industrial centres of New Glasgow and the coal-mining Towns of Stellarton and Westville, and to improve the road connection between the rest of Nova Scotia and the ferry from Pictou to Wood Islands, PEI.

In concert with these developments, was the conversion of a small coastal inlet located just across the harbour from Pictou and northeast of the East River estuary—Boat Harbour—into a treatment and settling pond for effluents and wastes from the pulp mill which now sat nearby on Abercrombie Point, the point of land between the mouths of East River and Middle River.

Knowing what we do now, all of these 'modifications' to the local environment probably had largely unmeasured but significant impacts on the oceanographic circulation, biological estuarine ecosystems, coastal fisheries, and socio-economic features of the area. "Causeway" is a swear word among environmentalists in Nova Scotia today, largely due to the effects of causeways on reducing the productivity of estuaries and saltmarshes throughout the Province and the important fish nursery areas they support. Pulp mills, though a necessary industrial evil, are now recognized for the potential environmental problems they cause, and today are fairly carefully regulated.

However it was also an era—it should be noted—that sported enormous optimism over the potential of environmental engineering to improve economic conditions, one that was universally shared throughout North America, and in particular elsewhere in Canada where forests were a major resource. Governments sought to attract big resource-based industries such as pulp and paper mills to provide jobs—in relative ignorance of the more balanced view of the importance of natural biological systems, including coastal ecosystems such as estuaries, in supporting wildlife, fisheries and ecosystems.

It also was prominently a time, which has continued until fairly recently and probably still to a degree today, when governments

Boat Harbour in relation to Pictou Harbour. The Province of Nova Scotia plans to remediate the inlet, used for the last half century as a settling basin for pulp mill wastes, and return it to tidal flow.

held less regard for First Nations communities. Enter Boat Harbour. The Boat Harbour impoundment, constructed to serve as a settling pond for effluents from the nearby kraft pulp mill owned by Scott Maritimes Industries, sits in the middle of reserve lands occupied by the Pictou Landing Band. The inlet in its former, pre-industrial, state, is revered by the Mi'Kmaq for its natural environment and the traditional activities, hunting and fishing, that used to take place there.

Pictou Landing is modern coastal community, set on the ocean with a view of outer Pictou Harbour (locally known as Pictou Road), with nearby beaches, good road access, and backed by the wooded areas of the Reserve to the south that surround Boat Harbour. Outwardly not unlike typical Nova Scotia and other Mi'Kmaq coastal communities, throughout Nova Scotia, with orderly subdivisions, neat bungalows, community centres, ball fields and other recreation facilities. Boat Harbour is not a tangible facet of the community for visitors to Pictou Landing, in part because there is no access to it. It is more prominent in its lore. Unless you live there, and have experienced its effects, or if the wind is blowing, you don't usually encounter its smell or even know it's there. You have to talk to community members to find out about it.

Although the use of an 'on reserve' tidal embayment as a treatment pond for a pulp mill, can't be entirely attributed to disregard for the Mi'Kmaq—prevailing negative attitudes towards First Nations at the time made it easier for governments and politicians to 'look the other way.

In fact, the Boat Harbour project went forward without the agreement of the Pictou Landing Band, which tried to get compensation from the Province of Nova Scotia until the early 1980s. Then, having failed, it targeted the federal government, which it finally sued for breach of fiduciary duty in 1986. An out-of-court settlement for some $35 million was reached in 1993.

Doubtless at the time, however, the Nova Scotia government probably provided optimistic assurances to the Pictou Landing Band, about the success and the innocuous nature of the project—the same sort of optimism that prevailed in other coastal engineering projects in the area and elsewhere in Nova Scotia.

The early, perhaps unfounded optimism, however, gave way to very noticeable (and probably easily foreseeable by engineers and scientists) effects—lack of access for anyone, the smell, loss of estuarine fish and eel populations, and also the air quality arising from the pulp mill, which is only six kilometres upwind from Pictou Landing. Not unlike pulp mills everywhere, air emissions from the mill disperse over tens of kilometres in all directions, reaching the Town of Pictou and the adjacent populated areas. Even with improved air emissions the mill has put in place over the years, you can tell it's there by its smell, for miles around.

And Boat Harbour—it was turned into a massive 140-hectare freshwater treatment pond, with a dam at the outlet that blocked access from the sea and regulated its water level, making it deeper and improving treatment characteristics by giving the effluent a longer retention time and reducing the basin's flushing rate. While this treatment enables the effluent to meet simple discharge criteria into the ocean imposed by the Province, in particular acceptable

Close-up of Boat Harbour and water treatment structures.

levels of suspended solids and dissolved oxygen—it has from the beginning been filled with the dark tea-coloured and smelly water, characteristic of pulp mill effluents everywhere. Sitting beside a water body that looked and smelled rank, and was not accessible or suitable for fish, and had air emissions with potential health effects, on their reserve, the Mi'Kmaq who lived in the nearby community of Pictou Landing nearby, clearly had reason, since the beginning, to be disturbed.

Over the years, conditions in Boat Harbour have improved, as successive phases of modernization of effluent treatment have been added at the mill and in Boat Harbour, but they have only been improving a bad situation for the Mi'Kmaq. Certainly it has been a huge financial commitment for the Province of Nova Scotia in its quest to help maintain good-paying jobs in the area—paying for treatment and management of the Boat Harbour site.

The latest initiative (see accompanying news article) will finally, it is hoped, clear up the long-term wrong, by removing the accumulated sediments and pulp mill waste—some of which is contaminated with heavy metals and toxic organics that were byproducts of bleaching processes—and also restoring the free exchange of tidal water within the inlet. A small compensation component has been proposed by the Province to help during the transition. Hopefully, restoring the inlet will also bring some closure to the Pictou Landing Band.

But, as it was when the Boat Harbour problem was thrust on the area, the ultimate outcome, I suggest, is not foreseeable. Ecological conditions may be restored to a degree, but economic conditions and even the Pictou Landing Band and their expectations have changed since that time, and will change in the future. Boat Harbour may be restored, but humans and their evolving mark probably will not be. In other parts of the world, which don't have the low population density and availability of natural areas, the same sort of choices aren't available (see accompanying article on coastal water storage). But at least the future will be framed by the presence of a chance for a natural and welcoming environment for Pictou Landing, instead of the exclusion an industrial site provides.

Boat Harbour Nova Scotia Clean-up Begun

Coastal environments have been widely used for expansion of cities and other coastal developments, as well as for sewage and other industrial developments.

Although the practice is not as widespread now as in past, use of Boat Harbour, a coastal inlet in Northern Nova Scotia, for treatment and disposal of pulp mill wastes, has been drawing attention for the past 50 years.

Earlier this year, the fuss finally brought resolution when the Government of Nova Scotia announced plans for a massive clean-up of accumulated pulp mill waste from Boat Harbour, the 140-hectare coastal inlet near Pictou, which was converted into a settling pond for effluent from a pulp mill in the late 1960s.

The latest estimates put the cleanup—the Boat Harbour Remediation Project—at $133 million. In May, the province of Nova Scotia awarded a $6.7-million contract to GHD, an international consulting firm, to come up with a detailed plan for the cleanup. Some work has begun, such as installing a 240-metre impermeable earth barrier built to isolate one of the coves in the impoundment as part of a pilot project to test technical options. The cleanup will begin in earnest in 2020, when the local pulp mill that uses the site–Northern Pulp Nova Scotia Corporation—will have in place a new $100 million waste treatment facility located on land near the mill.

View of Pictou Harbour and Northern Pulp mill looking towards Northumberland Strait. Pictou Landing First Nation and Boat Harbour are across the East River which enters from the right side of the photo. Photo credit: Northern Pulp website.

By current estimates, there are 350,000 cubic metres of deposits, primarily fine wood debris, deriving from the mill wastes, some of which are contaminated by heavy metals and toxic organic contaminants generated by pulp mill wastes, in particular lingering from early pulp chlorine bleaching processes used by the industry, which subsequently have been replaced. When dried, the material will fill about 100 Olympic-sized swimming pools.

After the cleanup is completed, a dam separating the lagoon from outer Pictou Harbour and the Northumberland Strait is expected to be removed and the entire area will be returned to a tidal condition, and turned over to the Pictou Landing First Nation, the local Mi'Kmaq Band on whose land Boat Harbour is located.

The Nova Scotia provincial government has operated the facility until recently but it became politically expendable, in 2014, when a major effluent spill into East River occurred from the pipeline that links the Northern Pulp mill with the Boat Harbour facility. The provincial Boat Harbour Act 2015 finally mandated its closure.

Credit: The article uses information from the CBC Nova Scotia website.

Northern Pulp mill in Trenton, Nova Scotia, viewed from Pictou.
Source: CBC website.

View of Boat Harbour settling pond from shore in 2017, during initial testing in preparation for dredging and cleanup. Source CBC website.

Asian Water Problems Provoke Radical Use of Coastlines for Water Storage

Despite decades of ignoring them, North Americans have become quite protective of their marine coastal areas, in particular due to the importance of their coastal ecosystems, their use as protected and recreational areas, and for fisheries, although, despite our best intentions, we continue to abuse them. Human population growth, urbanization of coastal areas, the overfishing of the ocean, and the expansion of aquaculture among other overwhelming human-derived activities that affect the ocean, are significant threats to undersea environments in coastal areas.

This concern of North Americans is also perhaps a little naïve in the face of the now common use of subsea areas in other parts of the world. [In fact, we don't know how lucky we are as an affluent nation to be able to spend the kinds of money we're investing to clean up sites like Boat Harbour—which are arguably infinitesimal in the grand scheme of things (see accompanying article on the Boat Harbour Remediation Project)].

In particular, initiatives I recently became aware of which use the coast and subsea bottom in India and a number of Asian countries, to construct giant reservoirs along the coast, to store floodwaters, are beyond comprehension for our North American sensibility. The concept strikes you as inconceivable when you first hear of it, but in these countries, the pressing needs of people for drinking water and a source of supply for industry and agriculture—coupled with an enormous capacity for major engineering projects—is beginning to override any concerns over the natural biological systems which occur there, and arguably more important in sustaining life there.

In terms of potential impacts, my first thought was the effect of the loss of freshwater mixing and nutrients in impacting the ocean. Canadian oceanographers, in particular Dr. Hans Neu of the Bedford Institute of Oceanography in Dartmouth, had shown in the 1970s that the damming of rivers along the St. Lawrence River for hydroelectric generation, and the effect of the moderated estuarine circulation, had an effect on recruitment of fish stocks. What would the Asian reservoirs do? On the other hand, the amounts of water stored in these reservoirs are probably small compared to the large volumes that reach the ocean through annual flooding in these areas.

Maybe it`s not such a bad idea after all, although the projects remove large chunks of sometimes productive estuarine environments at the mouths of rivers.

The jist of the thought process as I understand it, is that the water from heavy rains and flooding that are a regular plague to these areas, are largely physically lost to further use, particularly with water shortages regularly arising at other times of year. Storing the water somehow makes good sense. Dams are built across the mouths of major coastal embayments, to create giant coastal reservoirs. The idea may be worth looking into.

Inside a coastal water storage reservoir under construction.

The following snippet from Wikipedia with a connection from an Indian news website that I visited, has been abridged, but you should follow the link, which will lead to a large number of such projects undertaken worldwide; these will give you an idea of the grand schemes, arguably necessary, but maybe a bit crazy environmentally, that are afoot. The text has been edited slightly. The URL for a website proclaiming one such project is http://www.daijiworld.com/news/newsDisplay.aspx?newsID=436682

Enlarged Kalpasar [India] Project

The benefits of the Kalpasar project can be enhanced manifold… to use all the water flowing to the sea from Narmada and Tapati rivers. This is possible by constructing [a] sea wall/earth dam… nearly 70 km long [with a] maximum depth of 20 meters. The area of the … reservoir would be 3000 sq km with an average depth of 10 meters. The reservoir would store nearly 30 billion cubic meters (bcm) of water available from Narmada, Tapati, and other rivers which are draining into [it]… [This project can gain from experience with]… the Saemangeum Seawall already constructed in South Korea, which is 33 km long and … 36 meters average depth,[and the Kalpasar project …is …less]… challenging. From …[the Kalpasar reservoir]…water could be pumped throughout the year …to Ludhiana city on the banks of Sutlej river via Sikar situated at 435 m MSL in Rajasthan covering all the dry lands of North Western India.

This is only one of many projects you can find on the web, and perhaps some level of reason in terms of the broader scale

impacts, particularly biological ones, will prevail in the siting or undertaking of such projects. I hope we, in Canada, never reach the point where we need to undertake this kind of environmental engineering, but we should also always be aware that the world and its natural environments is a complex place, and there are often bigger issues afoot.

Environmental and Wildlife Issues Continue to Challenge the Maritimes

Submitted by Peter Wells, CSEB Atlantic Member

A myriad of environmental issues that require addressing by environmental biologists, amongst other groups, continue to plague the Maritimes. Some are legacy problems that simply have not been resolved in a timely fashion, while others are new.

Long-term persistent problems include the following:

- inadequate or non-existent pollution control, as shown by the continued raw sewage flowing from private homes into the LeHave River and estuary, near Bridgewater, NS;
- the apparent failure of the wastewater treatment plant in the Unesco World Heritage town of Lunenburg, NS, leading to fouled boats and wharves;
- the continued, seemingly uncontrolled, deforestation of Nova Scotia, and the use of its forest fibre for biofuel;
- the continued pollution of coastal waters by salmon aquaculture pens;
- the controversial use of tires for fuel in a cement plant in NS;
- the battle to control invasive green crabs in Keji Seaside National Park;
- the continued use of coal for power production; and
- the many concerns about the impact of large subtidal turbines on local fisheries and marine wildlife in the upper Bay of Fundy.

Newer problems and challenges include the following:

- finding the cause(s) of a mass mortality event affecting millions of inshore fish and invertebrates last fall in the Bay of Fundy;
- determining the ramifications of climate change that has increased surface water temperatures and lowered pH levels in the Gulf of Maine;
- the threat of land-based fish culture to water quality near coastal communities; and
- determining how to safely decommission the many oil and gas wells on Sable Island Bank, now that the offshore hydrocarbon resource has been exhausted.

Of special note and a major concern to wildlife biologists are the 13 recorded deaths this year of the North Atlantic Right Whale off New England, in the Gulf of Maine, and in the Gulf of St. Lawrence. This represents a significant loss to their already drastically reduced population. Causes include entanglement in fishing gear, especially ropes, and blunt trauma caused by ship strikes. Subtle climate change effects have not been ruled out, as waters in traditional summer feeding areas further south have warmed and zooplankton, such as cold water copepods and euphausiids, may have been affected, forcing the whales to move to non-traditional feeding grounds where protection measures are limited or non-existent. A major effort has been made by responsible agencies (ECCC, DFO, Coast Guard, NOAA), greatly aided by non-government groups, to sample the whales to determine causes of death, and monitor the whole population in the NW Atlantic. A report is imminent by the Department of Fisheries and Oceans.

The above is simply a sample of the local environmental challenges facing the Maritimes. The list is likely much larger! However, it points to the continued need for trained biologists of all stripes, committed to researching the problems, finding solutions and ensuring the long-term sustainability of our land, waters, and their living natural resources and wildlife.

Suggested Fall Readings

Submitttted by Peter Wells, CSEB Atlantic Member

Innis, Lorna, Alan Simcock and the Group of Experts of the Regular Process. 2017. *The First Global Integrated Marine Assessment. World Ocean Assessment I.* United Nations, New York, and Cambridge University Press, UK. 973 p. A major reference work, hence not light summer reading! "It examines the current state of knowledge of the world's oceans and the ways in which humans benefit from and affect them". It provides a synthesis of current science on ocean issues such as climate change for use by governments, various agencies and non-government stakeholders, and especially policy makers involved in marine and ocean affairs. It is definitely of value to environmental biologists working on coastal and marine problems.

Levin, Phillip S. and Melissa R. Poe. 2017. *Conservation for the Anthropocene Ocean.* Interdisciplinary Science in Support of Nature and People. Academic Press, Elsevier. London, UK. 500 p. This unique book "emphasizes practical strategies to better connect the practice of marine conservation with the needs and priorities of a growing global human population. It discusses interdisciplinary methodologies and science-based applications for coupled sustainability".

Moor, Robert. 2017. *On Trails. An Exploration.* Simon and Schuster Paperbacks, New York, Toronto. 340 p. "This is a fascinating exploration of trails and paths of all kinds, from miniscule ant trails to sprawling interconnected networks" (book cover). You will never look at a path in the same way again. The work was stimulated by an introspective thru-walk on the Appalachian Trail in the Eastern USA, where the author had much time to contemplate the significance of the path, beyond his muddy boots.

Mukherjee, Siddhartha. 2016. *The Gene. An Intimate History.* Scribner, New York. 594 p. This a must read for every biologist, penned by an amazing Pulitzer Prize-winning author who also works full-time as a professor of medicine and practising cancer physician. It is a highly readable and engaging overview of "the history and science of genetics and molecular biology, in the 20th century, and the extraordinary influence of heredity on our lives". If you are curious about the influence of the discovery of the structure and function of DNA, this is the book for you. It reads like a novel and is very hard to put down – a wonderful refresher on what makes organisms the way they are, and the crucial importance of this growing knowledge to human health!

TERRITORIES News

Submitted by Anne Wilson, CSEB President and Territories Director.

NWT and NU Regional Update:

Day lengths are getting shorter, and hopefully cooler temperatures are ahead! The long range forecast however is for above-normal temperatures in NU and part of the NWT right through to October. Precipitation forecasts show equal chances of being above or below normal, so I'm not sure if that is helpful or not for the rest of the fire season.

The forest fire season has been affected by recent record-breaking temperatures and drier conditions. As of August 15th, there were a total of 228 fires reported, with 134 active and 93 out. Fires have affected some 925,000 hectares of forested land in the NWT so far this season. Communities in the North and South Slave regions and the Sahtu have been under air quality advisories due to smoke.

NWT residents are concerned about the effects of fire on woodland caribou populations, due to loss of lichen food sources habitat. The Wek'eezhii Renewable Resources Board has announced that every region in the N.W.T. will have to develop a caribou range plan, and those plans will include how to manage forest fires to protect caribou habitats. This fall, the GNWT Department of Environment and Natural Resources expects to release a framework for boreal caribou range planning for public review and comment.

My travel to the NWT and NU has been limited this summer, with two trips up to Cambridge Bay and a site visit to the Gahcho Kue diamond mine. As always, it is wonderful to spend time in the territories, and the stopover in Yellowknife felt like going home. Developments are being reviewed carefully, and approvals are subject to comprehensive monitoring and mitigation conditions. I was very pleased to see how well that is being applied at the Gahcho Kue project – rigorous environmental monitoring and protection practices are in place, and wastes are being well managed. While I was in Cambridge Bay I saw the Canadian High Arctic Research facility, which is a striking building constructed to strive for LEED gold certification. The facility is substantially operational now, with the grand opening to be held in October.

The CHARS campus consists of the Main Research Building, the Field and Maintenance Building and two Triplex Accommodation Buildings for visiting researchers and scientists.

Recent News Items From the North:

Work is underway on designating 110,000 km^2 of Lancaster Sound as what will be Canada's largest marine protected area, some 2% of coastal marine waters. Lancaster Sound is an area rich in biodiversity, encompassing the migratory routes of several species of sea birds and whales, and home to polar bears, seals and walruses. Around 75% of the world's narwhals summer in the Sound, and 20% of the world's belugas migrate through it. Lancaster Sound is at the eastern entrance of the Northwest Passage, and the protected area will be closed to development and managed in accordance with Inuit traditional knowledge, with a memorandum of understanding signed with the Qikiqtani Inuit Association.

There were celebrations in Paulatuk on World Ocean's Day (August 14, 2017) to commemorate the marine protection area in Darnley Bay which came into being in November 2016. The 2,400 m^2 Anguniaqvia Niqiqyuam marine protected area borders the east coast of the Parry Peninsula, and is an ecologically important and highly productive site. It provides important habitat for a number of species such as Arctic char, cod, eels, beluga, polar bears, and a number of different bird species. The area is also home to the only thick-billed murre bird colony in the western Canadian Arctic, and is a feeding ground for the nearby Cape Parry Migratory Bird Sanctuary. Conservation objectives have been based on Inuit traditional knowledge, and ban oil and gas exploration and commercial fishing.

Wood bison have been added to the NWT List of Species at Risk as a Threatened species. The NWT populations number about 2500 animals currently. The threats to the populations include infectious diseases, predation, human-caused mortality, and habitat loss. A recovery strategy must be developed within two years.

In Nunavut, consultation is underway on the conservation plan for the endangered Red Knot (*Calidris canutus, rufa* subspecies). The difficulty is that the majority of the risks are in other countries on their migration route from Argentina to Nunavut each year. The proposed path forward includes protecting key breeding grounds, educating the public, and taking a collaborative approach to conservation across the range.

After conducting one regional hearing on the 2016 draft Nunavut Land Use Plan, the Nunavut Planning Commission indefinitely postponed the hearings for the Kivalliq Region and the Kitikmeot Region. Next steps for the Nunavut-wide land use planning process are unclear.

In July, the Supreme Court of Canada overturned a 2015 decision, confirming the right of Inuit to meaningful consultation. The Hamlet of Clyde River and the Nammautaq Hunters and Trappers Organization challenged the National Energy Board's permitting of seismic testing in Baffin Bay and Davis Strait. With the participation of the Qikiqtani Inuit Association, Indigenous and Northern Affairs Canada, and Nunavut Tunngavik Inc., the Nunavut Impact Review Board (NIRB) is leading a strategic environmental assessment of the area, with initial community engagement sessions held earlier this year throughout the Qikiqtani region.

And, to end on a positive note, it is a good year for whooping crane reproduction! See the article below for details.

Mining and Other Development News

Exploration and development activity continue in the NWT and NU, with number of major projects proceeding through the environmental assessment and regulatory processes. These processes are run by the co-management boards created under land claims agreements and northern legislation.

Ongoing environmental assessments (EAs) underway in the NWT and Nunavut include the following:

- Agnico Eagle's proposed "Whale Tail" project for its Amaruq satellite resource ore body is under review. This development would extend the mine life by several years, with ore trucked to the Meadowbank mill via a 50 km road. Technical meetings have been held, and public hearings are scheduled for late September.
- Sabina's Back River gold project (NU) successfully went through a further review process, with additional monitoring and mitigation measures identified for specific issues of concern (caribou, marine, freshwater). The positive EA decision is in the hands of the federal Minister, and once signed, the project will proceed to regulatory applications.
- The Hope Bay Phase 2 gold project was the subject of technical meetings in June. This is for the development of satellite ore bodies in two areas south of the existing Doris North mine. The proponent (TMAC) is expected to release the Final Environmental Impact Statement in December.
- Prairie Creek Mine (Canadian Zinc Corp.): Hearings were held for the road Environmental Assessment, and the Board's decision has not been released yet. The company is also working to assemble financing needed to take the mining project into production.
- Baffinland's Mary River project has submitted a modified Phase 2 EIS submission, which covers development of a rail line and additional marine port for ore transport. A major modification is the use of only open-water shipping, in response to concerns from Inuit living in the area.
- Revised terms of reference were issued last February for the impact assessment of the Mackenzie Valley Highway project, now reduced to 333 km of all-season gravel road connecting Wrigley and Norman Wells. This EA is still waiting on the submission of the Developer's Assessment Report.

- The Tlicho All Season Road is undergoing environmental assessment, with technical sessions held and the public hearing not yet scheduled. This infrastructure is a key factor in the ability of Fortune Minerals to construct and operate the NICO gold project.
- Enbridge will not have to go through an environmental review for repairs to the pipeline near Fort Simpson, despite First Nations' concerns. The pipeline runs from Norman Wells to Zama, and repairs will involve laying pipe under the Mackenzie River. Challenges to the project have delayed the work from summer 2017 to summer of 2018, pending regulatory approval.
- In the regulatory forum there is ongoing activity for various proponents, whether they are moving towards development or have applied for amendments to their water licences, or renewals.
- Ekati's Jay Pipe Expansion has now been fully approved and an amalgamated water licence issued for this development under the main licence for the Ekati Diamond Mine (Dominion Diamond Ekati Corp).
- Ekati's seepage report was recently out for review, and we are again learning from monitoring of projects in northern conditions. Some of the results are unexpected, and highlight uncertainties when dealing with permafrost and varying geologies.
- Snap Lake Diamond Mine (DeBeers Canada Inc.) continues to conduct monitoring and develop closure plans while in care and maintenance status. The underground works are flooding, and all the equipment was auctioned off in Yellowknife in early August, which indicates full closure is likely.
- Diavik continues with the construction of the A21 dyke, to allow them to access ore from an underwater pipe. Their seepage report is out for review. Submission of their Closure and Reclamation Plan is delayed.
- North American Tungsten Limited's Cantung Mine is being managed by the federal government, which has custody and control of the site and is sorting out what plans and licence requirements need to be met in closure status. The fifth and final EEM biological study commences in late August.
- Fortune Minerals is standing by for development of an access road to the NICO gold mine property.
- DeBeers Canada Gahcho Kue Diamond Mine started production late in 2016, becoming the third operating diamond mine in the NWT. Various regulatory requirements for management and monitoring plans are under review.
- The Avalon Rare Metals project is on hold, due to financing.
- TMAC Resources' Doris Gold Mine started production in 2017 following receipt of an amended Type A water licence and Project Certificate. These were amended to support a longer mine life, a change in tailings deposition strategy to subaerial, and effluent and groundwater discharge to the ocean.
- Agnico Eagle Mines' Meliadine Gold project is continuing exploration activities, but also underground development and mine construction including water management structures and infrastructure.
- The Giant Mine Remediation project team is exploring remedial development options prior to submitting an updated water licence application. Terms of the long-expired water licence are being respected, and the mine is still complying with the MMER requirements. A call for proposals has been put out for the full remediation project, worth an estimated $600 million for this phase, which includes freezing of the arsenic trioxide dust underground, along with securing pits, tunnels, tailings ponds, and building demolition. No word yet on progress for selecting a contractor. Engagements on the Health Effects Monitoring Program were held earlier in the year. Final stakeholder meetings were held in July, and Program testing is now underway. The Program is expected to commence this fall.
- Various municipal water licences are being renewed, with site specific evaluations of the terms and conditions, as the Wastewater Systems Effluent Regulations don't apply north of 60.
- Developments in both territories have submitted Annual Reports outlining operational activities and monitoring; available on the public registries.

Full details for current environmental assessments are available on the Boards' web sites at http://www.reviewboard.ca/registry for the NWT, and http://www.nirb.ca/application?strP=r for NU, and regulatory files at https://mvlwb.com/content/updated-online-registry for the NWT and http://www.nwb-oen.ca/content/public-registry for NU.

Closing:

If you are connected to activities in the Yukon, NT or NU, or 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 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.wilson2@canada.ca.

Record Number of Whooping Crane Chicks Born this Year in Wood Buffalo National Park

A record 63 whooping crane chicks were born in Wood Buffalo National Park this year — an encouraging sign for conservationists who continue to monitor the rare bird's long, slow climb back from near-extinction.

The impressive birth rate blows away the previous high of 49 fledglings, set during the 2006 season.

Sharon Irwin, a resource management officer with Parks Canada, said that hopes were high during a spring survey when they found 98 nests. The fledgling count is done later in the summer during a

flyover, where spotters search for fledglings near where the nests were pinpointed earlier.

"We had high hopes that the conditions would stay good over the summer," said Irwin. "I guess it was probably after day two of the survey — we had really good numbers — that we realized we were going to beat the record."

A photo from the 2017 fledgling survey shows a pair of whooping crane twins, which sport a brownish hue. The pair was one of four sets of twins born this season. (Parks Canada/J. McKinnon)

Four sets of twins were born during this season, the highest number since 2010. Multiple chicks from the same nest often don't survive in one birthing season, due to the scarcity of resources.

"It means that conditions were good, that there's plenty of food," Irwin said. "The ponds were full in the spring, and when we went out there in early August they looked pretty normal."

Though Irwin is pleased with the progress the crane population has made in Wood Buffalo, she said that there are "lots of hurdles" to overcome for the fledglings to make it through their first year, including a fall migration to Texas.

"There's lots of development down there," she said. "Hopefully there's room for them."

However, she said she believes Wood Buffalo National Park — the largest national park in Canada — offers lessons for governments looking to protect endangered species.

"We need more large protected areas like that to ensure rare species like this can survive," she said. "Even more common species."

Source: CBC News Posted: Aug 16, 2017

Undertaking Northern Research and Environmental Education to Benefit Northern Communities

Submitted by Dr. Kirsty E.B. Gurney (Environment and Climate Change Canada), Norman Pierrot (Fort Good Hope Renewable Resources Council), and Jennifer Fresque-Baxter (Government of the Northwest Territories)

Discontinuous permafrost underlies much of the landscape of the central Mackenzie Valley, which has a varied terrain, including plateaus, rolling hills, and poorly drained areas that are characterized by an abundance of wetlands. These diverse ecosystems are highly valued natural resources. In addition to providing ecological functions such as filtering and storage of surface water, they are culturally important areas for northern communities — supporting subsistence hunting and spiritual renewal. We do not, however, understand the impact that landscape-level environmental changes are increasingly having on northern wetland ecosystems and on water resources in this area.

This year, staff at Environment and Climate Change Canada (ECCC), with partners from the Fort Good Hope Renewable Resources Council (RRC) and the Government of the Northwest Territories (GNWT) Water Resources Program, put forward a proposal to the GNWT's Cumulative Impacts Monitoring Program (CIMP) to evaluate the cumulative impacts of human activities and natural processes on wetland ecosystems in the area around Fort Good Hope, particularly in the Ts'ude niline Tu'eyeta (Ramparts) Candidate Protected Area. Our proposal focused on contributing to CIMP mandates — to support resource management decision-making and to improve knowledge of cumulative impacts and environmental trends – by outlining three key goals:

- to build community partnerships,
- to identify field sites, and
- to develop and implement sampling protocols for long term, community-based, monitoring of wetland ecosystems near Fort Good Hope.

Our proposal was successful, and as soon as project funding was confirmed, partners began developing work plans for 2017 field collections and for training of local environmental monitors. During our planning, we were thrilled to connect with staff at the Chief T'Selehye School to talk about educational activities that would get local students excited about wetlands. Partners from ECCC were in Fort Good Hope from 12 – 21 June, with highlights of the trip including the following:

- meeting two local monitors, John Tobac and Danny Masuzumi, as well as other partners from Fort Good Hope (James Caesar, Norman Pierrot), and sitting down to discuss local knowledge about the Ramparts area and how to access field sites;
- getting our feet wet at a local wetland with students in grades 6 – 9: talking about wetland wildlife, practising use of Global Positioning Systems, collecting water samples, and identifying cool aquatic creatures; and
- collecting data (physical measurements) and samples (water, invertebrates) from 13 wetlands located in the Ramparts area, and in the Fossil Creek watershed to begin describing baseline wetland conditions in the area around Fort Good Hope.

Samples were delivered to Taiga Labs in Yellowknife and to the Prairie and Northern Wildlife Research Centre in Saskatoon, and local monitors repeated the sampling protocol one more time, at the end of July.

We are looking forward to continuing work on this project and to mutual learning opportunities as we share data and discuss results with community members and local decision makers. We are also

excited to continue to work with local teachers and leaders to expand our outreach activities, with the aims of including hands-on learning experiences and engaging northern students in matters related to the protection and management of the environment.

Below are some photos from the joint program:

Kirsty Gurney, checking her haul during a study on cumulative impacts of environmental change on northern wetlands, at a wetland on Manitou Island, near Fort Good Hope, NT. Photo Credit: Jamille McLeod, Environment and Climate Change Canada.

Danny Masuzumi and Jamille McLeod, planning field work for a wetlands-based project near Fort Good Hope, NT. Photo Credit: Kirsty Gurney, Environment and Climate Change Canada.

John Tobac, a monitor from Fort Good Hope, collecting water samples in the Fossil Creek area, as part of an effort to assess baseline water quality of wetlands in the Fort Good Hope – Ramparts area.

Danny Masuzumi, Kirsty Gurney, John Tobac collecting data as part of a study on cumulative impacts of environmental change on northern wetlands, at a wetland on Manitou Island, near Fort Good Hope, NT. Photo Credit: Jamille McLeod, Environment and Climate Change Canada.

Kirsty Gurney, collecting a water sample as part of a study assessing cumulative impacts of environmental change on northern wetlands. Fort Good Hope - Ramparts Area, NT. Photo Credit: Jamille McLeod, Environment and Climate Change Canada.

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