Pricey Fish Farms • Trappers Blockade • Drought & The Trees

NDP or GREEN?

Environmental News from BC and the World

Watershed

Sentinel

Summer 2015
Newstand Price $4.95

Cry Wolf

Soil Special

NASA Moisture Mission

For the Love of Peat

Fabulous Fungi

Arctic Microbe Research

7 25274 86324 2 03

Sustainers *of the Watershed Sentinel*

These generous sustainers help us to provide you with a strong independent voice for environmental issues, activism, and social justice. We depend on them, with deep thanks.

Stars ($500 and over annual donation)

Gordon Albright, Toronto ON • Vicky Husband, Victoria BC • Lannie Keller, Seed Fund of the Greater Saint Louis Community Foundation • Mel McDonald, Victoria BC • Glen Morton, Halifax NS

Friends ($200 - $499 annual donation)

Barnard-Boecker Centre Foundation, Victoria BC • Jim Bradshaw, Maple Ridge BC • Katherine Bruheim, West Vancouver BC • John & Sharon Cashore, Coquitlam BC • Elaine Golds, Port Moody BC • Barbara Holmberg, Edgewood BC • John & Cathie Howard, Hornby Island BC • Marlene Johnston, Kaslo BC • Juliette & Rick Laing, Salt Spring Island BC • James Leslie, Hornby Island BC • Mike Major, Victoria BC • Fred McMechan, Williams Lake BC • David Moulton, New Westminster BC • Susan & Doc Paynter, Salt Spring Island BC • David Pinel, Courtenay BC • Robert Pulsford, Black Creek, BC • Colin Rankin, Victoria BC • Murray Rankin, Victoria BC • Helen Lee & Michael Redican, Quathiaski Cove BC • Mary Richardson, Athabaska AB • Paul Sanborn, Prince George BC • John Shirley, Watford, ON • Frances Slaney, Ottawa ON • Art Tkachuk & family, Nipawin BC • Jim Whitworth, Ucluelet BC • R.E. Wolf, Calgary AB

Patrons ($100 - $199 annual donation):

Jacqueline Ainsworth, Fanny Bay BC • Valerie Barnes-Connell, La Ronge SK • Rosemary Baxter, Courtenay BC • BC Shellfish Growers Assn, Comox BC • Mike & Arlene Bell, Comox BC • Michael Beulah, Summerland BC • Andrew & Catherine Black, Comox BC • David Boehm, Gabriola Island BC • Melanie Boulding, Nanaimo BC • Sherry Loof & Peter Broomhall, Vancouver BC • Arthur Caldicott, Victoria BC • Linda Cheu, Courtenay BC • Jeff Chilton, Tofino BC • Jim Cooperman, Chase BC • Renate Kroesa & John Dafoe, Halfmoon Bay BC • Anicca de Trey, Comox BC • Ursula DeShield, Galiano Island BC • Rick Dobson, Cumberland BC • Susan Clarke & Alan Dolan, Sidney BC • G. B. Dryvynsyde, San Francisco CA • Nick Dudink, Nanaimo BC • Alan & Christina Eastwood, North Saanich BC • Betty Fairbank, Hornby Island BC • Don Ferguson, Lethbridge AB • Susan & Harold Fletcher, Sechelt BC • Harvey Gee, Coldstream BC • Karl Goodwin, Denman Island BC • Gerald Grappin, Agassiz BC • Alison Graves, Nanaimo BC • Phil Haight, Dawson Creek BC • Hennessey Hammocks, Gabriola Island BC • Jim & Diane Hentschel, Manson's Landing BC • Pierre Hiemstra, Smithers BC • Chris Hilliar, Courtenay BC • Sue Hiscocks, Victoria BC • Barb Hourston, Nanaimo BC • David Huntley, Burnaby BC • Stuart Isto, Powell River BC • Frantisek Jakoubek, Vancouver BC • Paul & M. Knepperges, Powell River BC • Susan Steffner & John Kristensen, Whaletown BC • Ben Livant, Victoria BC • Paul MacGillivray, Mission BC • Lillian Martin, Harrison Hotsprings BC • Robert Mathews, Chase BC • Dave McCandless, Aldergrove BC • Lisa Pierce & Heather McLean, Denman Island BC • Mary Mitchell, Squamish BC • Gail & David Morton, Port Alberni BC • David Morwood, Courtenay BC • May Murray, North Vancouver BC • Peter Ommundsen, Salt Spring Island, BC • Maggie Paquet, Port Alberni BC • Victor Prochaska, Vancouver BC • Nina Raginsky, Salt Spring Island BC • Norman Riggs, Powell River BC • Bill Weaver & Shivon Robinsong, Victoria BC • Peter Rowlands, Newmarket ON • June Ryder, Vancouver BC • Penny Sanger, Ottawa ON • Paul Senez, Kirkland QC • Margaret Sigurgeirson, Hornby Island BC • Helen Spiegelman, Vancouver BC • David & Maria Squance, Victoria BC • Keiko & Allan Stewart, Hagensborg BC • Robert Thompson, Vancouver BC • George & Heather Waddell, Sechelt BC • Eileen Wttewaall, Salt Spring Island BC • John & Betty Zaikow, Powell River BC

Sustaining Subscribers ($50 - $99 annual donation)

Jane Armstrong, Port Alberni BC • John Atkinson, West Vancouver BC • Robert Bach, Barriere BC • Suzanne Blair, London ON • Susan Clark, North Saanich, BC • Frances Cochran, Courtenay BC • Anne de Cosson, Denman Island BC • Guy Dauncey, Ladysmith BC • John Dickin, Madeira Park, BC • Elizabeth Ferris, Vancouver BC • Gwyn Frayne, Courtenay BC • Mary Gavan, Vancouver BC • David & Bridget Gillespie, Telkwa BC • Bill & Pat Halliday, Comox BC • Anne Hansen, Victoria BC • SaltSpring Seeds, Salt Spring Island BC • Jessie Jensen, Skookumchuk BC • Heidi Juergens, West Vancouver BC • Alice Kidd, Lillooet BC • Wal & Ester Kneifel, Vancouver BC • Bob Lane, Vancouver BC • Edmund Livingston, Vancouver BC • George Logan, Victoria BC • Ana Simeon & Tom Martin, Victoria BC • Kathy Mezei, Burnaby BC • Kyra Montague, Cambridge MA • Pam & Don Munroe, Courtenay BC • James Musgrove, Vancouver BC • Denise Nadeau, Courtenay BC • Kevin Neish, Victoria BC • Stefan Ochman, Bamfield BC • Bob Peart, North Saanich BC • Jo Phillips, Sooke BC • Joyce & John Prothero, Salt Spring Island BC • Wendy Prothero, Comox BC • Dona Reel, Gibsons BC • Mary Richardson, Athabasca AB • Norberto Rodriguez dela Vega, Oliver BC • Michael Rooksby, Victoria BC • Linda Safford, Cumberland BC • P. Maurebrecher & T. Schneider, Victoria BC • Barbara Scott, Victoria BC • Gillian Seaton, Jasper AB • Gail Shepherd, Vancouver BC • Daniel Siegel, Hornby Island BC • Ronni Solbert, Randolph VT • Roy & Lois Sutherland, Victoria BC • Anna Tilman, Aurora ON • Bill Trussler, Fanny Bay, BC • Marjorie Urquhart, Fanny Bay BC • Len Walker, Bowser BC • Deb Weiers, Red Deer AB • James Wentworth, Kamloops BC • Patty Wheeldon, Courtenay BC • Sheila White, Summerland BC • Mark Whitear, Salt Spring Island BC • James Wilson, West Vancouver BC • Jim Windsor, Qualicum Beach BC • Ray Zimmerman, Victoria BC • Fred & Ruth Zwickel, Manson's Landing BC

A big *Thank You* to all those listed, to our monthly donors, the bundle donors, those who wish to remain anonymous, and the many who add a little extra to their subscription.

Friends of Cortes Island sponsors public education features about sustainable living for Georgia Strait and the Islands. To receive a tax receipt, for your donation ONLY, make your donation to FOCI and mail to:

Watershed Sentinel,
P.O. Box 1270, Comox, BC
Canada V9M 7Z8

Watershed
Sentinel

Summer 2015
Vol. 25, No. 3

Land & Wildlife

Water & Fish

Forests

Soil Feature Section

News & Other

Printed on Enviro 100, post consumer recycled, FSC®-Certified paper, with vegetable inks.

Society

Cover Photo
by Ian McAllister

Not a Subscriber Yet?
Look for the subscription form inserted for your convenience.

Watershed Sentinel

Publisher: Watershed Sentinel Educational Society
Editor: Delores Broten
Managing Editor: Susan MacVittie
Associate Editor: Don Malcolm
Graphic Design: Ester Strijbos
Renewals Manager: Dawn Christian

Special thanks to Adrian Raeside, Ian McAllister, Karen Birch, Norleen Lillico, Patricia Robison, Arthur Caldicott, Gloria Jorg, Dyane Brown, Norberto Rodriguez de la Vega, Anicca de Trey, Mike Morrell, Kathy Smail, Ray Woollam, the writers, advertisers, distributors, and all who send information, photos, and ideas.

Deep thanks to our Board of Directors: Anicca de Trey, Alice Grange, Mike Morrell, Norberto Rodriguez de la Vega, Susan Yates, and Lannie Keller. Published five times per year.
Subscriptions: Canada $25 one year, $40 two years; US $35 per year, Electronic only $15 a year

Distribution by subscription, and to Friends of Cortes Island and *Reach for Unbleached!* Free at Vancouver Island and Vancouver area libraries, and by sponsorship in BC colleges, universities, and eco-organizations.

Member Magazine Assn of BC and Magazines Canada
ISSN 1188-360X

Publication Mail Canada Post Agreement PM 40012720
Return Undeliverable Canadian Addresses to:

Watershed Sentinel
Box 1270, Comox
BC, Canada V9M 7Z8
Ph: 250-339-6117
Email *editor@watershedsentinel.ca*
http://www.watershedsentinel.ca

EDITORIAL

Growing Goodness

In this issue, we salute the UN's International Year of the Soil, with stories about the life in the soil, microbes and fungi, the release of ancient carbon due to bad land practices, and the beautiful ecological function of bogs.

But as we were going to press, we learned of an astounding study, *Regenerative Organic Agriculture and Climate Change,* from the Rodale Institute, peer-reviewed science that offers immediate hope for dealing with the intractable climate/fossil fuel dilemma and political mess. We can grow our way out of this stalemate!

"Simply put, recent data from farming systems and pasture trials around the globe show that we could sequester **more than 100% of current annual CO_2 emissions** with a switch to widely available and inexpensive organic management practices, which we term "regenerative organic agriculture." These practices work to maximize carbon fixation while minimizing the loss of that carbon once returned to the soil, reversing the greenhouse effect."

As is so often the case with ecology, the science confirms what our hearts tell us. The organic gardener's mantra is "Feed the Soil, Not the Plants."

No fancy gadgets, no high end geo-engineering, no expensive new devices, and, best of all, no poisonous legacy.

Just hard work and common sense, producing healthy food for all and tending the earth.

Delores Broten, Comox BC, June 2015

PS: You can read the study at *www.rodaleinstitute.org.* If you want to just roll up your sleeves and get right to work, we recommend *Building Soil: A Down-to-Earth Approach,* from Cool Springs Press (March 2015).

At the 'Shed

Welcome! If you have picked up this magazine as part of our new circulation initiative on the Langdale ferry, welcome. We hope you find something in these pages that inspires you and that you want to read more. The free distribution is time-limited so if you want to stay in touch, use the subscription form enclosed, or order online at *www.watershedsentinel.ca*

New Masthead: We decided to change up the masthead on the cover and since more and more of our stories are about the junction between environment and social justice, we figured it made sense to emphasize the Sentinel in *Watershed Sentinel.* We all live in a watershed.....

Around The World

Compiled by Susan MacVittie

The Pope Speaks Out

Pope Francis is a strong advocate on behalf of the world's poor and vulnerable. He speaks out to protect the environment so as to ensure food production. The Heartland Institute, funded by the Koch Brothers, sent delegates to the Pope's summit on climate change, in April, to tell him that "humans are not causing a climate crisis on God's green Earth." The Pope's advisor, Cardinal Oscar Rodríguez Maradiaga, chastised US climate deniers, blaming capitalism for their views.

— www.ecowatch.com May 13, 2015

Cancer-Causing Glyphosate

The International Agency for Research on Cancer has concluded that there is sufficient evidence of carcinogenicity in glyphosate, based on laboratory studies. Glyphosate is touted as a low toxicity chemical safer than other chemicals. It is widely used in food production and on lawns, gardens, parks, and children's playing fields. Monsanto brought glyphosate to market in the 1970s under the trade name Roundup.

—Beyond Pesticides,March 20, 2015

Japan Whaling

An International Whaling Committee report concludes that Japan had not demonstrated that the culling of up to 333 minke whales a year for 12 years was necessary to meet the research objectives of obtaining more information on minkes. Japan was forced to suspend its scientific whaling program following a landmark International Court of Justice ruling in 2014. Japan has said they will continue to pursue a scientific whaling program. In May, the Sea Shepard Society filed claims against Japan's Institute for Cetacean Research (ICR) in a US District Court, seeking a declaration that ICR's whaling in the Southern Ocean near Antarctica is illegal under international law.

—Sea Shepherd Society, May 27, 2015

Storing Ice Samples

Scientists are planning to ship ice to the Antarctic. They're afraid that mountain glaciers around the world are melting as a result of climate change and want to store samples of ice in a new vault in the coldest place on Earth. "We are probably the only scientific community whose archive is in danger of disappearing from the face of the planet," says Jerome Chappellaz, of the French National Centre for Scientific Research, which is involved in creating the new ice storage in the Antarctic.

— www.bbc.com, May 27, 2015

Ground Shaking

A US Geological Survey (USGS) report outlines a preliminary set of models to forecast how hazardous ground shaking, triggered by man-made practices, could be in the areas where sharp increases in seismicity have been recorded. Earthquake activity has increased since 2009 in the central and eastern United States. The increase has been linked to industrial operations that dispose of wastewater by injecting it into deep wells. USGS's studies suggest that the actual hydraulic fracturing process is only occasionally the direct cause of earthquakes.

— US Geological Survey
April 23, 2015

Spain's Initiative

Street lights powered by their own wind turbines and solar panels are lighting up a section of Barcelona's sea front as part of the city's bid to become energy self-sufficient.

— Reuters, May 26, 2015

Water Saving Techniques

The Millennium Drought in southeastern Australia forced Greater Melbourne, a city of 4.3 million people, to successfully implement innovations that hold critical lessons for water-stressed regions around the world, according to findings by UC Irvine and Australian researchers. Integrated outreach by utilities and agencies working together led to a culture shift among ordinary water users.

By the time Australia's worst-drought ended in 2010, one in three Melbourne households had a rainwater barrel. Many had built retention ponds to contribute to the urban water supply, for which they still earn credits on their bills and highly treated sewage water was used to irrigate farm fields.

— www.sciencedaily.com
May 26, 2015

From Our Readers

Foreign Affairs & Mining

I just came across your November-December 2014 issue, and I wanted to thank you for David Ravensbergen's article on the evolution of Department of Foreign Affairs, Trade and Development and Canadian mining companies. This article is a clear, quick-to-read piece I can share when informing folks on this topic. I was working for a small Alberta-based non profit called Sahakarini from 2010-2012; they and their excellent international partners lost their funding in the ideological shifts. Sahakarini continues, but their capacity has been altered drastically. It's a shame; their interpretation of international development is so much more appropriate than that of our current government, to put it mildly. Thanks again for keeping these examples of political and social changes on the radar.

Tif McNaughton, Terrace, BC

Electoral Reform

Barbara Berger puts forward some well-thought/convincing arguments for electoral reform in Canada [WS March/April 2015]. She makes a good argument for some form of proportional representation over the devastating effect of our first past the post system that elects a "majority" government with less than 40% of the vote. I am, however, a bit disappointed that in naming the federal parties that endorse proportional representation, she states that the Liberal Party is not in favour of proportional representation without letting readers know that the Liberal Party does support preferential ballot as an alternative to first past the post. Such an omission leaves the impression that the Liberal Party is not in favour of electoral reform – which it definitely is – just not the particular brand of electoral reform that she advocates.

We have no big money to pressure the Liberals, New Democrats, Greens to find some kind of electoral cooperation, so we who are appalled by the social and environmental devastation of the Conservatives, must find a way to cooperate *for the good of us all* – even in the face of opposition by party leaders – by looking for commonality, not complete agreement or merger, by asking what do we have in common rather than what divides us.

Norm Reynolds, Courtenay, BC

With your help, the *Watershed Sentinel* will be precious cargo on the BC Ferry Langdale-Horseshoe Bay run for six months.

The **Keep Us Afloat online fundraising campaign** hopes to raise the money needed to pay for BC Ferry placement and the additional print run. We aim to reach some much needed **new subscribers** with this campaign. And keep our commitment to be **the voice of Canada's environmental movement** by spreading the news from leading thinkers and community members working hard on the issues.

We will send an email to subscribers with a link to the online campaign when it goes live.

For now, we thank you for your support and encouragement.

Together, we will keep print and independent media afloat!

WSES AGM - June 22, 1 pm, Comox, BC

The Watershed Sentinel Educational Society (WSES) Annual General Meeting. The WSES publishes the *Watershed Sentinel*. This meeting is open to the public. For more information email *editor@watershedsentinel.ca* or call 250-339-6117.

The *Watershed Sentinel* welcomes letters but reserves the right to edit for brevity, clarity, legality, and taste. Anonymous letters will not be published. Send your musings and your missives to:

Watershed Sentinel, Box 1270, Comox BC V9M 7Z8
editor@watershedsentinel.ca or online :
www.watershedsentinel.ca

Have You Heard?

Compiled by Susan MacVittie

No Ocean Dumping

Transport Canada has abandoned proposed regulatory changes that would have allowed small vessels to dump sewage just one nautical mile from shore, bowing to pressure from local health authorities, water users, and water quality advocates.

— Fraser RiverKeeper, May 14, 2015

Haida Win Herring Case

A federal court has ruled that the Minister of Fisheries and Oceans cannot open a fishery in Haida Gwaii this year. An injunction was given to the Haida Nation, against the federal government, to prevent the re-opening of a commercial herring fishery on the nation's north coast. In November 2014 the Department of Fisheries and Oceans recommended that the herring fishery be opened in all five major areas of the Pacific Region. The Haida argued that herring stocks had not rebuilt enough to support the opening, and that the department's management process was flawed.

— Global News, March 6, 2015

Appealing GM Salmon

Ecojustice lawyers, representing Living Oceans Society and the Ecology Action Centre, have filed evidence against the federal government's approval of genetically modified (GM) salmon. The court case was initiated in 2013 but was delayed because the government did not provide its documents until 2015. Environment Canada approved the development and manufacture of GM salmon by AquaBounty in Prince Edward Island in 2013.

— Living Oceans Society, May 5, 2015

Kinder Morgan Opposition

Unifor has filed evidence with the National Energy Board that demonstrates that the proposed Kinder Morgan Trans Mountain expansion for Burnaby, BC poses serious risks to the economy and food security of British Columbia. The union is critical of the threat to the commercial fishery and job losses in the refining industry. Burnaby Mayor Derek Corrigan is also opposed to the project, as well as the Tsleil-Waututh Nation, who published their own report on the dangers to their traditional territory. Economist Robyn Allan quit as an expert intervenor for the NEB saying the review process was "a broken system and enables the pretence of due process where none exists."

— Unifor, May 28, 2015

LNG First Nation Decisions

The BC government has revenue-sharing agreements in place with 28 First Nations for planned pipelines meant to supply LNG plants on the coast of BC. However, an LNG information meeting in Kispioux was interrupted by some Gitxsan First Nation members opposing the TransCanada Pipeline through their territory. Lax Kw'alaams First Nation, near Prince Rupert, BC unanimously rejected a $1-billion cash offer from Pacific NorthWest LNG. The Canadian Environmental Assessment Agency, is expected to rule on the Pacific NorthWest LNG project by October.

In May, Premier Christy Clark inked a new LNG industry agreement in Vancouver with Malaysian gas giant Petronas.

— www.globeandmail May 13, 2015, www.vancouverobservor.com May 20, 2015


Ester Strijbos

Fungicide Review Ignored

Ecojustice has reactivated a lawsuit for the David Suzuki Foundation and Équiterre challenging the Canadian government for shielding the fungicide, difenoconazole, from review. The federal government cancelled plans to carry out a mandatory review of products containing the pesticide difenoconazole after Syngenta, the manufacturing company, asked the Pest Management Regulatory Agency to terminate the review. Difenoconazole is used in several neonicotinoid products that are toxic to bees.

— Ecojustice, May 14, 2015

Big Deal on the Mackenzie

Alberta and the Northwest Territories have signed a legally binding agreement to share and protect the Mackenzie River watershed, which is one of the largest in the world, covering 20% of Canada.

Threats to the watershed include climate change, the tar sands and BC's hydro dams.

The unique deal makes water levels and quality the top priority, measuring contaminants and limiting withdrawals from the Slave River to 1.9% of annual flow.

— Macleans, March 18, 2015

Photo by Ian McAllister

CRY WOLF

WILDLIFE

Wolves blamed for caribou decline, though studies point to habitat loss

by Susan MacVittie

The first year of the controversial BC wolf cull ended in mid-April. Government-contracted hunters killed 84 wolves from helicopters, below their target of 184 wolves.

The cull began January 15 in the South Selkirks and the South Peace regions of BC where the BC government says wolves prey on caribou herds with declining populations. The BC Ministry of Forests, Lands and Natural Resource Operations says the caribou population in the South Selkirks declined from 46 to 14 between 2009 and March, 2015, and in the South Peace wolves account for 37 per cent of all adult caribou mortalities. Previous methods, such as hunting and trapping of wolves have not effectively reduced caribou populations. The Ministry reported that 11 wolves had been shot in the South Selkirks and another 73 killed in the South Peace when the hunt ended.

Ian McAllister of Pacific Wild is one of many who are critical of the hunt, saying the real problem for caribou is habitat destruction. "Killing top predators will harm the whole ecosystem and not miraculously save the caribou in the absence of habitat protection."

Pacific Wild and *Watershed Sentinel* were two of 60 Canadian and international signatories to a letter opposing the wolf cull. The letter asked government to halt the wolf cull and put the cost of the slaughter, $575,000, towards caribou habitat protection. It fell on deaf ears and the wolf continues to be a bloody scapegoat for poor decision making.

A new report, *Witnessing Extinction*, studied five BC caribou herds over 11 years and found that caribou, which are displaced by clearcuts, pipelines, and seismic cut-lines, have had extreme habitat loss due to industrialization. The two University of Northern BC scientists and the government biologist who authored the report stated that we may observe the extinction of the South Peace herds in our lifetime, if industrialization continues at its current rates.

Indeed, killing wolves has yet to be linked to an increase in caribou populations. In Alberta, a wolf cull has claimed more than 1000 animals since 2005. An analysis published in the November, 2014, *Canadian Journal of Zoology* found the Alberta caribou are just maintaining their numbers, not increasing.

There, caribou have been listed as threatened since 2002, mainly because much of their boreal forest habitat has been sliced into small fragments by a web of roads, pipelines, clear-cut swathes, and well pads. Moose and other deer species do well in these open areas, and their populations have boomed – supporting an increasing population of wolves, which have learned to use the roads and pipelines to access caribou in the deep woods.

Companies in Alberta's tar sands are scrambling to find a way to reclaim tens of thousands of kilometres of seismic lines cut into the boreal forest, before provincial regulations mandating the recovery of endangered caribou habitat are implemented in 2017. Yet the Alberta government is still selling off caribou habitat to oil and gas companies. The province came under fire in March for putting 21,000 hectares of energy leases in caribou habitat up for auction, and quickly put the sale on hold – for now.

Meanwhile, advocates to stop the wolf cull in BC, such as Pacific Wild, are using donations to fund an ad campaign to educate the public about the wolf cull. Though the wolves are safe for now, BC's wolf cull is meant to be a five year project and will resume again next winter.

If there was ever a time to cry wolf, it is now.

Action: Letters can be written to the BC Minister of the Environment. Email: *mary.polak.mla@leg.bc.ca*

Sign petition: *www.change.org/p/save-b-c-wolves*

♦

Susan MacVittie is managing editor of the *Watershed Sentinel*.

TANKER BARGES on BC Coast

Fuel deliveries are routinely routed through the Inside Passage

by Delores Broten

American tanker barges without Canadian pilots make dozens of trips through the Salish Sea, Johnston Strait and BC's northern Inside Passage every year, under a waiver granted to the companies by the Pacific Pilotage Authority. The 10,000-ton barges are making fuel deliveries from the Anacortes Refinery near Bellingham, Washington.

Aviation fuel goes to the Kinder Morgan Westridge terminal in Burnaby, BC, and then by pipeline to the Vancouver airport. The barges continue up the coast to deliver gasoline and diesel to communities in BC and Alaska. Each barge carries about 10 million litres of gasoline and diesel on their journey, which occurs three to four times each month.

Tanker Exclusion Zone?

Some members of the public mistakenly believe the area is protected by the voluntary Tanker Exclusion Zone (TEZ) instituted by the Canadian government in 1985, after studies of the impact of a potential oil spill off Canada's west coast. The TEZ is intended to keep oil tankers out of the Inside Passage and 100 kilometres off the BC coast. It has been respected by the US and Canadian Coast Guards and the shipping industry for 30 years, although lately petroleum and condensate for the tar sands have been shipped across the zone from Prince Rupert to the open Pacific Ocean.

Technically, the Texas-based oil vessels are not tankers, but Articulated Tanker Barges (ATBs) where the tug is pinned into a large notch in the transom of its barge, from where it pushes, rather than tows, it through the water. The barges are under the 40,000 ton deadweight limit (the size of the Exxon Valdez spill) that the TEZ specifies.

Ingmar Lee, who lives on Denny Island near Bella Bella, BC, began checking ship traffic in his area, using the Automatic Identification System [the tracking system for marine vessels] (AIS) and is concerned by the tankers carrying fuel on the Inside Passage. Lee said, "I first noticed them about three years ago, and I have been tracking them regularly over the past year as they make their way up and down this coast." [See *www.marinetraffic.com*]

> Each barge carries about 10 million litres of gasoline and diesel on their journey, which occurs three to four times each month.

Captain Kevin Obermeyer of the Pacific Pilotage Authority told the *Watershed Sentinel* that 26 American and 30 Canadian companies had waivers which exempt them from the requirement of a Canadian pilot, including three companies that run ATBs. Obermeyer explained that traffic carrying petroleum supplies was historical on the coast from the early logging days, and that the tug and barge crews know the local waters so well that they are the main source of recruits to be trained as pilots.

Clean Up

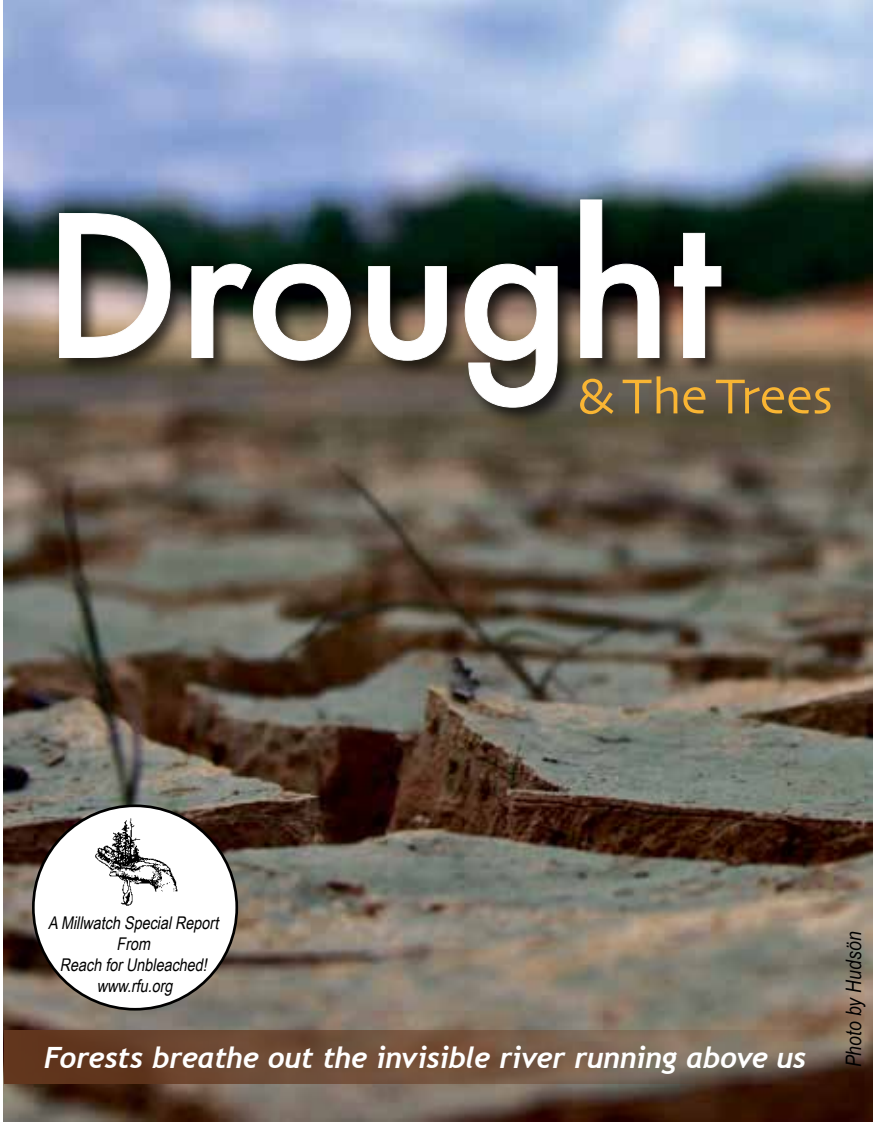
There is great concern that a spill from tankers travelling near the coast will do irreparable damage to the marine ecosystem. The original drift study of oil spills which led to the creation of the TEZ calculated that it would take tugs 18 hours to reach a tanker off Estevan Point, midway up Vancouver Island.

Meanwhile, the Western Canada Marine Response Corporation (WCMRC), funded by shipping companies and oil handling facilities that operate along the West Coast, is certified to deal with spills up to 10,000 tons, with a response time within 72 hours. Their primary area of concern is the lower mainland and southern Vancouver Island, although they do have some equipment in Prince Rupert and run spill response training along the coast. [See *wcmrc.com/vessels/*]

From the recent experience of a spill in Vancouver, the lack of equipment nearby, and the six hour response time before booms were deployed, fears about a spill in the remote coastal areas are justified.

♦

Delores Broten is editor of the *Watershed Sentinel*.



Drought & The Trees

by Joyce Nelson

North America has been in the grip of a weird weather pattern that keeps a high atmospheric pressure system locked in place over the Pacific. This blocking ridge of atmospheric pressure disrupts wind patterns and prevents rainstorms from reaching California, while sending warm, dry air up the West Coast and re-routing the rainstorms farther to the north. Meanwhile, cold air has been moving down from the Arctic and across the northeast, keeping temperatures low and bringing higher precipitation across the East Coast.

According to the *Globe & Mail* (April 3, 2015), "Some climate scientists have suggested that the persistence of such weather patterns is the result of a jet stream that has been weakened by global warming." A weakened jet stream could have dire consequences for weather patterns worldwide – locking in unusual atmospheric patterns for years.

ExxonMobil's "Solution"

On June 27, 2012, Rex Tillerson, Chair and CEO of ExxonMobil, gave a speech to the Council on Foreign Relations entitled "The New North American Energy Paradigm." In it, Tillerson discussed the shale oil/gas industry. During question time, Tillerson was asked about the massive volumes of freshwater used in fracking – in the midst of a severe drought across much of America.

Tillerson gave a revealing answer. "Water is a big concern, I know, to a lot of people," he said. "They're worried about water scarcity. There is plenty of water. It's just not in all the right places. That's the issue. It's not that we have a water resource problem; we have a water distribution problem."

Tillerson cited freshwater in Canada that flows into the oceans, implying that it is therefore wasted.

The timing of Tillerson's June 2012 remarks is important, and in order to fully grasp the import, we need to recall a Vancouver conference that occurred in May 1992 with the theme "Water Export: Should British Columbia's Water Be For Sale?" which attracted delegates from across the continent. One of the papers presented by Montana delegates assessed Canadian legislation pertinent to water export, naming three pieces of legislation "likely to come into play" to impede export – the *Navigable Waters Protection Act*, the *Fisheries Act,* and the *Canadian Environmental Assessment Review Process.*

Twenty years later, the majority Harper government re-wrote the *Canadian Environmental Assessment Act,* made major changes to the *Fisheries Act* and the *National Energy Board Act*, and replaced the *Navigable Waters Protection Act* with the *Navigation Protection Act.*

In January 2013, Greenpeace and the CBC revealed a December 2011 letter from the oil and gas industry requesting that the Harper government make changes to the *Canadian Environmental Assessment Act*, the *Fisheries Act*, the *Navigable Waters Protection Act,* the *National Energy Board Act,* the *Species at Risk Act,* and the *Migratory Birds Convention Act*. —J.N.

Scientists call the atmospheric ridge that is currently blocking rain from California "the Triple R" (the Ridiculously Resilient Ridge). Stanford University scientist, Bala Rajaratnam, told *Counterpunch.org* that such large-scale atmospheric conditions "are far more likely to occur now" because of "large amounts of greenhouse gases" from producing and burning fossil fuels.

The Union of Concerned Scientists recently issued a statement claiming, "This pattern of intense rain and snowstorms and periods of drought is becoming the new normal in our everyday weather as levels of heat-trapping gases in the atmosphere continue to rise."

But other scientists are factoring in a different dimension of human activity that is contributing to drought (and weird weather) worldwide.

Flying Rivers

Apparently, western scientists have misunderstood the hydrological cycle, long assuming that rain clouds form because of evaporation over water-bodies. Instead, they are now realizing forests and other "greenbelts" are central to rainfall patterns because of "transpiration."

As water expert Maude Barlow told CBC's "The Current" (March 3), "the air moving over rainforest carries twice as much rain as air coming over a desert or a cut-down forest. So the forest gives off vapours that are called flying rivers – huge areas of humidity [that] then travel thousands of kilometres. That's what deposits rain when it's needed in Sao Paulo [Brazil] and other places. That is the key here."

Barlow is basing that comment on the work of Brazilian scientist Antonio Donato Nobre and his team of researchers at Brazil's Earth System Science Centre. Nobre issued a report in October 2014 warning that deforestation of the Amazon is contributing to droughts and extreme weather events through the disruption of the "vegetation-climate equilibrium."

Nobre reported that the 600 billion trees in the Amazon forest (through transpiration) transfer "20 billion metric tons of water" into the atmosphere *DAILY* in this "river of vapor that comes up from the forest and goes into the atmosphere" – an amount greater by volume than the entire Amazon River. Nobre calls it "this invisible river running above us."

But in the past twenty years, the Amazon has lost 763,000 square kilometres of forest – an area the size of two Germanys – and another 1.2 million square kilometres have been degraded. This has decreased forest transpiration and has contributed to the lengthening of dry seasons. It is also likely a factor in the severe drought affecting southeast Brazil, where Sao Paulo (the biggest city in South America) is facing the worst water shortages in a century, with water-rationing affecting some six million residents.

Continued on Page 10 ⇨

A Horrible Vicious Circle

The "shale gas revolution" prompted the plastics and petrochemicals industry in North America to switch away from crude oil as the source of its ethane – the component used to make ethylene for common plastics like polyethylene. The new source for ethane became natural gas liquids (NGL) derived from fracked shale gas.

Natural gas liquids (ethane, propane, butane, pentane, isobutene) should not be confused with liquid natural gas (LNG), which is natural gas that has been chilled for tanker transport.

The leading producers of ethylene include Chevron, ExxonMobil, Shell, BP, Dow Chemical and Nova Chemicals. The leading users of ethylene include three beverage companies: Nestle, Pepsi, and Coca-Cola.

According to the *Huffington Post* (July 29, 2013), by 2012 the world-wide bottled water industry was selling 50 billion bottles annually. To create the ethylene used for those 50 billion plastic bottles, the plastics/petrochemicals industry uses approximately 50 million barrels of oil (or NGL shale gas equivalent) each year.

Truthout reported on March 14, 2014, that Pennsylvania regulators determined that between 2008 and 2012, fracking and other oil/gas development contaminated the drinking water supplies in at least 161 locations in that state. The people in those locations (and in many other fracked communities across North America) are now forced to rely on bottled water – including those huge plastic "water buffalo" containers – for their everyday water needs.

Obviously, a horrible vicious circle is being created: fracking increasingly ruins the drinking water of entire communities, who are forced to rely on water bottled in plastic made from shale NGLs produced by fracking.

Many of the parent companies contracting the frackers are themselves "vertically integrated" with the plastic makers as petrochemicals businesses – for example, Shell, Chevron, ExxonMobil, BP and others – so they are profiting from all sides of this situation. —J.N.

Nestlé

Peter Brabeck-Letmathe, the current Chairman and former CEO of Nestlé, has stated that "to believe you have a right to water" is "an extreme belief." He has also been quoted as saying that "water should not be a public right" but "should be something only the wealthy have access to."

As the leading supplier of bottled water worldwide, Nestlé is currently under fire for its water takings at sites in drought-stricken California, and for the ridiculously low price it will pay for groundwater in BC as of 2016 – $2.25 per million litres. According to Reuters (April 2), Quebec currently charges $70 and Nova Scotia $140 for that amount of groundwater. In 2013, Nestlé bottled 265 million litres of water in BC and paid nothing for it. Much of that groundwater was taken from First Nations Sto:lo territory: without consultation.

Nestlé has dozens of water extraction sites across North America for its many bottled water brands: Perrier, San Pellegrino, Arrowhead, Ozarka, Ice Mountain, Zephyrhills, Pure Life, Deer Park, Poland Springs. The company's takings of water in the Great Lakes region alone result in more than $500,000 per day in profit. —J.N.

⇦*Drought continued*

Nobre told *The Guardian* (Oct. 31, 2014), "Studies more than 20 years ago predicted what is happening with lowering rainfall. Amazon deforestation is altering climate. It is no longer about [computer] models. It is about observation."

A December 2014 study by scientists at the University of Virginia found that deforestation can disrupt rainfall patterns thousands of miles away.

Global Forest Watch recently reported that the world lost more than 18 million hectares (650,000 square miles) of tree cover in 2013 – with Russia and Canada at the top of the deforestation list. Because of all this forest loss, Nobre says the "vegetation-climate equilibrium is teetering on the brink of the abyss."

"Vegetative-Climate Equilibrium"

In a 2014 speech, Nobre explained that while he was researching all this, he attended a public declamation given by Davi Kopenawa, a representative of the Yanomami tribe who live deep in the Amazon. As Nobre tells it, Davi Kopenawa basically said, "Doesn't the white man know that, if he destroys the forest, there will be no more rain? And that, if there's no more rain, there'll be nothing to drink, or to eat?"

Nobre says he was astounded by this statement because "we [scientists] are starting to get to this conclusion, which he already knows!"

Nonetheless, Davi Kopenawa's declamation bothered Nobre at the time because, as he puts it, the Yanomami tribal people have never deforested, so how could they know its effects on rain patterns? The question bugged Nobre until finally he met Davi Kopenawa at another event and asked him, "Davi, how did you know that if the forest was destroyed, there'd be no more rain?" He replied: "The spirit of the forest told us."

Nobre says "For me, this was a game changer, a radical change." Nobre is now urging the massive replanting of forests to "reverse climate change, including global warming."

As Maude Barlow told CBC Radio's The Current, scientists now understand that the Dust Bowl of the Dirty Thirties was caused by the widespread elimination of trees and perennial vegetation like Prairie grasslands – "the taking down of the grasses created the drought." Barlow has written elsewhere, "... destroying water-retentive landscapes is in and of itself a major cause of climate change," but that fact "is not part of the analysis or discussion in climate change circles," which primarily focus on the burning of fossil fuels.

In BC, thousands of hectares of industrial forest land are waiting to be replanted. Doing this wisely could have multiple benefits, not just for the province but the planet.

The National Gardening Association website states that on a sunny summer afternoon, an average-size backyard maple tree transpires "more than fifty gallons [of water] per hour" into the local climate. All plants transpire, and Antonio Donato Nobre refers in his speech to a colleague in India, Suprabha Seshan, who is involved in rebuilding ecosystems. Her motto, he says, is "Gardening back the biosphere."

♦

Joyce Nelson is an award-winning freelance writer/researcher and the author of five books.

Photo by Hudsön: https://www.flickr.com/photos/_hudson_/4163567741/in/photolist-dywNuP-7kVnCH-9g5Vbg-8z8PX5-aTvmr

Not That Professional

New BC study reveals problems with professional reliance

by Jim Cooperman

In 2002, I wrote an article for the *Watershed Sentinel* that sharply criticized the then-new "results based" forestry legislation, because it would entrench corporate control of BC's forests. In February, a study *Professional Reliance and Environmental Regulation in BC* by the University of Victoria Environmental Law Centre, has determined that the province's deregulation efforts, for most industrial sectors, has "gone too far" in moving resource management decisions to industry.

The goal for the BC Liberal government was to reduce red tape, ease regulatory restrictions, and thus lower costs for industry. The principle of professional reliance is now applied to most sectors, including forestry, mining, sewage management, water supply, pesticide use, landfill use, dam safety, and riparian areas management.

The study evaluated eight of the 27 professional reliance regimes against ten criteria essential to good management. The results vary from poor for such activities as riparian areas management and forestry, to good for contaminated site remediation.

Conflict of interest

In many cases, professional reliance puts the professional in a conflict of interest. While the professional's supposed first responsibility is to represent the standards and ethics of their governing association, they also must protect the interests of their employers, or risk losing their job. With government oversight now gone, decisions are focused on ensuring continued profits rather than on protecting the interests of the public owners of the resources.

The study was based in part on interviews with biologists, foresters, engineers, agrologists, and technicians as well as individuals and representatives of professional associations. A government working group in 2012 also raised many of the concerns identified. Overall, professional reliance is seen as a euphemism for deregulation that provides industry with too much control over public resources by removing important checks and balances.

The report identifies a litany of problems, including the loss of expertise within government, lack of confidence in government monitoring and enforcement, inability of the public to access monitoring reports, reluctance of government to investigate environment incidents, user conflicts, an increase in "grey areas" because standards of practice are optional, and the failure to apply adaptive management. Yet many of the interviewees said the system is here to stay and simply needs to be fixed to be credible and reliable.

Of particular concern are the regulatory systems for forestry and riparian development, which are "unduly loose" and fail to address concerns such as proper tree and foliage buffers between water bodies and logged areas – a concern also raised recently by the BC Ombudsperson.

The regulatory system that oversees mining in BC has broad discretionary powers that retain a significant degree of government authority. However, the system also relies on the expertise and diligence of professional engineers to inspect and report on tailings dam safety issues. It is unclear whether they have power or authority to require mining operations to make changes needed to protect the environment, which was a factor in the Mount Polley disaster.

The report recommendations for improving professional reliance, included plugging loopholes, addressing conflicts of interest, incorporating better checks and balances, improving environmental performance, restoring governmental approvals and thereby increasing public confidence. These reforms should be developed and tested prior to any further expansion of professional reliance.

Within the environmental community, the impact of the BC government's concerted effort to deregulate forest management and hand it over to industry has resulted in what could be termed defeatism. Along with the forest service, the public is unable to have any idea where logging will take place or how it will be done. All we can hope for is that the land use plans we worked so hard to create along with industry and government are being followed.

♦

Full report: *www.elc.uvic.ca/documents/Professional-Reliance-and-Environmental-Regulation-in-BC_2015Feb9.pdf*

Jim Cooperman is president of the Shuswap Environmental Action Society, *www.seas.ca*

NATURE Needs a New Pronoun

by Robin Wall Kimmerer

Singing whales, talking trees, dancing bees, birds who make art, fish who navigate, plants who learn and remember. We are surrounded by intelligences other than our own, by feathered people and people with leaves. But we've forgotten. There are many forces arrayed to help us forget – even the language we speak.

I'm a beginning student of my native Anishinaabe language, trying to reclaim what was washed from the mouths of children in the Indian Boarding Schools. Children like my grandfather. So I'm paying a lot of attention to grammar lately. Grammar is how we chart relationships through language, including our relationship with the Earth.

Imagine your grandmother standing at the stove in her apron and someone says, "Look, it is making soup. It has gray hair." We might snicker at such a mistake; at the same time we recoil. In English, we never refer to a person as "it." Such a grammatical error would be a profound act of disrespect. "It" robs a person of selfhood and kinship, reducing a person to a thing.

And yet in English, we speak of our beloved Grandmother Earth in exactly that way: as "it." The language allows no form of respect for the more-than-human beings with whom we share the Earth. In English, a being is either a human or an "it."

> Language has always been changeable and adaptive. We lose words we don't need anymore and invent the ones we need.

Indigenous Ways

Objectification of the natural world reinforces the notion that our species is somehow more deserving of the gifts of the world than the other 8.7 million species with whom we share the planet. Using "it" absolves us of moral responsibility and opens the door to exploitation. When Sugar Maple is an "it" we give ourselves permission to pick up the saw. "It" means it doesn't matter.

But in Anishinaabe and many other indigenous languages, it's impossible to speak of Sugar Maple as "it." We use the same words to address all living beings as we do our family. Because they are our family.

What would it feel like to be part of a family that includes birches and beavers and butterflies? We'd be less lonely. We'd feel like we belonged. We'd be smarter.

In indigenous ways of knowing, other species are recognized not only as persons, but also as teachers who can inspire how we might live. We can learn a new solar economy from plants, medicines from mycelia, and architecture from the ants. By learning from other species, we might even learn humility.

Colonization, we know, attempts to replace indigenous cultures with the culture of the settler. One of its tools is linguistic imperialism, or the overwriting of language and

names. Among the many examples of linguistic imperialism, perhaps none is more pernicious than the replacement of the language of nature as subject with the language of nature as object. We can see the consequences all around us as we enter an age of extinction precipitated by how we think and how we live.

Language - The Path to Sustainability

Let me make here a modest proposal for the transformation of the English language, a kind of reverse linguistic imperialism, a shift in worldview through the humble work of the pronoun. Might the path to sustainability be marked by grammar?

Language has always been changeable and adaptive. We lose words we don't need anymore and invent the ones we need. We don't need a worldview of Earth beings as objects anymore. That thinking has led us to the precipice of climate chaos and mass extinction. We need a new language that reflects the life-affirming world we want. A new language, with its roots in an ancient way of thinking.

If sharing is to happen, it has to be done right, with mutual respect. So, I talked to my elders. I was pointedly reminded that our language carries no responsibility to heal the society that systematically sought to exterminate it. At the same time, others counsel that "the reason we have held on to our traditional teachings is because one day, the whole world will need them." I think that both are true.

English is a secular language, to which words are added at will. But Anishinaabe is different. Fluent speaker and spiritual teacher Stewart King reminds us that the language is sacred, a gift to the People to care for one another and for the Creation. It grows and adapts too, but through a careful protocol that respects the sanctity of the language.

He suggested that the proper Anishinaabe word for beings of the living Earth would be *Bemaadiziiaaki*. I wanted to run through the woods calling it out, so grateful that this word exists. But I also recognized that this beautiful word would not easily find its way to take the place of "it."

We need a simple new English word to carry the meaning offered by the indigenous one. Inspired by the grammar of animacy and with full recognition of its Anishinaabe roots, might we hear the new pronoun at the end of *Bemaadiziiaaki,* nestled in the part of the word that means land?

"Ki" to signify a being of the living Earth. Not "he" or "she," but "ki." So that when we speak of Sugar Maple, we say, "Oh that beautiful tree, ki is giving us sap again this spring." And we'll need a plural pronoun, too, for those Earth beings. Let's make that new pronoun "kin." So we can now refer to birds and trees not as things, but as our earthly relatives. On a crisp October morning we can look up at the geese and say, "Look, kin are flying south for the winter. Come back soon."

Language can be a tool for cultural transformation. Make no mistake: "ki" and "kin" are revolutionary pronouns. Words have power to shape our thoughts and our actions. On behalf of the living world, let us learn the grammar of animacy. We can keep "it" to speak of bulldozers and paperclips, but every time we say "ki," let our words reaffirm our respect and kinship with the more-than-human world. Let us speak of the beings of Earth as the "kin" they are.

♦

Originally published in *YES! magazine,* Spring 2015.

Robin Wall Kimmerer is the founding director of the Center for Native Peoples and the Environment at the SUNY College of Environmental Science and Forestry. Her book *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* (Milkweed Editions) was published in October 2014.

BC's Expensive Fish Farms

Government is propping up fish farms despite the high costs

by Briony Penn

On the afternoon of February 10, 2015 a whale watching boat docked at Port McNeill, BC, packed with 48 Malcolm Islanders from the small village of Sointula.

They weren't whale watchers; these were shrimp fishermen, fishing lodge operators, First Nations people, residents, members of local organizations, and biologist Alex Morton, who were coming to an open house of Grieg Seafood – the company that is proposing an expansion of two salmon farms in the Broughton Archipelago that would set a precedent of replacing shellfish tenures with finfish. The reason the islanders were delivered by a whale watching boat was because the meeting was scheduled at the time when the ferry only carries dangerous cargo.

Some might argue that the residents were the dangerous cargo. According to Gord Curry of Living Oceans Society, the islanders, determined to have their voices heard, found their own transportation to Port McNeill and delivered their message loud and clear: No more open net salmon farms; closed containment systems are the answer. Locals pointed to the Namgis First Nation down the road that has set up the first land-based closed containment systems in the region and has been delivering farmed salmon for nearly a year with no risk to wild salmon. The open house was intended to be a little tête-à-tête with industry representatives, but it quickly changed into a town hall meeting where people voiced their concerns collectively.

The same calls of alarm are echoing around the coast as the industry is poised to expand open-net salmon farming four-fold. With the recommendations of the $26 million BC Cohen Commission (tasked to find answers to the disappearing Fraser sockeye in 2012) still mostly unimplemented, the increasing volatility of viruses and other pathogens, the declining efficacy of sea lice drugs, the slashing of federal regulations to allow indiscriminate use of new chemicals to fight the lice, and the continued muzzling of government scientists, there are reasons to be concerned.

On the lower Vancouver mainland, Stolo First Nation activist Eddy Gardner is gathering steam encouraging groups to boycott Costco, Walmart, and other stores with his online Farmed Salmon Boycott kit with easy instructions for anyone to get started to stage your own boycott. The *Change.org* petition to ban salmon feedlots is at 106,000 and rising.

Back in Port McNeill, Curry pointed out the obvious to officials, given that one of the recommendations of the Cohen Commission was to put a moratorium on salmon farm expansion in the Discovery Islands – south of the Broughton-Archipelago – to assist the Fraser sockeye migration: "It isn't a stretch of logic that what's good for Fraser salmon is good for Knight Inlet salmon." And that is what's at stake with the Grieg applications: a safe migratory route for the Knight Inlet salmon, and the loss of productive shrimping grounds. Fishermen of Sointula who rely on that productivity stand to lose their livelihoods with no compensation."

Fish Farm Expansion

Meanwhile, over on the west side of Vancouver Island, Clayoquot Sound fish farm watchers, like Clayoquot Action's Bonny Glambeck, continue to tussle with the planned expansion of two new Atlantic salmon feedlots in Millar Channel and Herbert Inlet. There are currently 21 fish farm sites in the Clayoquot Sound UNESCO Biosphere Reserve, and Cermaq, a big player in the Sound, wants to add another farm to Millar Channel, which already suffered major die-offs from infectious hematopoietic necrosis virus (IHNV) in 2012, and from an algal bloom in 2014.

Herbert Inlet is at the gateway to the Moyeha River, one of the last intact watersheds on Vancouver Island, through which spawning fish enter and smolts leave. According to Glambeck, the issue is simple: "Salmon populations are crashing in pristine watersheds – coincidentally where all the fish farms are. So why wouldn't we be implementing everything we learned from the Cohen Commission before we start expanding this industry? The recommendation of Cohen was not to have farms on migration routes and Herbert Inlet, for one, is on a migration route."

One of Cohen's recommendations was for DFO to review and change the siting criteria and analyze all current licenses to meet the new criteria. According to the federal Department of Fisheries and Oceans (DFO), it is now poised to release its new licencing regulations and will be open for business. DFO will now be evaluating new marine finfish aquaculture applications (other than the Discovery Islands area and the north coast where the provincial 2008 moratorium is in place) "through the lens of environmental sustainability and engagement with First Nations and other stakeholders."

DFO has been unlawfully allowing the salmon farming industry to transfer farmed salmon into marine net pens that are carrying diseases with the potential to 'severely impact' the wild fishery at an international level.

In an effort to expand the social licence for fish farming, DFO set up the Aquaculture Management Advisory Committee (AMAC). Craig Orr, long-time advocate with Watershed Watch, was invited to serve on the committee but quickly dropped out, claiming it was "a sham." He stated, "In particular, that there wasn't a broad enough science input into AMAC. DFO said that their own scientists would be the only representation. The Cohen Commission specifically identified that DFO's science mandate was too narrow and conflicted in terms of them wanting to expand the industry and that is exactly what they are doing now."

DFO refutes these allegations. It claims the federal government respects the 2008 moratorium in the north and that it takes a "science-based approach to the management of aquaculture in British Columbia, including consideration of both DFO and non-DFO research."

Glambeck also turned down a seat on the advisory committee which hosts seven industry reps, two industry associations, two local government reps, seven First Nations and, ostensibly, three environmental non-governmental organizations' (ENGOs) representatives. No ENGOs have accepted the invitation. Why? The advisory committee is tightly controlled, as are the questions that come before it for review.

Fish Virus and Sea Lice

One of the independent scientists whose questions and research have been rejected by the Science Advisory Secretariat is Alexandra Morton, who has published extensively in peer-reviewed journals like *Science* and posts monthly updates on her work with viruses and sea lice. She has been continuously testing for one of the most dangerous viruses, Infectious Salmon Anemia (ISA), a strain of which hit Chilean fish farms with devastating results in 2007-2009. The Cohen Commission revealed evidence of strains of ISA in farms from Clayoquot Sound (reported by a DFO lab). As Morton attests, "We have learned from the Cohen Commission that several government labs have produced positive tests for the ISA virus in BC. Last fall the Canada Food Inspection Agency made an announcement that they couldn't find ISA virus on the coast. I've asked them to detail their methods but they won't provide them. I continue to do work with the eastern lab [that tested positive results for ISA in supermarket-bought fish] and I hope to publish the results."

In order to bring attention to the severity of the problem, Morton launched a lawsuit with Ecojustice last December, based on a 2007 confidential memo in which the provincial vet in charge of farmed salmon told the minister that BC is at low risk from ISA because BC doesn't import live salmon eggs. He wrote that memo at the time when his colleagues in DFO were filing reports on the importation of 28 million live Atlantic salmon eggs into BC. As Morton recounts, "I asked the College of Veterinarians to investigate twice and they refused, so I went to Ecojustice." [Update: In May, the Federal Court of Canada handed down the decision that "DFO has been unlawfully allowing the salmon farming industry to transfer farmed salmon into marine net pens that are carrying diseases with the potential to "severely impact" the wild fishery at an international level." See *www. alexandramorton.typepad.com*]

Morton's early research focused on the sea lice issue. As she notes "The salmon fish farm industry is in a drug war with sea lice that they are losing around the world. There is a myth in BC that says sea lice are not a problem here, but it is not true. They are currently using drugs to suppress them .... But a life on drugs never works. Companies are certainly looking for new drugs."

In response to diseased fish invading Norwegian sportfishing waters and apparently intractable sea lice drug prob-

Continued on Page 27 ⇨

LOST in the 21st Century

Photo by Ester Strijbos

by George Monbiot

Consumerism has broken its promise. Perhaps now we can begin to reconnect.

A woman walks into a department store. She takes in the racks and stacks of stuff, the sugared music, the sale signs, the listless customers shuffling through the aisles, and is moved – suddenly and to her own astonishment – to shout, "Is this all there is?!" An assistant comes round from behind his till. "No madam. There's more in our catalogue."

This is the answer we have been given to everything, the only answer. We might have lost our attachments, our communities, our sense of meaning and purpose, but there will be more money and more stuff with which to replace them. Now that the promise has evaporated, the size of the void becomes intelligible.

It's not that the old dispensation was necessarily better: it was bad in different ways. Hierarchies of class and gender crush the human spirit as effectively as atomization. The point is that the void that was filled with junk is a void that could have been occupied by a better society, built on mutual support and connectedness, without the stifling stratification of the old order. But the movements that helped to smash the old world were facilitated and co-opted by consumerism.

Individuation, a necessary response to oppressive conformity, is exploitable. New social hierarchies, built around positional goods and conspicuous consumption, took the place of the old. The conflict between individualism and egalitarianism, too readily ignored by those who helped to break the oppressive norms and strictures, does not resolve itself.

An Epidemic of Loneliness

So we are lost in the 21st Century, living in a state of social disaggregation that hardly anyone desired, but that is an emergent property of a world reliant on rising consumption to avert economic collapse, saturated with advertising and framed by market fundamentalism. We inhabit a planet our ancestors would have found impossible to imagine: seven billion people, suffering an epidemic of loneliness. It is a world of our making but not of our choice.

Now it appears that the feast to which we were invited is only for the few. Figures released last week show that wages in the United Kingdom are lower than they were 13 years ago. A fortnight ago, Oxfam revealed that the top 1% now possesses 48% of the world's wealth; by next year it will own as much as everybody else put together. On the same day, an Austrian company unveiled its design for a new superyacht. It will be built on the hull of an oil tanker, 918 feet long. There will be 11 decks, three helipads, theatres, concert halls and restaurants, electric cars to take the owner and his guests from one end of the ship to the other, and a four-storey ski slope.

In 1949, Aldous Huxley wrote to George Orwell, to argue that his dystopian vision was the more convincing. "The lust for power can be just as completely satisfied by suggesting people into loving their servitude as by flogging and kicking them into obedience .… The change will be brought about as a result of a felt need for increased efficiency." I don't believe he was wrong.

Lotus Eating

Consumerism is at odds with common purpose: you could pay your taxes or you could spend the money on a new car. It stifles feeling, dulling our concern for other people. Freedom to spend displaces other freedoms, as lotus eating allows us to forget our losses. Most forms of peaceful protest are now banned, but no one stops us from devouring the resources upon which future generations will

depend. All this helps the global oligarchs to rip holes in the social safety net, find relief from the constraints of both democracy and taxation, and enclose and privatize our common weal.

Just as human society has been pulled apart by consumerism and materialism, pushing us into an unprecedented Age of Loneliness, so ecosystems have been shattered by the same forces. It is the consumerist mindset, raised to the global scale, that now threatens us with climate breakdown, catalyses a sixth great extinction, imperils global water supplies, and strips the soil upon which all human life depends.

But nor do I believe that the acceptance of servitude Huxley envisaged is a permanent state. Wage stagnation, the brutality of the new conditions of employment, the breaking of the link between educational attainment and social advancement, the impossibility, for many young people, of finding good housing, all these confront us with the question that could be deferred only during conditions of rising general prosperity: is this all there is?

> We might have lost our attachments, our communities, our sense of meaning and purpose, but there will be more money and more stuff with which to replace them.

As the growth of the European anti-austerity parties Syriza and Podemos suggests, we cannot build political movements to challenge these issues unless we also build society. It is not enough to urge people to change their politics: we must create not only communities of interest but also communities of mutual support, offering the security, survival and respect that the state will no longer provide.

In a remarkable series of contemplations, extending beyond its familiar brief, Friends of the Earth has begun to explore how we might reconnect, with each other and with the natural world. It is looking, for example, at new models for urban living, based on sharing rather than competitive consumption: the sharing not just of cars and appliances and tools, but also of money (through credit unions and micro-finance) and power. This means community-led decision-making, over transport, planning and, perhaps, rent levels, minimum and maximum wages, municipal budgets and taxation. Such initiatives are not a substitute for government action – like David Cameron's Big Society they are meaningless without facilitation from the state – but they can bring people together with a sense of shared purpose, ownership and mutual support that centralized decision-making can never provide.

Friends of the Earth also supports the empathy revolution championed by the author Roman Krznaric, and lifelong education that might counter the ever narrower schooling now inflicted on our children, whose purpose is to prepare people for jobs they will never have, in the service of an economy ordered for the benefit of others.

In these ideas and movements we find the glimmerings of an answer to the question: no, this is not all there is. There is attachment. Despite the best efforts of those who believe there is no such thing as society, we have not lost our ability to connect.

♦

Originally published in the *Guardian*, February 4, 2015, *www.guardian.co.uk*

George Monbiot is a journalist with the UK *Guardian* and blogs at *www.monbiot.com*

2015 International Year of Soils

HEALTHY SOILS ARE THE BASIS FOR HEALTHY FOOD PRODUCTION

Soils **supply**

- essential nutrients
- water
- O_2 oxygen
- root support

that our **food producing plants** need to grow and flourish

THE IMPORTANCE OF MAINTAINING HEALTHY LIVING SOILS

Soils maintain a diverse community of organisms that:

- help control **insect & weed pests and plant disease**
- form beneficial **symbiotic associations** with plant roots
- recycle essential **plant nutrients**
- improve **soil structure**

Soils serve as a buffer to **protect delicate plant roots** from drastic fluctuations in temperature.

Healthy soil contributes to **mitigating climate change** by maintaining or increasing its **carbon content**

it is the foundation of food systems and the medium in which nearly all food-producing plants grow

SOILS, FOOD SECURITY & NUTRITION

95% **of our food** is directly or indirectly **produced on our soils**

In the past **50** years

advances in agriculture technology has led to increased food production, but sometimes **with negative impacts**

In many countries, **intensive crop production** has **depleted the soil,** jeopardizing our ability to maintain production in these areas in the future

It can take up to **1000** years to form **1 cm** of soil

Soil health and its fertility have a direct influence on the **nutrient content of food crops**

SUSTAINABLE SOIL MANAGEMENT

diverse farming approaches

promote the sustainable management of soils

Agroecology

is a systems approach based on a variety of technologies, practices and innovations, including local and traditional knowledge and modern science

Agroforestry

includes both traditional and modern land-use systems where trees are managed together with crops and/or animal production systems in agricultural settings

Organic farming

is agricultural production without the use of synthetic chemicals or genetically modified organisms, growth regulators , and livestock feed additives

Zero tillage

is a technique used in conservation agriculture to maintain a permanent or semi-permanent organic soil cover that protects the soil allowing soil microorganisms and fauna to take on the task of "tilling" and soil nutrient balancing

Conservation agriculture

follows three principles (minimal soil disturbance, permanent soil cover and crop rotations) to improve soil conditions, reduce land degradation and boost yields

Sustainable soil management could produce up to 58% more food

fao.org/soils-2015

THE YEAR OF SOILS

by Tsiporah Grignon

"Eating is an agricultural act" is a simple, yet profound statement from naturalist poet and lifelong advocate of the small family farm, Wendell Berry.

The UN's Food and Agriculture Association has designated 2015 as the International Year of Soils. Events are being organized in over 30 countries to address the continued toxic overload and abuse of our soil.

The process of soil degradation began in the middle of the 20th century when big business got involved with growing food, creating industrial agriculture. The practice of monoculture was widely adopted – growing single crops intensively on a very large scale. Today, this is how most wheat, corn, soy, rice, and cotton are grown.

In order to grow a single crop in the same place every year, it became necessary to replenish nutrients in the soil that were depleted by the practice of mono-cropping. In this way, chemical fertilizers became indispensable. But there was more to industrial farming. Pests and weeds have always been a nuisance to farmers. And since a single crop is like an all-you-can-eat restaurant for pests, it became necessary to kill pests through the practice of aerial spraying of chemicals. This was also done to kill weeds.

Never before in human history has the drive to sell poisonous chemicals for massive profits dictated the future of our soil.

Never before in human history has the drive to sell poisonous chemicals for massive profits dictated the future of our soil. The system of monoculture, propped up by application of toxic substances, destroys microscopic creatures, healthy bacteria and fungi in the soil, which are nature's helpers that nurture and maintain life-giving soil integrity.

The most widely used chemical herbicide is Monsanto's notorious Round-up, whose active ingredient is glyphosate. There is now ample evidence that glyphosate has become a serious threat – to the soil, to the plant, and to the health of those that eat plants treated with Roundup.

We recognize that a modern industrial farm has been described as "a place where petroleum turns into food." We observe that thousands of years of poor land management, such as over-ploughing and overgrazing, has led to soil erosion, and ultimately to desertification. Surely it is absurd to expect nutritionally deficient soils to produce more and more food.

Still, the chemical companies convinced governments they could do better than nature. Genetically engineered food was hailed as a scientific and technological breakthrough - and "the way to feed the world."

At a recent food forum on Gabriola Island, BC, one organic farmer said that even organic food may be mineral deficient, due to contamination of the water supply from glyphosates that inhibit the uptake of minerals. She reminded us to focus on what to put back into the soil, to feed and encourage the microbes and the friendly life-giving bacterias. Another farmer, who uses permaculture techniques, referred to industrial farming that has made topsoil "North America's largest export in the last hundred years – up to five feet of it in the prairies, truckload after truckload."

One method of soil regeneration being currently emphasized is no-till farming, which sequesters carbon in the soil. In essence, plants release oxygen; when we till the soil, carbon is exposed to the atmosphere, allowing some of it it to combine chemically with the oxygen in the air to form carbon dioxide (CO_2). Tilling also destroys mycorrhyzae, worms and other soil life, as well as letting water evaporate instead of returning to the aquifers and hydrating plants. Storing carbon in the soil has other positive results, such as reducing soil erosion and improving the overall health of the ecosystem.

There is a global movement saying "No" to corporate control of food and agriculture, and saying "Yes" to organics and soil renewal. In this Year of Soils, may we cultivate reverence for the living soil that supports and sustains us.

♦

Tsiporah Grignon writes about our food supply and has organized Food Forums on Gabriola Island, BC that bring together Island producers and consumers.

NASA Launches SOIL SATELLITE

NASA begins a three year mission to collect soil moisture data

by Catherine DeLong

Dara Entekhabi, a hydrologist and faculty member at the Massachusetts Institute of Technology in Cambridge, Massachusetts, reminds us that "Earth is a unique place." It is the only planet (that we are aware of) where "water exists in all three phases: liquid, solid and vapor." This lucky position is maintained because of the cozy distance of the Earth's orbit to the sun, as well as the protective blanket of our atmosphere. The sun also provides the energy source for these phase transitions; the sun heats the land and liquid water evaporates from the surface before re-condensing as clouds in the atmosphere. Whenever water changes forms, energy is either used or released which, as Entekhabi points out, means "the hydrologic cycle is a major conveyor of energy."

Running parallel to the global water and energy cycles is the carbon cycle. The sun's radiation is used by Earth's plant community to biochemically combine carbon (in the form of carbon dioxide) and water to produce plant matter. The water needed for plants to

Photo by NASA

complete this photosynthetic process is stored in the porous medium that anchors their roots – the soil. Soil moisture, a component of the water and energy cycles, regulates the carbon cycle by managing plant growth. 'Soil moisture is the piece of the water cycle which links the energy and carbon cycles,' states Entekhabi. And together, 'these three cycles maintain life on Earth.'

SMAP Satellite

On January 31, 2015 the Soil Moisture Active Passive, (SMAP) satellite was launched on a three year mission to observe and collect global soil moisture data to a 5 centimetre depth. Dara Entekhabi is the lead scientist for the SMAP mission, and has been working on its realization for over a decade. SMAP is one of the first satellites to be developed by the National Aeronautics and Space Administration (NASA) in response to a National Research Council survey to assess top priority space-based Earth observations. Soil moisture received such high priority because of the insights it may provide into the water, energy and carbon cycles.

Dara Entekhabi

As the concentration of carbon dioxide and other energy-trapping greenhouse gases increase in our atmosphere, so too does the amount of radiation. The implications for this influx of atmospheric energy and its effect on the climate are unclear. "The large uncertainty," notes Entekhabi, "in how we can predict what the extra trapping of radiation will mean for climate systems is partly because we just don't know how the cycles are linked together. And that's what [SMAP] is trying to address."

Beyond providing the missing piece of the puzzle for climate predictions, researchers in the United States, Canada, and India are already planning to use SMAP's data to aid drought monitoring which currently relies on theoretical models rather than observational measurements. Also, soil moisture data combined with rainfall predictions can improve forecasters' ability to predict flooding, landslides and improve disaster relief. In fact, the United Nations (UN) World Food Programme already plans to use SMAP's data to improve flood warning in data-poor regions. The data will also have major implications for crop productivity, famine early-warning, and crop insurance pricing. In Germany, researchers are also planning on taking advantage of SMAP's ability to distinguish between frozen and liquid water in order to track polar ice fluctuations.

Reaching Into the Boreal Forest

Perhaps the most highly anticipated contribution of the soil moisture data will be in the boreal forests, the vast, perennially frozen biome which covers the northern reaches of Canada, Alaska, Scandinavia, Russia, Kazakhstan and Japan. This region, which spans 16 million square kilometres, "is the on/off switch for the carbon cycle" according to Entekhabi. Soils in the boreal forests are very cold and often frozen at some point during the year. Cold soils slow down the carbon cycle, and frozen soils almost completely stop the release of carbon into the atmosphere. SMAP, by observing the length of the annual thaw in this region and ensuing flux of atmospheric carbon dioxide, will be able to gauge the rate at which climate change is occurring. In Entekhabi's words, "the longer you leave the lights on, the more energy goes into the system."

By orbiting at 685 kilometres above the Earth, SMAP is gathering global soil moisture data at a scale that would be unfeasible on the ground. The boreal forest, were it a country, would be the second largest after Russia. In order to directly measure soil moisture in this massive and remote area, researchers would need to take literally millions of ground samples as moisture levels can change every few metres. And because soil moisture varies seasonally, these millions of samples would need to be repeated every few days. SMAP takes global measurements every three days, and can therefore pinpoint when the freeze/thaw cycles begin. In this way a single satellite can accomplish a task that would require thousands of researchers on the ground.

SMAP's mission began just in time to celebrate the UN's International Year of Soils. Entekhabi agrees that "SMAP is timely." "The soil is a living resource, and it's a finite resource; anything we can do to understand the role of this vital resource is important to communicate during this one year." Although SMAP is limited to a three year mission, Entekhabi is hopeful that the observations gained during this time will provide insights for years to come.

♦

Catherine DeLong is a science writer and native of Des Moines, Iowa who is working with the United Nations on the International Year of Soils blog.

For the Love of PEAT

Bogs act as carbon sinkholes ... with enough water

by Gerard John Cowan

Traditionally, bogs have been seen as worthless, ugly pieces of land, holding little or no intrinsic value. Indeed, the phrase "bog standard" is used to denote anything that is basic, ordinary, unexceptional, or uninspiring. Bogs have such a serious image problem that, in Ireland and Scotland, the word bog has long been a slang term for toilet. "Going to the bog" is synonymous with "going to the bathroom."

Bogs may not catch the eye in the way rainforests or coral reefs do, but they hold a subtler charm. In recent years, the negative image of bogs has started to be overturned. People are reassessing bogs and discovering that they are a fascinating ecosystem, vital in the fight against climate change. The principle reason for this change of view lies in the chief product of bogs: peat. In recent years bogs and mires have come to be known as peatlands in order to throw off the negative connotations associated with bogs.

Something that had taken ten thousand years to accumulate was almost wiped out in just four short decades.

What Is Peat?

Bogs have a variety of flora growing in them, the most famous of which are sphagnum mosses. Sphagnum has been credited as "the bog builder" by the Irish Peatland Conservation Council. It is capable of growing in the highly saturated, low-nutrient bog environment because it is able to absorb a vast amount of water, and does not need as much nutritional input as larger forms of vegetation.

Once bog vegetation dies, it decomposes at a much slower rate than vegetation found in other ecosystems. The slower decomposition happens because bog water is acidic and low in nutrients. This is the secret to how peat is formed. The decomposing bog vegetation slowly begins to form a new peat layer, storing large amounts of carbon and preventing it from making its way into the atmosphere. It is estimated that a metre of peat takes thousands of years to accumulate. Fresh layers of sphagnum mosses grow on top of the peat layer, and the cycle continues until a dome shape is formed at the top of the bog.

Peat has traditionally been used for a number of purposes. In European countries, including Ireland, Finland, and the Netherlands, peat was extracted to be used as a fuel source to heat homes. Peat was never a major source of fuel in North America. Instead, it is used in horticultural composts and starter soils. Indeed, the peat extracted from Burns Bog, Delta, BC, was used primarily for horticultural purposes.

Peat harvesting is now regarded as an unsustainable practice, due to the length of time peat takes to form, and the damage that can be done by extraction over a short period of time. Entire bogs can be erased over a period of just a few decades. The peat harvesting industry in Burns Bog only lasted from the 1940s to the 1980s, but in that time 40% of Burns Bog's peat layers had been harvested to a depth of two meters, and huge damage was caused to the bog's hydrology. Something that had taken ten thousand years to accumulate was almost wiped out in just four short decades.

In addition, peat extraction techniques cause enormous damage to the hydrology of peatlands. The harvesting techniques require the drainage of peatlands in order to gain easier access to the peat. This is achieved through digging ditches to release the water. As a result, peatlands are left with a much lower water table than is necessary for a vi-

able future. Remember; peatlands/bogs are still primarily wetlands, and adequate hydrology is vital to their survival.

How Do Bogs Help Prevent Climate Change?

Peatlands help prevent climate change by permanently absorbing carbon dioxide from the atmosphere, and preventing the release of methane. Figure 1 demonstrates how a bog with a high water table can act as a carbon sink. Carbon dioxide is absorbed from the atmosphere by the vegetation growing on the surface of the bog. As the vegetation dies, it sinks under the water table and forms new layers of peat. Provided the water table remains high, the carbon dioxide and methane produced by the decomposition cannot be released into the atmosphere.

Contrast that with the low water table bog in Figure 2. Peatlands generally have a low water table as a result of human activities. The peat extraction and agricultural industries have traditionally dug ditches in order to lower the water table and dry out the peat. This makes it easier to extract the peat, or sow a different type of crop.

In Figure 2, the carbon dioxide absorbed from the atmosphere, is not trapped under the water table and turned into peat. As the vegetation dies, it releases methane (the most intensive greenhouse gas) into the atmosphere. The dry peat becomes aerobic, resulting in carbon dioxide making its way into the atmosphere. Instead of acting as a sink for greenhouse gases, the bog is now acting as a source.

The release of these harmful greenhouse gases contributes to the warming of our atmosphere and the changes in our climate. It is estimated that the peatlands in the northern hemisphere alone store up to 450 billion tons of carbon dioxide. Were this carbon to be released into the atmosphere, it would have catastrophic consequences for our climate.

What Can Be Done To Save Bogs?

Now that you are aware of the importance of peatlands in preventing climate change, you may be wondering what is being done to save these essential ecosystems. The short answer is, not enough. Many peatlands around the world are still being harvested, developed on, or drained for other purposes.

However, things are gradually beginning to change, and efforts are being made to preserve or restore many of our valuable peatlands. In many peatlands, including Burns Bog, efforts are being made to restore the water table and encourage the growth of sphagnum mosses. This is done through blocking the ditches that were dug when the peatlands were being exploited. Over time, results have shown that the water table in these damaged peatlands can return to a sustainable level. With the water table restored, conditions are right for sphagnum moss to again thrive. Indeed, in some bogs, sphagnum mosses have been planted to encourage quicker growth with positive results.

In addition, peat is declining as a fuel source, and there are many alternatives to peat in horticultural soils. So, really, there is no logical reason for continuing to destroy such a valuable resource. We do not need peat for fuel or compost, and by damaging peatlands we would ultimately be harming ourselves with a worse climate.

In his poem, *Bogland*, the great Irish poet, Seamus Heaney, marveled at the ability of peat to preserve historical artefacts for centuries. He referred to it as "kind black butter." Perhaps, peat can perform its greatest act of kindness in preventing climate change.

Peat has a history of preserving our cultural past. Perhaps its next job is to ensure our future.

♦

Gerard John Cowan is a research and communications coordinator with the Burns Bog Conservation Society.

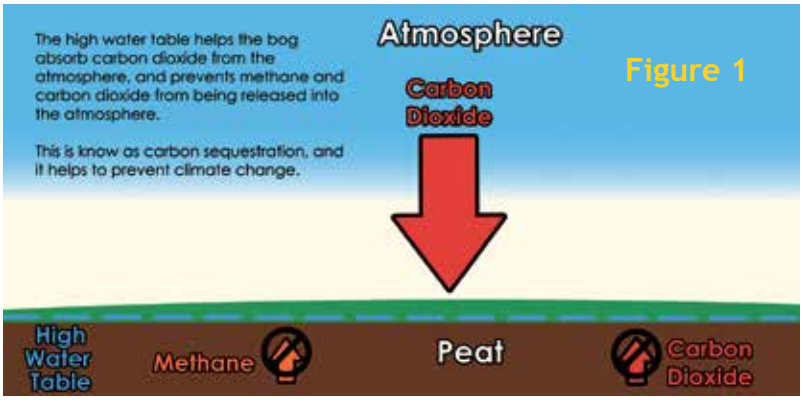


Figure 1

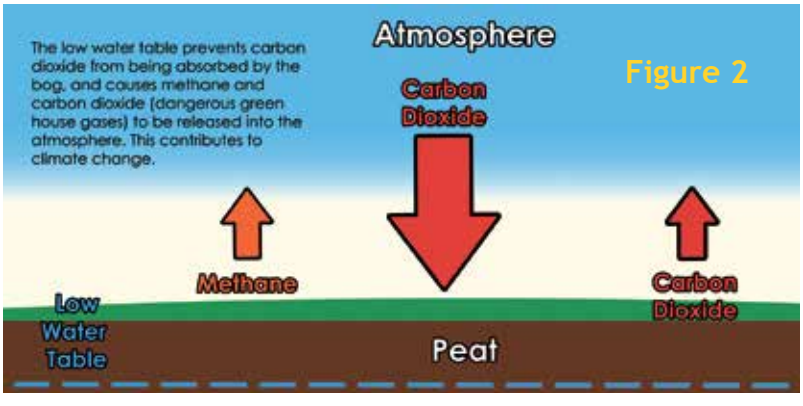
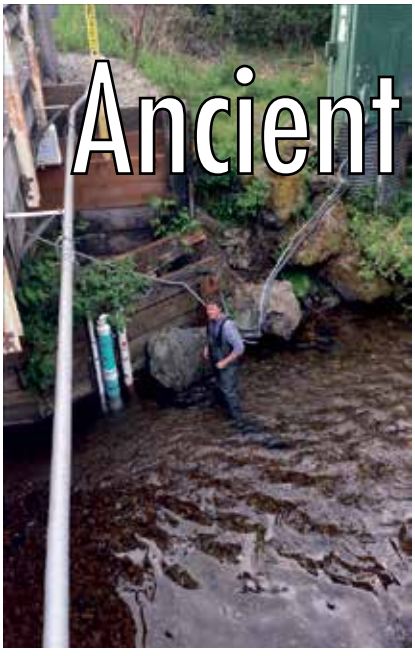


Figure 2



Ancient Carbon in the Air

Soils are the largest repository of carbon on land

by Stephen Leahy

Cutting forests or building a road, a dam, a mine, or any other activity that digs up the earth puts old carbon into the atmosphere as carbon dioxide (CO_2) in a way no one has accounted for. New research shows that wind and water runoff bring this old carbon into rivers where it's converted into CO_2.

"The IPCC (Intergovernmental Panel on Climate Change) didn't consider this in their latest assessment. It's not part of the CO_2 emission models," said Marguerite Xenopoulos, a biologist at Ontario's Trent University and study co-author.

Fossil fuels (oil, gas, coal) are forms of very old carbon that are dug out of the ground and burned putting massive amounts of heat-trapping carbon dioxide (CO_2) into the atmosphere. And all that CO_2 acts like a thick blanket heating up the planet, aka climate change.

Xenopoulos and colleagues paper, published in *Nature Geoscience*, reveals that digging up soil, particularly intensive farm cultivation and drainage of wetlands and peatlands, liberates carbon that's been sequestered in the ground for thousands of years. When this carbon is blown or washes into waterways, bacteria convert it into CO_2 and it ends up in the atmosphere.

"The release of this aged carbon is comparable to the burning of fossil fuels," Xenopoulos said in an interview.

In undisturbed landscapes, the carbon in rivers is newly formed and produced carbon from soils and nearby plants and trees. Using carbon isotopes researchers determined the age of the carbon in waterways at many locations around the world. They were surprised to find that as much as 9 per cent of the carbon they found was old carbon that would have remained buried except for human activity, she said. "The greater the human activities on land the more old carbon we found."

Soils are the largest repository of carbon on land – much of it is tens of thousands years old. A hectare of boreal peatland will hold more than 500 tonnes in the first metre. In grasslands, valleys, and deltas it ranges from 200 to 500 tonnes per hectare. When a field is ploughed or bulldozed for a building site, some of this soil carbon moves into waterways through the actions of wind and water, including storm water runoff and sewage systems.

In waterways, bacteria breakdown this soil carbon, turning some of it into CO_2. In a similar fashion bacteria also breakdown any dead plant matter – leaves, bits of wood – that fall in the water.

Until recently, researchers thought of "rivers as passive pipes funnelling all that carbon into the oceans where it eventually ended up buried on the ocean floor," said co-author David Butman, at the School of Environmental and Forest Sciences at the University of Washington.

Now the new research reveals that human activities are putting significant amounts of old carbon into rivers, which puts additional CO_2 in the atmosphere. This means we've been underestimating global emissions, said Butman.

Compared to burning of fossil fuels, which is on the order of 35 billion tonnes, the amount of old CO_2 released through land disturbance is small but not insignificant he said.

This old CO_2 from the land is in addition to the CO_2 produced from cutting down forests or turning grasslands into corn and soy fields. Agriculture, deforestation and other land use changes represent about 21% of all global emissions.

The first comprehensive analysis of US land use change found that seven million acres of new farmland was created from natural areas to feed the government-subsidized ethanol industry between 2008 and 2012. The loss of the CO_2-absorbing natural areas resulted in more net emissions, equivalent to adding 28 million more cars on the road.

It wouldn't be difficult to estimate how much old CO_2 is being mobilized by specific landscape changes but it is very expensive to measure, said Xenopoulos.

"Building the 407 (a major highway construction project near Toronto) will produce a massive flux of CO_2," she said. "We could easily measure it but we just don't have the funding."

♦

Stephen Leahy is an environmental journalist from Uxbridge Ontario.

Companion Planting with the Garden Giant™

by Alex Taylor

If you are a mushroom fan you have probably heard of the Garden Giant mushroom *(Stropharia rugoso-annulata)*. Or if you heard mycologist, Paul Stamets speak or have read his book, *Mycelium Running*, you may also know a bit about this species' role in fungal bioremediation. If you engaged in Garden Giant companion planting last season, then the mycelium is already hard at work helping to protect and groom your garden.

For those unfamiliar with outdoor mushroom cultivation, companion planting with the Garden Giant mushroom is easy. This rich edible mushroom is available from mushroom supply companies as spawn. Garden Giant outdoor mushroom spawn comes as a bag of sterilized wood chips that are infused with the white cobweb-like tissue of the mushroom, called mycelium. This mushroom spawn is simply mixed into the mulch layer in your garden to establish a mushroom bed.

Among the many fascinating features of this species is a tendency toward tenacious growth on unbelievably diverse materials. From corn stalks to straw, from conifer duff to hardwood chips, the Garden Giant can digest them all. It can accomplish this feat primarily because of its unique suite of leaf litter decomposing enzymes. The Garden Giant is unique in that it can grow as either a primary or secondary decomposer. This trait allows it to interface readily between the topsoil and mulch layer in your garden. As spring temperatures warm and your Garden Giant wakes up, it is actively digesting and remobilizing last season's refuse into this summer's fertility.

These benefits may be obvious for the observant gardener, but what may be less obvious is the Garden Giant's guardianship of the microscopic microbial landscape. In the late 1980s, Fungi Perfecti founder and mycologist Paul Stamets determined that a serendipitously placed Garden Giant mushroom was responsible for reducing bacteria runoff from upland pasture at his western Washington, US farm. Following this initial inspiration, several years of small experiments, an EPA stormwater management innovative research grant, and some large-scale field trials, have documented that the mycelium of the Garden Giant mushroom can improve the ability of mulch to filter and remove *E. coli*. Further, *Stropharia rugoso-annulata* mycelium produces spiky crystalline-like spherical structures called acanthocytes. In 2005, researchers at Yunnan University and Kunming University of Science and Technology in China documented that acanthocytes act as nematode-destroying microscopic barbs that eviscerate garden pests as they pass by the mycelium in the soil (Hong et al., 2006).

The Garden Giant is a delicious and adaptable mushroom and will thrive in most locations. FMI go to *www.fungi.com*

♦

Alex Taylor is assistant researcher at Fungi Perfecti.

Photo by Paul Stamets

Garden Giant

Microbes in the Arctic

Kate Buckeridge sampling at Thule Air Base in Greenland.

by Catherine DeLong

Kate Buckeridge, an ecosystem ecologist, has worked in some of the most remote regions on earth. Places like Toolik Lake in Alaska, La Pérouse Bay, Manitoba, Thule Air Base in Greenland and Daring Lake in the Northwest Territories. The route to these locations can be arduous. La Pérouse Bay requires a long ride in a tundra buggy – an all-terrain vehicle with large wheels that keep passengers safely elevated above the frozen tundra (and polar bears). Daring Lake is even more remote. After arriving in Yellowknife, Buckeridge and her fellow researchers fly 300 kilometres northeast in a small propeller plane over glacial lakes and ponds, before landing on Daring Lake.

Buckeridge has been traveling to these arctic locations because she studies the tiny creatures that lie below the snow and ice: soil microorganisms. Soil microorganisms are responsible for the most basic functions of our planet. Even in the cold arctic tundra they are busy at work decomposing plant matter, filtering water and recycling nutrients. In the early twentieth century Fritz Haber and Carl Bosch were awarded the Nobel Prize for their work which mechanized the conversion of atmospheric nitrogen into a form that can be taken up by plants. Soil microorganisms, such as bacteria which form nitrogen absorbing nodules on legume roots, have been completing the same process for millennia. Contributing to the same search for nutrients, protozoa and nematodes cannibalize other nitrogen-containing microbes and convert their biomass into plant-available nutrients. Mycorrhizal fungi, another important soil microorganism, attach to plant roots and by doing so increase the root's surface area and ability to take up water and nutrients.

Microbes not only contribute to plant nutrition, they also improve soil health and buffer against broader environmental degradation. The energy source of soil microorganisms is carbon; as microbes eat the carbon-rich material of decaying plants, animals and other microorganisms, they produce organic matter. Organic matter is the "glue" that holds soil particles together. By improving water infiltration and the water holding capacity of the soil, organic matter can also mitigate flooding, drought and erosion.

While we know that soil microbes are a vital part of our ecosystem, we do not yet know the extent of their role in it. Between 1,000 and 1,000,000 species of bacteria can reside in a single gram of soil. Scientists are working to find, categorize, and understand the functional roles of soil microbes, but their sheer number, ability to adapt to environmental conditions, and rapidly transfer genes between groups, are obstacles to fully understanding the microbiome.

In her research, Buckeridge is working to understand how global changes – warmer temperatures, changes in vegetation or increased snowfall – will effect microbial cycling of nitrogen. One of the greatest mysteries in soil science is how microbes will respond to global warming and the many repercussions associated with it. When soil microorganisms "eat" carbon, they also produce carbon dioxide (CO^2), methane (CH^4) and other nitrogen-containing greenhouse gases like nitrous oxide (N^2O). If the temperature of the soil is increased, will microbes work harder and produce more greenhouse gases? Or will microbes become overheated and less efficient, therefore leading to a decline in greenhouse gas production? A third possibility is that with warming, a new community of soil microbes will be awakened leading to unforeseeable results.

The Arctic is an ideal location to study the effect of climate change on the soil microbial community because it is the area where the most rapid changes are taking place. Permafrost, a great reservoir of carbon and ice, is thawing and the microbes within it are waking up. But who is being woken up and how will these microbes respond to their environment? These are some of the questions that Buckeridge is attempting to answer.

♦

Catherine DeLong is a science writer and native of Des Moines, Iowa who is working with the United Nations on the International Year of Soils blog.

⇦*BC's Expensive Fish Farms continued*

lems, the Norwegian parliament is tightening up their water regulations. Unfortunately, that sends Norwegian companies to the wild frontier of BC where licenses and rents are virtually free, regulatory oversight is minimal, government compensation is provided in case of die-offs from disease, and the government accommodates industry expansion.

In Norway, salmon farm licenses cost $1.69 million dollars each. With 1,400 of them, substantial revenues are generated. Compare that to DFO's proposed flat fee of $100 per license which will come into effect in 2015 for 115 federally-listed aquaculture licences.

The Numbers

BC takes $2.50 per tonne of produced farmed fish. With 787,000 tonnes produced annually, that means about $2 million is coming in – not much considering it costs $6.3 million to run the BC Aquaculture Regulatory Program, $54 million to run the Sustainable Aquaculture Program, and $6.5 million is spent on regulatory research. The province, under the new federal/provincial harmonized Aquaculture Application, now just handles the renting of Crown seabed under a farm, a role which the Stolo's Eddy Gardner refers to as the "slum landlord of the coast." He has a point: Industry rents farms at a little over $700 per hectare per year. With a total of 4,575 hectares, that brings BC another $3.3 million in annual rent.

The BC Salmon Farmer's Association argues that their industry "provides 6,000 direct and indirect jobs while contributing over $800 million annually to the provincial economy." It is hard to know where those numbers come from. In their recent Fisheries and Aquaculture Sector report, BC Statistics counts only 1,700 people as employees of either finfish or shellfish farms (at least 20 per cent are in shellfish). The report notes both forms of aquaculture contribute a total of $61.9 million to the GDP (from $496 million in direct sales of farmed fish and shellfish).

According to the government report, the multiplier for the aquaculture sector is 7.83 jobs per $1 million of direct sales of salmon sold, which at $496 million means there are, at most, an additional 3,883 jobs. But the numbers seem high. The award-winning environmental reporter D.C. Reid, in his *Fish Farm News and Science*, claims he could only find 795 actual employees of all fish farms in BC.

Regardless of which set of data one uses, aquaculture doesn't come close to the economic benefits of sport fishing. This sector contributes $325.7 million to GDP, $936 million in gross revenue with 8,400 direct jobs, according to BC Stats. The government uses an 11.36 multiplier effect in the sports fishing sector, for 10,633 additional jobs. This is an industry that is detrimentally impacted by fish farming. If you add the data for the commercial capture fishery, which still generates $102 million to the GDP and 1,200 direct jobs, plus the subsistence fishery for First Nations, aquaculture – which threatens all three – is blown out of the water in terms of jobs generation.

One figure the BC Salmon Farmer's Association doesn't like to talk about is the number of taxpayer dollars its members get from the Canadian Food Inspection Agency for their diseased fish. Last year, after weathering an injunction against releasing compensation figures, D.C. Reid reported payments of $2.64 million to Cermaq Mainstream for 959,498 diseased salmon at its IHN-infected Clayoquot Sound farms and $201,000 for infected equipment and supplies. Grieg Seafood's open-net operation in Sechelt received $1.61 million for 312,032 IHN-diseased fish and $152,000 for infected equipment and supplies. Adding BC figures to those in Atlantic Canada, Reid said, "Here's the bottom line: In little more than a year, the Canadian Food Inspection Agency paid fish farms almost $50 million taxpayer dollars for diseased slaughtered fish across Canada."

Why is the federal government catering to three foreign companies which employ few people, bring relatively few dollars into the economy, and cause high administrative and legal costs – let alone the incalculable ecological damage of devastated wild stocks that create far more jobs and economic benefit?

If Canadians are not benefitting, who is? The shareholders of Marine Harvest, who are mostly European and American banks.

So is there any good news on the horizon? When Marine Harvest failed to honour their agreement with ENGOs to do a full-fledged land-based closed-containment pilot project, the Namgis First Nation set up their own and the first harvest took place last April. (See *Focus,* July 2014). Other First Nations are exploring Namgis' lead.

Morton is "heartened to see more and more scientists ending up speaking out. It wasn't our original role, but if you are the person who is on the ground with your hands on these fish and see the effects that the viruses and sea lice have on them, if you don't stand up then who will?"

♦

Briony Penn, PhD has been reporting on the environment since 1975 and has completed a biography of Ian McTaggart Cowan.

This is an abridged version of the original, published in *Focus*, March 2015.

Photo:Dru! https://www.flickr.com/photos/druclimb/256098633/in/photolist-bkPH2f-oCzcF-2fCyY7/

Young Voters Could Shift Election Results

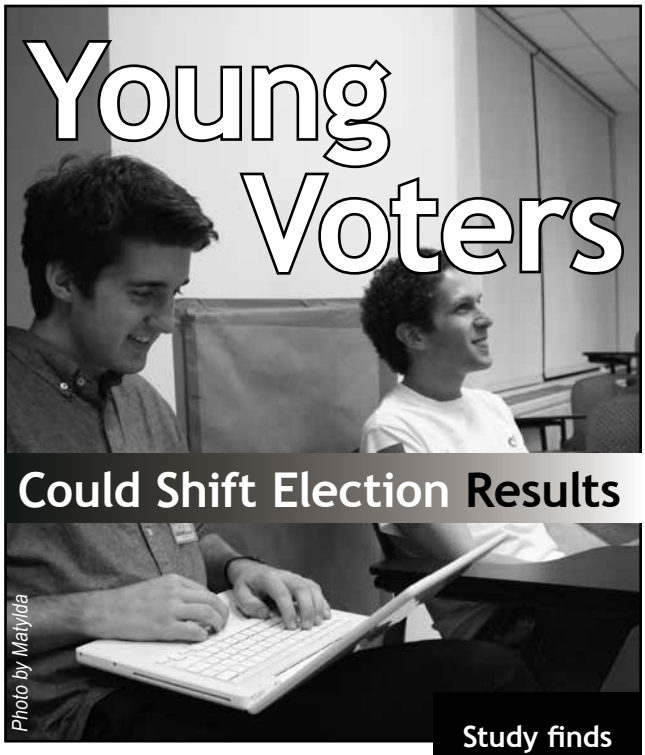


Photo by Matylda

Study finds that younger Canadians are more progressive

by the Broadbent Institute

More than older Canadians, younger Canadians support increases in taxes tied to better public services, prioritize environmental protection over economic growth, support more spending on health and education, and want an activist government that creates jobs, according to a new study.

Could a Progressive Platform Capture Canada's Youth Vote? is authored by University of Saskatchewan political scientist David McGrane and published by the Broadbent Institute. The study analyses the results from the Comparative Provincial Elections Project (CPEP), a unique dataset that probes a wide breadth of opinions through 19 attitudinal questions with robust sample sizes in every province.

"While we found that Canadians are broadly progressive on most issues, there is a generational divide on some key issues," said McGrane, a member of a team of political scientists that received funding from the Social Sciences Research and Humanities Council, to conduct post-election attitudinal surveys over a complete cycle of provincial elections, from 2011 to the end of 2014.

This is the first time the complete dataset of 8,121 Canadians has been analyzed to compare the political attitude of older Canadians (over the age of 35) to young Canadians (35 years old or younger).

The study's key findings include:

- When asked if government should leave it entirely up to the private sector to create jobs, 77% of younger Canadians disagreed, compared to 66% of those aged over 35.
- 82% of Canadians aged 35 or under said government should see that everyone has a decent standard of living, compared to 72% of older Canadians.
- 72% of younger Canadians said the world is always changing and we should adapt our view of moral behaviour to these changes; 57% of Canadians over the age of 35 agreed.
- 56% of younger Canadians said it was more important to protect the environment than create jobs, compared to 46% of those over the age of 35.
- Among younger people, those who are university-educated, big city dwellers, Ontarian, or British Columbian tend to lean more to the left. Young people that have not attended university, live in small cities and rural areas, or are Manitoban tend to lean more to the right.
- Notably, there are essentially no differences in the opinion of younger and older Canadians on the issue of raising corporate taxes, with six out of 10 indicating support. Younger Canadians are more supportive than older Canadians of tax increases tied to better public services.

"As we gear up for a federal election, this rich database offers important insights into youth political culture. One of the most intriguing findings of this study is that young people from all walks of life have relatively similar, and more often progressive, political priorities. Political parties would be wise to take a close look at what could galvanize young people," said McGrane.

Added Rick Smith, Executive Director of the Broadbent Institute: "The results are good news for those of us championing a progressive agenda. More young people, more often, support elements of a progressive agenda than do older voters. And in general, most Canadians – young and old – hold largely progressive views."

The study is available online at *https://www.broadbentinstitute.ca/en/issue/could-progressive-platform-ca*

♦

The Broadbent Institute is an independent, non-partisan organization championing progressive change through the promotion of democracy, equality, and sustainability and the training of a new generation of leaders.

The margin of error for the telephone-based random survey of 8,000 Canadians would be under 1%, and in each province is +/-3%, 19 times out of 20.

Why I've Gone Green

Paul Manly sums up his progressive case against the NDP

by Paul Manly

People will know from my film work and community activism that I am solid and unequivocal on a number of issues. Initially, I thought that running to be an NDP MP would help steer the party in a positive, progressive direction. Since the time that I was blocked from seeking the NDP nomination I have learned how the NDP has abandoned their own policies on issues that are very important to me.

Energy Policy

I found out that the leader of the NDP supports Energy East, a raw bitumen export pipeline that will expand tar sands production 40% above the current rate of two million barrels per day. This flies in the face of NDP climate policy. I am opposed to any new raw bitumen export pipelines. I stand with First Nations that oppose tar sands expansion and pipeline expansion.

The NDP leader also supports Kinder Morgan but just isn't happy with the environmental assessment process. He states that with a better process Kinder Morgan would be acceptable. I unequivocally oppose this pipeline.

Trade Deals

I found out that not a single NDP MP voted against the Canada Korea free trade agreement this fall. It contains the same investor state, corporate rights provisions as NAFTA. This went against NDP trade policy, which opposes such trade agreements. Canada's largest union UNIFOR, of which I am a member, opposed this agreement. Korean companies are major investors in Raven coal on Vancouver Island. This free trade agreement gives those companies special rights.

Marijuana

The NDP leader is also opposed to decriminalizing marijuana and has stated on national TV that he will not follow through with NDP policy to decriminalize it. I found out that the NDP supports gas fracking. I am opposed to gas fracking and have been for a long time.

I heard via an Ottawa insider that it is just as likely I was blocked from entering the NDP nomination race because of my involvement with the Council of Canadians and my unequivocal stands against investor state provisions in trade agreements, my unequivocal stance against new raw bitumen export pipeline projects, and my unequivocal stand to protect water resources and oppose fracking.

But I didn't have to change my views when I joined the Green Party.

In the Greens I found a party that stands for my views. I read its policy document, Vision Green, after being approached by Elizabeth May to run, and was pleasantly surprised with what I learned.

I knew the Green Party would be strong on environmental policy, but it is also has very strong policies on social justice, health, inequality, and a range of other social issues. The Green Party has a balanced approach to the economy, fair taxation and fiscal reform. They also focus on good governance and democratic reform.

Principled Base

I agree with the Green Party's six fundamental principles: Non-Violence, Social Justice, Sustainability, Ecological Wisdom, Participatory Democracy, and Respect for Diversity. These values are the foundation for all Green Party policies and decisions.

I like the fact that it is Green Party policy that MPs cannot be whipped to vote against their conscience or the wishes of their constituents.

I also like the Green Party because it is the only party opposed to any further pipeline expansion for the export of raw bitumen from the Alberta tar sands; it supports a national moratorium on hydraulic gas fracking and LNG export terminals; and it is the only party opposed to any international trade and investment agreements that include Investor State Dispute Settlement provisions.

For those of you who are worried about splitting the vote, it is voter cynicism and vote abandoning that should be our focus. I want people to be positive and enthusiastic about politics, and vote for a candidate and party that they can trust to represent them with honesty and integrity.

We owe it to future generations to be hopeful and vote for what we really want.

♦

Paul Manly is a Nanaimo-based filmmaker dedicated to raising public awareness about environmental, social and democratic issues.

GREENS - A LONG SHOT

Stuart Parker makes his case for Pro-Rep and against voting Green

by Stuart Parker

In this election, there is going to be another silly debate about the merits of "strategic voting". This debate will be silly because of its very premise, which is that it is possible to vote without a strategy. You see: on Election Day, every person thinks about how to use their one vote most effectively to bring about the kind of Canada in which they want to live. And that is their voting strategy. Today, when the fate of our country and our planet hang in the balance, it is our responsibility to craft the most effective voting strategy we can to bring about a just and sustainable Canada. But it is sometimes hard to craft the best strategy for doing that.

The main reason it's hard is because of the voting system Canada uses. The "first-past-the-post" (FPTP) voting system will be turning 800 this year. It was created by the brightest minds England could assemble in 1215 to design a system of "ridings" to represent the commoners living in the isolated villages of the English countryside.

> "On Election Day, every person thinks about how to use their one vote most effectively to bring about the kind of Canada in which they want to live."

Voting for Pro-Rep

In most modern democracies, regardless of where you live, you can pool your votes with other citizens of like mind and concentrate them behind candidates and parties you all support. In most of the European Union, people casting votes for Green candidates can be separated by hundreds of miles and still pool their votes to elect candidates who share their worldview and elect parliaments where most parties' share of the vote corresponds to their share of the seats.

But until we get proportional representation (PR) in Canada, we still use medieval England's voting system, in which the country is carved-up into 338 arbitrary polygons. So we can't pool our votes with people whom we agree with, but instead must pool them with people in our polygon or riding.

And so, creating a strategy that connects our political aspirations to political outcomes through our votes is tough. First, we have to make a guess about which candidates in our riding are close enough to winning that our vote could push them over the top and make them the "first past the post." But our guesses are sometimes wrong. Sometimes our guesses are also dispiriting. We look at the lawn signs, the polls, the results of the last election, media reports, and conclude that the only candidates close to winning are ones we don't like very much. That's why academics have observed that FPTP reduces voter turnout.

I am voting NDP in this election for two reasons. First, the NDP has promised to enact PR if they win. Unlike Greens and Liberals, they are not promising to study it. They are not promising a referendum. They are promising to legislate PR on day one of their mandate. Tom Mulcair and democratic reform critic Craig Scott have fought naysayers in the party because they understand that PR is a human rights issue. The right to have one's vote count equally with that of every other Canadian is a fundamental one and, without PR, we don't have it.

Second, I am voting NDP because I want my vote to affect the outcome in my riding. Unless you live in the Southern Gulf Islands or Greater Victoria, BC, or the Bruce Peninsula and Owen Sound, Ontario, casting a Green vote is extraordinarily unlikely to affect whom your riding sends to Ottawa. You can legitimately say that there is a small chance I will guess wrong about the finalists in my riding. But the fact that we might be wrong does not absolve us of the responsibility to make our best guess.

Greens - A Long Shot

Some people will say that they are willing to bet on that one-in-a-million chance that the Green Party of Canada will do better than any other Green Party running under FPTP ever has anywhere. I might find that argument more compelling if it could be shown that, when in power, the Greens significantly out-perform other parties on environmental and social justice issues. But that is not what the record shows. In their thirty-two years, the Canadian Greens have elected less than a dozen people, but they have elected enough that there is a record.

In 1999, the Greens elected a parks commissioner in Vancouver and a councillor in Victoria, BC; both crossed the floor within months of their election and finished out their terms as NDPers. In 2002, they elected a Vancouver school trustee who, in 2005, was instrumental in defeating PR in BC's nail-bitingly close referendum and, later that year, switched parties to the pro-developer Vision Vancouver. In 2013, the Greens sent their first MLA to Victoria; in office, he voted for the BC Liberals' Liquid Natural Gas bonanza budget, with its education cuts, privatization, attacks on worker rights and expansion of the fossil fuel sector. And he remains a shill for oil refinery and pipeline development on BC's north coast. In 2014, the Greens elected their second Vancouver school trustee who currently holds the balance of power on the board; so far, she has used it to ditch the progressive incumbent chair and replace her with a Fraser Institute-backed conservative who advocates public-private partnerships with oil companies and privatization in our schools.

"And with the party's opposition to caucus solidarity a Green Party slate is like a box of chocolates. You never know what you're going to get."

I would never take away from the strong track record of Vancouver parks commissioner Stuart Mackinnon, councillor Adriane Carr, or Saanich's superb MP Elizabeth May. I just want to note that electing a Green does not guarantee you a strong advocate for social justice or the environment. And with the party's opposition to caucus solidarity a Green Party slate is like a box of chocolates. You never know what you're going to get.

Like the Greens, the NDP has good and bad candidates and policies. Unlike the Greens, the NDP have a shot at winning in most ridings. And, unlike the Greens, the NDP has a process for choosing policies and sticking with them. But most importantly, the federal NDP has a strong commitment to giving Canadians PR so we can finally put these strategic voting problems behind us.

Symbolic Meaning

Some people say that if we want environmental sustainability or electoral reform, what matters is not whom your vote elects, or whether your vote elects anyone, but the symbolic meaning of your vote. "The more Green votes there are, the greener Canada will become," people will say or "the more wasted votes there are, the less legitimate our voting system and our government will be and the more pressure there will be for electoral reform." But these are not truisms; they are testable hypotheses. Wasting more anti-Tory votes does not increase pressure on Stephen Harper to ditch FPTP or fight climate change; it makes him an even-more committed defender of the status quo.

If moving votes from electable progressives to unelectable Greens resulted in greener policies, Ralph Nader's presidential bid against Al Gore would have made George Bush sign the Kyoto Treaty. And moving votes from Adrian Dix's NDP to Jane Sterk's Greens would have made Christy Clark less committed to climate change denial, pipeline-building and privatization. But the reality is that when climate villains, pipeline shills, privatizers and extreme-right think tanks watch people move their votes from the NDP to the Greens, they raise their glasses and order another round of martinis.

Casting a Green vote in most ridings, in defiance of real, measurable, empirical evidence is not a decision not to vote strategically; it is just choosing a bad voting strategy. It is just voting using a debunked, disproven theory that flies in the face of the available evidence, much like climate change denial.

So, this fall, take time to develop a voting strategy based on the best evidence and a realistic theory that connects your vote to the kind of Canada you want.

♦

A founding director of Georgia Strait Alliance and Fair Voting BC, Stuart Parker served as leader of the BC Green Party from 1993-2000.

Fair Vote Canada / Représentation équitable au Canada

MAKE EVERY VOTE COUNT!

THIS IS DEMOCRACY?

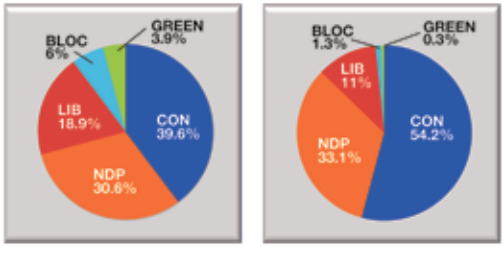
Why Canadians need a fair and proportional voting system

The voting system is the heart of representative democracy. It's the tool citizens use to create democratic government.

When every citizen's vote has equal value, parliaments can reflect the political will of the people.

If the voting system ignores or distorts what voters say, governments cannot be properly accountable and democracy is compromised. This is the core problem with the Canadian political system. Our 21st century democracy is hobbled by a dysfunctional 12th century voting system that was scrapped long ago by most major democracies.

Canadian 2011 Election



VOTES SEATS

Fair Vote Canada is a national network of concerned citizens who are pressing for fair voting systems at all levels of government and throughout civil society

In a typical federal election, more than seven million Canadians, or just over half of voters, cast wasted votes.

The United States and the United Kingdom are the only other major Western democracies using Canada's version of winner-take-all (first-past-the-post). When the new democracies in Eastern Europe chose their voting systems, not one adopted this system.

Fortunately, we're not stuck with the system we have. Most established democracies use other voting systems that better represent what voters are saying.

Canada's voting system can be changed through a simple majority vote in Parliament… no constitutional amendment required!

But it won't happen without pressure from all of us.

As a multi-partisan citizens' campaign with chapters across the country, FairVote lobbies MPs and educates the media and the public to bring Canada's democracy into the 21st century.

Take action today at www.fairvote.ca

The heart of the problem: the winner-take-all principle

Canada's current voting system is based on the winner-take-all principle. It's just what it says. In each riding, one group of voters wins – their votes send an MP to Parliament.

Every other voter in that riding loses – their votes elect no one to represent them in Parliament. They cast ineffective, wasted votes. The only voters sending MPs to Ottawa are those who support the most popular party in their riding. **In other words, your political beliefs and place of residence determine whether your vote counts.** If you hold the "wrong" political views or live in the "wrong" place, your vote does nothing. **In a typical federal election, more than seven million Canadians, or just over half of voters, cast wasted votes.**

The United States and the United Kingdom are the only other major Western democracies using Canada's version of winner-take-all (first-past-the-post). When the new democracies in Eastern Europe chose their voting systems, not one adopted this system.

What is proportional representation?

Proportional representation is any voting system designed to produce a representative body (like a parliament, legislature, or council) where voters elect representatives in proportion to our votes. For instance, if 30% of votes are cast for a party, that party would have 30% of the seats.

Who uses proportional representation?

Canada is one of only three OECD countries still using the antiquated Winner-Take-All system., while 85% of OECD countries use voting systems based on Most of these have used it for decades. New countries almost never opt for a system like Canada's when setting up their first democratic voting system.

Blue Orchard Mason Bees

With a short season and a short range, the BOB is a very localized pollinator.

by Monika Grünberg

What hatches twice, sounds like Rice Krispies in milk, creates no honey, wax or hive, does not sting and increases fruit, seed, and nut production? Right here in the Comox Valley? If you said, "Mason Bees", you are right! Specifically, the Blue Orchard Mason Bees.

The Blue Orchard Bee (BOB) is one of thousands of pollinator insects that are native to Vancouver Island, the rest of Canada, and the US. Like hummingbirds and butterflies, the BOB has been here much longer than people, and its job has always been to help keep plant life going from generation to generation.

But habitat reduction, intensive mono-crop agriculture, and poisons have left the BOB, just like its more well known cousin the honey bees, in urgent need of human friends. It's ironic, but true: because humans have invaded their world, the bees now need human help.

Fortunately, the BOB is easy to love. It is gentle, and, in its humble way, beautiful. It has a simple but fascinating life cycle. Provided with clean, mite-free tunnels each spring, the BOB will multiply and pollinate gardens, orchards, flowers, and all of the early-blooming fruit and seed-bearing trees of nearby woodlots and forests. With a short season (about 6 weeks) and range (about 200 metres), the BOB is a very localized pollinator. Urban gardeners and town dwellers especially benefit from helping the BOB. But so do orchardists who experiment with additional pollination options, and naturalists who like observing the natural world around them.

Monika Grünberg, of Green Mountain Pollinators, has been getting to know the BOB for over 15 seasons: setting out cocoons and clean tunnels, gathering, cleaning and counting cocoons each winter, storing them out of harm's way and starting the cycle again each spring. She has listened to the crunching of bees ready to hatch, watched and even held the cocoons in her hand as brand new bees emerge and prepare for flight. She is sharing her knowledge, craft, and, most important, her love for the bees with products, instructions, and workshops on befriending the BOB.

Now BOB friends can not only provide appropriate housing; they can also watch the life cycle of the BOB, up close and personal: from the first hatching (egg to larvae), through cocoon building, then a second hatching and flight as adult bee, and, finally, the amazing craft of the female Mason Bee as she prepares the chambers and summer meals for the new season's eggs. With Observatory Houses, anyone with a heart open to wonder can safely watch and participate in the life cycle of the Blue Orchard Bee (aka Mason Bee).

Proceeds from this year's sale of cocoons, Observation houses and workshops will go to fund our first book, *The Life of a Mason Bee*, to be published in the fall of 2015. In simple words and pictures, *The Life of a Mason Bee* will introduce children, parents and grandparents to life as the bee sees it – short, sweet, delicious, exciting, and always part of the larger story that unites us, big and small, in the natural world.

♦

Monika Grünberg has raised Mason Bees for over 15 years and can be reached at *www.greenmountainbees.com*

See also *lifecyclesproject.ca/resources/bee_average/*

Northern Trappers Alliance

Dene and Metis trappers speak out against resource extraction in Saskatchewan

by Susan MacVittie

Since November 19, 2014, Dene and Metis trappers have been camped out at a checkpoint on highway 955 near LaLoche, Saskatchewan in Treaty 8 lands, to stop Cenovus Energy from accessing indigenous lands. With temperatures regularly dropping to -40^0C throughout the winter, their conviction to occupy the land remains strong and the trappers have moved their camp to the Clearwater River.

The Northern Trappers Alliance are taking a stand in response to the mineral and oil exploration that has grown in the past six years across their traditional hunting grounds. They have found roads to traditional hunting grounds gated and blocked, preventing them from entering. This has been done without their consent or knowledge, and in violation of treaties.

They are very concerned about the unprecedented rise in cancer, which they believe is due to contamination from nearby uranium mines.

Potash and Uranium

Mining in Saskatchewan centres around potash and uranium. In the north, 36 abandoned and decommissioned uranium mines left behind piles of radioactive dust, known as tailings. After closure in the 1960s, the Gunnar mine site along the shore of Lake Athabaska, with all of the other uranium mine and mill sites, were abandoned with little remediation and no reclamation. The governments of Canada and Saskatchewan are now funding the clean-up of these abandoned sites. To the east, a uranium corridor spreading over 250 kilometres hosts the largest high-grade uranium mines and mills in the world, with their own stockpiles of radioactive tailings and a history of radioactive spills.

The trappers say an unprecedented rise in cancer is the legacy of contamination from nearby uranium mines. Uranium is soluble in water and emits radiation until it stabilizes as lead in 4.5 billion years. The World Health Organization says that radon gas, a by-product of uranium, is the second leading cause of lung cancer.

In the trappers' remote area, more than 85 per cent of northern Saskatchewan residents are aboriginal and most people speak Dene, often as a first language. In January, 2015 the Northern Trappers Alliance invited supporters to attend a meeting on the future of their camp. It drew about 150 attendees from communities across BC, Alberta, the Northwest Territories, and Manitoba. Aboriginal people shared similar stories of colonization, industrial growth, and ecological devastation.

The trappers are in conflict with elected leaders to their south, including local governments who are developing ties with industry and making decisions that affect lands beyond their jurisdiction. The province is looking to indigenous lands in the north for new bitumen and mineral mines, a high-level nuclear waste dump site, and the construction of nuclear reactors to encourage "environmentally responsible" tar sands extraction by exporting energy to Alberta.

The province of Saskatchewan has said that it is not required to consult with communities during the exploration phase of a project. Regional politicians note that more consultation will occur when a mining project is officially proposed. The Northern Trapper Alliance requested to meet with the province but they would not meet under the alliance's terms of meeting on the land, not behind closed doors.

The trappers say that thirty years of jobs and money is not worth the sacrifice of contaminated land and water. They say the time to stand up and speak out is now.

Support the Alliance via their Facebook page: Holding the line – Northern Trappers Alliance

♦

Susan MacVittie is the managing editor of the *Watershed Sentinel.*

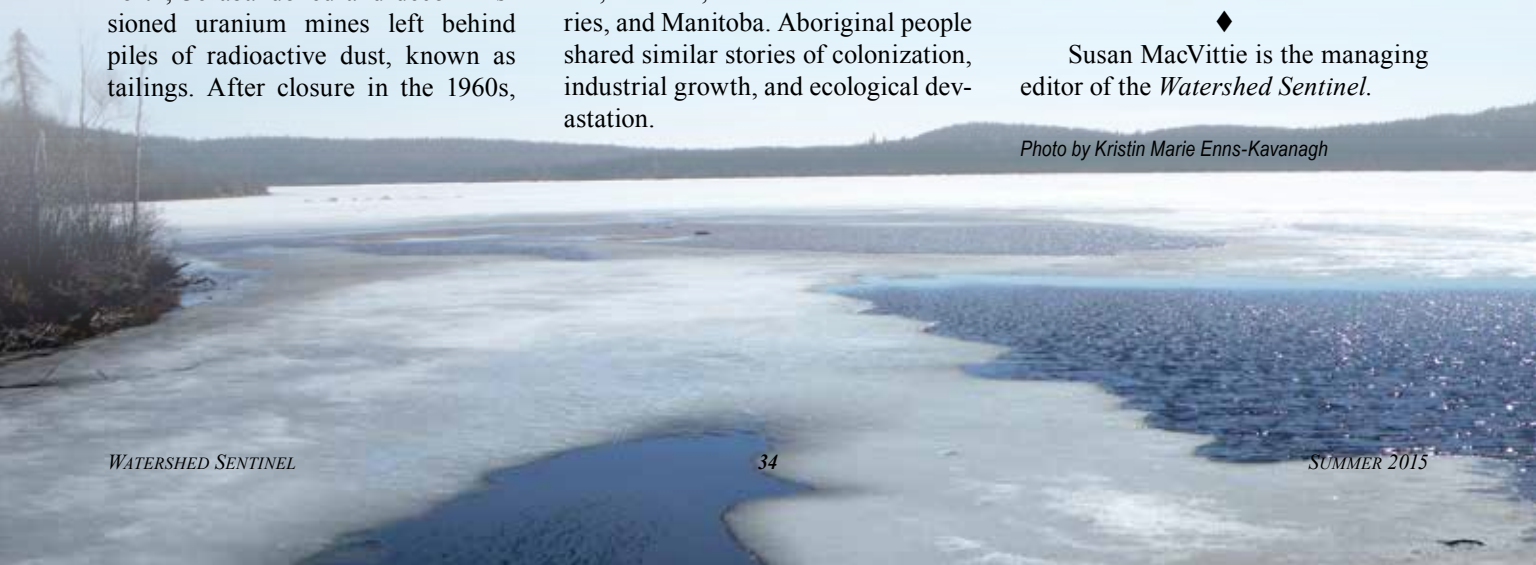


Photo by Kristin Marie Enns-Kavanagh

BC'S GREAT BLUE HERON

by Tamsin Baker

Photo by Winnu

You may see them like statues, waiting patiently to catch their dinner along the shoreline. Or admire their huge wings as you spot them flying overhead. There is no doubt that the Great Blue Heron (*Ardea Herodias fannini*) is an iconic bird of BC's south coast. Its statuesque silhouette is commonly used to represent coastal BC's natural surroundings, as exemplified by the logo of this magazine.

There are not many other birds that the Great Blue Heron can be confused with. When standing, this blue-grey wading bird can be over one metre in height and when in flight can be identified by its almost two metre wide wingspan. The Sandhill Crane looks somewhat similar, but the crane has a partially red head and flies with an extended neck. The Heron holds its head in an "S" curve.

Based on its high visibility, you would be forgiven for thinking that our coastal fannini subspecies of Great Blue Heron is thriving. However, the provincial government has Blue-listed the bird, meaning it is of special concern. The federal government has also listed it as Special Concern under the Species at Risk Act (SARA). Population estimates indicate there are only about 4-to-5,000 breeding birds left.

Unlike other types of herons who migrate, our subspecies of the Great Blue Heron lives year round on the coast. They can be found stalking their prey in areas ranging from fresh and saltwater marshes, beaches, streams and open grassy fields to ornamental backyard ponds. While they mostly like to eat fish, they also hunt for amphibians and small mammals.

At the beginning of every year, the males and females meet up to court. While they sometimes find new mature trees to build their nests in colonies (also known as heronries), they typically return to the location of a previous colony year after year. Their nests are usually high above ground consisting of large stick platforms and the heronries are generally located within ten kilometres of where they hunt for food. Colonies can be quite large with as many as 350 nests. While they generally pick quiet forested locations where there is little human disturbance, some heronries are found near urban areas. The best example of this is the heronry found in Stanley Park in Vancouver with active tennis courts nearby.

Monitoring data shows that nest productivity has been significantly dropping since the 1970s. It is thought that the main threats to the Great Blue Heron are those that impact their ability to successfully breed. Issues include human disturbance and loss of habitat due to development. Bald Eagles, who prey on the chicks of Great Blue Herons, have become more of a threat due to their recovering populations. If bothered enough by humans or eagles, Herons will abandon their nests completely.

Part of addressing these threats involves establishing a buffer zone to protect the nesting birds from unexpected events or disturbances. Disturbances can include nearby logging or loud noises from construction. With the nesting season lasting from February to August, noise disturbances should be avoided around this time, particularly during the initial nesting stages. Buffer guidelines can be found in the BC Ministry of Environment's 2014 "Develop with Care, Great Blue Herons Fact Sheet #11."

To learn more about coastal Great Blue Herons and find resources, visit the South Coast Conservation Program's website: *www.sccp.ca*.

♦

Tamsin Baker is the stewardship coordinator of the South Coast Conservation Program.

Wild Times

Occupied Lands

by Joe Foy

Many countries – some of which I have visited – have been occupied by outside forces for at least a period of their history.

While on a trip to Vietnam, I learned that the country had been occupied by China for a thousand years before it had regained its independence, only to be reoccupied by the French, then the Americans – before finally regaining it's independence in the 1970s. During times of occupation, nations live on in the hearts and minds of their citizens. You don't have to look far to find nations that have been taken over, only to rise again – Ireland, Philippines, Malaysia, India – the list goes on and on.

You may wonder what does any of this have to do with environmental issues in BC. Well, it turns out it has a lot to do with us because our province occupies many First Nations territories. And how we treat the environment is all about how much we respect those First Nations citizens.

One statement recorded centuries ago in Vietnam goes something like: If all the trees in China were cut down to make paper it would not be enough paper to record the crimes against the Viet people during the occupation.

I wonder what history will say about our behaviour during the occupation of First Nations?

Our Prime Minister has apologized for Canada's shameful residential school system. And some first steps towards reconciliation are being made.

But great crimes against First Nations continue. Certainly the plan to flood the Peace River Valley in the face of their opposition is one such crime. I know that the government of BC does not view the Site C Dam project as a crime – but then, occupiers rarely do consider their iron-rule policies as crimes.

I wonder what history will say about our behaviour during the occupation of First Nations?

But what else would you call what has been done to the First Nations of the Peace River Valley? Without their consent starting in the 1960s the BC government's WAC Bennett Dam and then in the 1980s the Peace Canyon Dam together flooded the majority of the Peace River bottomlands within their territory.

Chief Roland Willson of the West Moberly First Nation describes how caribou were once so plentiful in their territory that elders spoke of them resembling a swarm of bugs on the land. For certain months of the year West Moberly hunters would rely on moose, while in other months they would shift to caribou to take the pressure off the moose. This is how the people fed themselves. But the dams changed all that. The caribou lost access to the flooded lowlands and were cut off from their travel routes. Today the herd is listed as endangered. The people can no longer use caribou as a food source – so moose must bear a greater hunting pressure.

Chief Willson recently travelled to the legislature in Victoria to unload 200 pounds of fish contaminated by mercury leached from the Peace dam reservoirs. The fish had carried the mercury in their bodies upstream 70 kilometres from the reservoirs – to a place that West Moberly fishers had been harvesting fish for generations. But no more. The West Moberly First Nation had taken the fish in to be tested and were shocked to learn how toxic they had become. Chief Willson's message to BC's Premier – "You take them, we can't eat them any more."

The West Moberly First Nation, along with other local First Nations have launched a series of court cases against the proposed Site C Dam.

Once again the First Nations are pitted against the occupiers in Victoria who want to flood the Peace valley bottom lands – this time it's pretty much all that's left in their country. What else could this be called but a crime?

♦

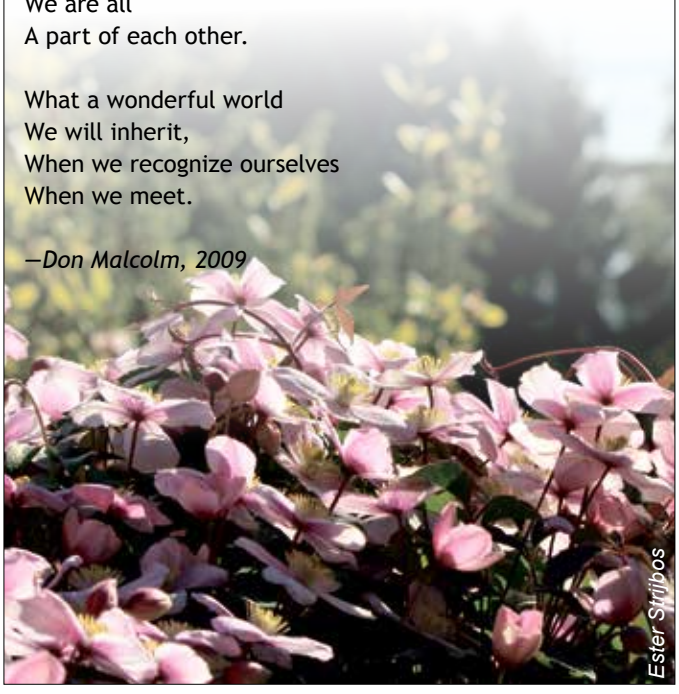
Joe Foy is the national campaign director for the Western Canada Wilderness Committee, Canada's largest citizen-funded membership based wilderness preservation organization.

Family of Strangers

In this humanity,
In which we all live,
We are all
A part of each other.

What a wonderful world
We will inherit,
When we recognize ourselves
When we meet.

—Don Malcolm, 2009



If undeliverable, return postage will be paid by:

Watershed Sentinel
Box 1270,
Comox BC
Canada V9M 7Z8

Publications Mail Agreement No. 40012720

Postage Paid
at Comox BC
Canada
V9M 7Z8