

*The Talon*

Vol. 29, No.5, May 2019



# NEWSLETTER

## SOUTH LAKE SIMCOE NATURALISTS

SLSN is an incorporated not-for-profit Member of Ontario Nature.

Post Office Box 1044 Sutton West, Ontario, L0E 1R0

Telephone 905-722-8021

([www.slsnc.ca](http://www.slsnc.ca))

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*Research Partner with The Zephyr Society of Lake Simcoe ([www.zephyrsociety.ca](http://www.zephyrsociety.ca))*

*Member: Rescue Lake Simcoe Coalition*

*Member: Ontario Greenbelt Alliance*

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**Note: Please renew your membership to receive future Newsletters**

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## Meetings and Outings

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**Meetings:** All Meetings start at 7:30 p.m. at the York Region Police Building Meeting Room (Baseline Road between McCowan and Civic Centre Road) unless noted otherwise. No July or August Meetings. Members events (insurance compliance). Visitors welcome.

York Regional Police, 3 District Community Meeting Room  
3527 Baseline Road, Georgina.



**NOTE: Consistent with YRP recent procedures in place regarding evening use of their Community Meeting Room (CMR), attendees of SLSN meetings must be current members of SLSN in good standing, and may be asked to provide further information, as requested.**

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**Tuesday, May 14: Salamander – Spring has sprung:** With the warm weather arriving many animals that we definitely do not see in the winter are stirring at this time of year. Ontario has ten species of tailed amphibians, a number of which live in our area. They require standing water in which to breed and lay eggs. Come out and learn about these amazing creatures in our midst. Club members research, presentation and conversation meeting.

**Outings:** All regular outings – Note: **Paid-up members in good standing may participate (for insurance compliance).**

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### **2019 Winter**

**Wednesday June 5: Birding Expedition and Nature Study:** A day long Birding trip down to Lake Ontario hot spots, Thickson Woods and Oshawa Second Marsh. Rare avian migrants can sometimes turn up unexpectedly so be prepared. While in these important habitat areas we will also do some light hiking and general nature study. Meet at 8:00 a.m. at the Coffee Time, Highway 48, south of Baldwin. Dress for the weather. Bring binoculars etc.

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**Members, please consider writing and submitting an article to the Talon Newsletter. Submit to one of the Executive members.**

Phone Paul 905-722-8021 or Norma 905-476-4747 for further information about meetings and naturalist outings.

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**Note:** In the SLSN Newsletter Vol. 29, No.3, March 2019, should have been, Second Vice-President: Barrie Braiden.

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**Five Good news about the World in 2019, from Canadian Astronaut Chris Hatfield**

- **Canada protected 85% of the Great Bear Rainforest, part of the world's largest temperate rainforest.**
- **An ebola vaccine was developed by Canadians with a 100% success rate!**
- **The Giant Panda is no longer an endangered species.**
- **China announced plans to end the ivory trade in their country**
- **U.S. veteran homelessness has declined by 10% in the last 10 years.**

P.H. Source: The Percolator Jan./Feb. 2019.

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## **Annual SLSN Spring Birding trip along Lake Simcoe**

An intrepid but enthusiastic group of six members participated in a cold, wet morning birding expedition (zero degrees C, NNW wind 42km./hr., with large lake surf) along the shore of Lake Simcoe from Jackson's Point to Mid-Keswick. Indeed, in some areas there was recent snow on the ground and in trees! Not a typical weather day for our annual spring birding day. The birding was concentrating on waterfowl species on the Lake as an annual documentation of spring arrivals of potential breeding and migratory species in our area, but other avian species observations were also documented. Irving Himel and Andrew Sibbald provided their documentation notes to round-out the day's records. Some 40 species were documented. Highlights included Red-breasted mergansers, Lesser scaup, and a few Pintail ducks. Some important returning species were Caspian terns, Common tern (Irving), a Ruby-crowned Kinglet (Andrew), Killdeer among others. Notables were a very late lingering Snow owl (Irving) south of Keswick later in the day, and House finch. The observed arrival of Tree swallows and Barn swallows, in numbers feeding on the Lake, especially at Lands End was a real treat to see. A suspected few Purple Martins in the area at distance, was exciting.

Paul Harpley

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## **Important Conservation in the East G.T.A. Leader, Lois James Dies at the age of 95.**

Lois inspired and mentored thousands of "Save the Rouge" volunteers to rally and sustain the public and political support necessary to safeguard the health, beauty and biodiversity of the Rouge River System through the creation, and hopefully implementation, of Watershed, Greenbelt, Federal Green Space and Rouge National Park Plans. Lois was a champion of the environment and a nemesis to those who would degrade or destroy it. She spoke "truth to power" on environmental and social justice issues with admirable passion, wisdom, good-will and persistence (Jim Robb, SRVS 2019-04-23).

**Lois's main maxim was 'never give up' and she was always true to this directive, and in fact she was fearless. She met with so many people and always promoted conservation of the Rouge Valley, and other issues for almost half a decade. She would as easily advocate to a Provincial Minister of Natural Resources as to a neighbour about Saving the Rouge. I first met Lois James as a second-year undergraduate geography and science student at the University of Toronto, Scarborough Campus in the mid-1970's. The original initiation of Save the Rouge Valley (SRVS) happened then and there, with Lois and the support of her husband Dr. Bob James, a Sociology Professor. They brought some important and dynamic knowledge and information of American conservation experiences to a rather staid Toronto in those days. Lois's unending and direct advocacy and management of often eager young volunteers like myself, with her in the vanguard, enabled the growing movement, with others, was essential to saving the Rouge. This long and difficult work finally led to the more recent establishment of the Rouge Park Alliance, and eventually the Rouge National Urban Park.**

**Paul Harpley 2019-04-28 – requested comment to Metroland Newspapers)**

In 2003, Lois of James became a Member of the Order of Canada for her successful lifetime of work to "Save the Rouge". The legacy of Lois James lives on through her family and the Rouge National Park she helped to create, and within the hearts and minds of the many environmental and community leaders she inspired and mentored. She provided us with a shining example of a life well-lived. When I visited Lois recently, her unfaltering spirit surrounded her and those near to her like warm sunlight, despite her failing health (Jim Robb, SRVS 2019-04-23).

P.H. SLSN

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## **Nature's Dangerous Decline - World**

**UN Report: Nature's Dangerous Decline 'Unprecedented';  
Species Extinction Rates 'Accelerating'**



Current global response insufficient;  
'Transformative changes' needed to restore and protect nature;  
Opposition from vested interests can be overcome for public good  
Most comprehensive assessment of its kind;  
1,000,000 species threatened with extinction

**PARIS, 6 May** – Nature is declining globally at rates unprecedented in human history – and the rate of species extinctions is accelerating, with grave impacts on people around the world now likely, warns a landmark new report from the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the summary of which was approved at the 7th session of the IPBES Plenary, meeting last week (29 April – 4 May) in Paris.

“The overwhelming evidence of the IPBES Global Assessment, from a wide range of different fields of knowledge, presents an ominous picture,” said IPBES Chair, Sir Robert Watson. “The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide.”

“The Report also tells us that it is not too late to make a difference, but only if we start now at every level from local to global,” he said. “Through ‘transformative change’, nature can still be conserved, restored and used sustainably – this is also key to meeting most other global goals. By transformative change, we mean a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values.”

“The member States of IPBES Plenary have now acknowledged that, by its very nature, transformative change can expect opposition from those with interests vested in the status quo, but also that such opposition can be overcome for the broader public good,” Watson said.

The IPBES Global Assessment Report on Biodiversity and Ecosystem Services is the most comprehensive ever completed. It is the first intergovernmental Report of its kind and builds on the landmark Millennium Ecosystem Assessment of 2005, introducing innovative ways of evaluating evidence.

Compiled by 145 expert authors from 50 countries over the past three years, with inputs from another 310 contributing authors, the Report assesses changes over the past five decades, providing a comprehensive picture of the relationship between economic development pathways and their impacts on nature. It also offers a range of possible scenarios for the coming decades.

Based on the systematic review of about 15,000 scientific and government sources, the Report also draws (for the first time ever at this scale) on indigenous and local knowledge, particularly addressing issues relevant to Indigenous Peoples and Local Communities.

“Biodiversity and nature’s contributions to people are our common heritage and humanity’s most important life-supporting ‘safety net’. But our safety net is stretched almost to breaking point,” said Prof. Sandra Díaz (Argentina), who co-chaired the Assessment with Prof. Josef Settele (Germany) and Prof. Eduardo S. Brondízio (Brazil and USA).

“The diversity within species, between species and of ecosystems, as well as many fundamental contributions we derive from nature, are declining fast, although we still have the means to ensure a sustainable future for people and the planet.”

**The Report finds that around 1 million animal and plant species are now threatened with extinction, many within decades, more than ever before in human history.**

The average abundance of native species in most major land-based habitats has fallen by at least 20%, mostly since 1900. More than 40% of amphibian species, almost 33% of reef-forming corals and more than a third of all marine mammals are threatened. The picture is less clear for insect species, but available evidence supports a tentative estimate of 10% being threatened. At least 680 vertebrate species had been driven to extinction since the 16th century and more than 9% of all domesticated breeds of mammals used for food and agriculture had become extinct by 2016, with at least 1,000 more breeds still threatened.

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## **Sounding the Alarm on Behalf of Caribou in Canada**



Ecojustice Photo

**Our organization SLSN has been following the plight of Caribou in Ontario in our e-Newsletters and an evening members research and presentation meeting a**

**few years ago.** Ontario Nature advises that Boreal woodland caribou are threatened with extinction in Canada. Decades of science show the impacts of human activities and natural disturbances within their ranges. With increased disturbance comes increased risk.

In 2012, the Canadian federal government gave provinces and territories five years to develop range plans for each herd that show how ranges will be managed to protect critical habitat. Ontario did not fully meet the timeline for the development of range plans. To say nothing about the potential impact on caribou, the government of Ontario's failure to meet the deadline puts a black mark on Canada's reputation at home and abroad.

The Forest Products Association of Ontario (FPAC) in 2018 is casting doubt on the science to further delay action. The FPAC full-page newspaper ads and website ignore the overwhelming evidence.

Caribou need their critical habitat protected now more than ever. **Please use your voice to support caribou and science by signing our letter to the Minister of the Environment and Climate Change at <https://ontarionature.good.do/caribouhabitat/email/>.**

P.H. Source: ON 2018-04

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**Strike for the Future – May 2, 2019**





From Tofino, B.C. to Charlottetown, P.E.I., youth from coast to coast will take to the streets tomorrow.

Organizers across Canada have spent weeks planning the May 3 nation-wide school strike. They'll march on Parliament Hill in Ottawa, at Queen's Park in Toronto and City Hall in Calgary, and to other strategic locations across Canada.

The plaza outside the Vancouver Art Gallery has a long history of hosting protests. But even though it's witnessed more than a century of rallies and protests, I can't help but feel that tomorrow will be one for the history books.

I've been an environmental lawyer for more than a decade, first in the U.K. and now as the climate program director at Ecojustice. In all that time, I've never seen anything like Fridays for Future.

Today's young people —and future generations, yet to be born — will inherit a changing world very unlike the one their parents and grandparents grew up with. They will bear the brunt of climate change —wildfires, floods, heatwaves — despite having the least responsibility for causing it or ability to stop it.

Ecojustice is committed to doing its part to tackle this injustice.

There's a term for this: intergenerational equity. It's the idea that future generations must have a right to inherit a livable earth, including a safe and stable climate. To protect this right, older generations — whose members currently hold positions of power in our society — have a duty to act to prevent climate breakdown. Intergenerational equity is also one of the core principles that Ecojustice fights to uphold in court and embed in Canada's climate laws.

We are in this fight together, and it will take all of our efforts to secure a climate-safe future for our children.

There are also other ways to support the movement. One of the most powerful opportunities to do this will be during the 2019 federal election.

While surveys show that today's young people are more committed than ever to voting with the climate in mind, many of the students striking tomorrow will be too young to vote this time around. If you're 18 or older, you have the power and the responsibility to put the environment first



## Invasive Species News Ontario



**Beech bark disease** (insect-fungus complex *cryptococcus fagisuga* and *neo-nectria* spp.) began ravaging beech trees in Ontario in the late 1990s after spreading west from Atlantic Canada, but recently a new beech disease has emerged in the province. The first detection of **beech leaf disease** in North America occurred in 2012 in Lake County, Ohio and has spread rapidly to other Ohio counties, Pennsylvania, New York, and Ontario. This new disease was discovered in Elgin County, Ontario in 2017 and has since been detected in four additional counties – Norfolk (2017), Middlesex, Chatham-Kent, and Oxford (2018).

At this time little is known about this new disease, including where it came from, what causes it, or how it affects the trees. Recent research indicates that nematodes of the *Litylenchus* genus, related to those native to New Zealand, are associated with the disease but are unlikely to be the sole cause. Research is ongoing to investigate how beech leaf disease is caused and spread. Beech leaf disease has spread quickly throughout its current distribution. From 2012-16, it spread across 1,250 acres per year in one Ohio county. This disease seems to be in a rapid expansion phase, similar to what has been seen with other invasives such as the emerald ash borer. In many of the areas that have been infected with beech leaf disease, there are already visible changes in the canopy.

## Endangered species need your help. A

# message from Ontario Nature

Last week Minister of Municipal Affairs and Housing, Steve Clark, introduced omnibus Bill 108, the More Homes, More Choice Act. This Bill affects 13 pieces of legislation including the Conservation Authorities Act, the Planning Act and the Endangered Species Act. This Bill contains just about everything developers, the aggregate industry and other industries have been seeking. Schedule 5 of Bill 108 contains the changes to the Endangered Species Act. These changes are sweeping and tantamount to having no Endangered Species Act at all. If passed the changes spell a dire future for species at risk in our province.

Bill 108 hastily went to second reading on May 8<sup>th</sup> so is on track to pass and come into law soon although we don't know the timing.

Before Bill 108 was introduced, the Ministry of Environment, Conservation and Parks, posted its proposed amendments to the Endangered Species Act (ESA) on the Environmental Registry of Ontario (ERO) for public comment. **The deadline for those comments is May 18<sup>th</sup>.**

We urge your groups to make a submission on the ESA amendments. The link to the ERO notice is here: <https://ero.ontario.ca/notice/013-5033>. We are also preparing a submission for organizations to sign onto which I will circulate early this coming week. If you are unable to make a separate submission from your group, we welcome you to sign onto ours.

Ontario Nature has worked with Ecojustice and the David Suzuki Foundation to produce the attached concise guide to the changes to the ESA to inform your ERO submissions. It will also inform any direct contact with your local MPP. We encourage you to write or phone him/her. Better still would be to seek a meeting.

One of the proposed changes is that assessments of species be based not on the status of a species in Ontario, but instead on its status across its "biologically relevant geographic range." Most species now listed as threatened or endangered in Ontario, which are considered to be more stable in the US, could be delisted (e.g. during regular reassessment processes) and receive no protection as a result.

Ontario Nature has compiled the list of Threatened and Endangered Species currently listed along with their global status. G4 rank means apparently secure and G5 means secure. Based on the government's proposal, it is conceivable that 74% of currently listed threatened and endangered species could be delisted and lose protection.

Finally, please share our online letter to Minister Phillips (MECP), the Environmental Registry of Ontario, and local MPPs with your memberships: <https://ontarionature.good.do/esa2/sign/>.

**We must ensure that the voices of naturalists and nature lovers are heard.**

If you have any questions, please don't hesitate to get in touch with me or Lisa Richardson

([lisar@ontarionature.org](mailto:lisar@ontarionature.org)).

Caroline Schultz, Executive Director, O.N. 2019-04-29

**Note:** Individual naturalists can make comments on this legislation to the Ontario Government.

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## Bird Research News

# Weird chromosome may have spurred evolution of thousands of songbirds



Zebra finches were thought to be a genetic oddity  
Zoonar GmbH / Alamy

There's more to **songbird sex** than we thought. It seems that all of them have an extra chromosome in their sex cells that isn't seen elsewhere in their bodies. The extra DNA could help explain why songbirds account for roughly 5000 of the 10,000 known bird species.

Songbirds typically have 40 pairs of chromosomes in most cells of their body. But in the late 1990s, biologists studying **zebra finches** made an odd discovery. Some of the cells involved in sexual reproduction, called germline cells, carried an **additional pair of chromosomes**.

At the time zebra finches were considered a genetic oddity, says Pavel Borodin at Russia's Institute of Cytology and Genetics in Siberia, and few researchers bothered to investigate any further. But now Borodin and his colleagues have discovered other songbirds have a 41<sup>st</sup> chromosome pair too.

They examined the chromosomes of 14 species scattered across the family tree of songbirds, including finches, skylarks and canaries, along with chromosomes from eight non-songbird species.

All 14 songbirds carried the extra chromosome in their germline cells, but none of the non-song birds did. Borodin says this suggests the extra chromosome may have first appeared in the last common ancestor of all songbirds, which lived about 35 million years ago and as such is probably present in all modern songbirds.

### **Rapidly evolving**

Borodin thinks the 41<sup>st</sup> chromosome may help during sexual reproduction by providing more protein and nutrients for developing sperm and egg cells. Two studies published last year that looked at the zebra finch's extra chromosome in more detail back up the idea. They found evidence that it contains additional copies of protein-generating genes found elsewhere in the genome.

Because that protein boost isn't needed elsewhere in the body, natural selection has eradicated the extra chromosome from other body cells. "We don't know how, but it is eliminated," says Borodin. "It's not just switched off – it's physically absent."

Whether the extra genes are important in additional ways is unclear. Some songbirds have a vocal learning ability similar to that underpinning human speech. Borodin and his colleagues found fragments of a vocal learning gene on the extra chromosome, but because those fragments are probably non-functioning they think it's unlikely that this is a sign that the extra chromosome boosts the birds' vocal learning ability.

Alexander Suh at Uppsala University, Sweden – who co-authored one of last year's studies on the zebra finch chromosome – says the extra chromosome could be significant for songbird evolution.

His team discovered that the extra chromosome is evolving rapidly. He says this means it might be driving the evolution of new songbird species, which could explain why there is such an extraordinary diversity of songbird species on Earth today.

Source: Journal reference: *PNAS, Life, Colin Barras* 2019-04-30

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## **Ocean Conservation News**

**The amount of plastic in the ocean is a lot worse than we thought, study says**

SLSN has been following the plastic in the environment issue in Ontario especially for Lake Simcoe and its rivers, in our e-Newsletters. The serious plastics issue in our local area has

**major implications for the world's Oceans as well. The CNN item below provides global perspective.**

If you're sad when you see stories about dead whales washing ashore with dozens of pounds of plastic in their bellies or feel guilty when you forget to bring your reusable bags to the grocery store, there's a good reason.

The amount of plastic that's been dumped into the ocean has been increasing, according to a new study, and the problem will probably get worse.

Scientists call plastic litter "one of this generation's key environmental challenges" because it is a persistent pollution that hurts wildlife, the ocean itself and might hurt humans.

Many stories and studies have focused on microplastic, the smaller stuff that plastic items like bottles, toothbrushes and shopping bags get broken into by ocean currents and exposure to ultraviolet light. The new study, published Tuesday in the journal Nature Communications, finds that there's been a significant increase in macroplastic pollution, too: entire plastic bags, plastic fishing gear and other items.



Guinness will stop using plastic in beer multipacks

The increase in large plastic pollution has been happening since 1957, with a significant increase since the 1990s, according to this study.

The researchers didn't set out to do a study about plastic pollution. They were initially studying plankton.

"This happened through chatting with the guys that do the metal work to fix the equipment and the volunteers working to tow the recorders," said study co-author Clare Ostle, a research scientist at the Marine Biological Association in the UK. "They were talking about how this plastic kept getting tangled up in the equipment."

There are very few historical records of ocean plastic pollution, she said, so the researchers used the incidents to investigate exactly how much plastic pollution there was and how often these entanglements happened.



Ostle and her team looked at 60 years worth of ocean data covering over 6.5 million nautical miles in the North Atlantic and adjacent seas. They found that plastic entanglement on the equipment used to measure plankton increased by about 10 times from 2000 on.

"We have known that plastic production has increased, and although there are a number of studies that have shown increased concentrations of plastic up to the 1990s, these studies have not been able to demonstrate the expected increase in plastics in open ocean surface waters," [Ostle](#) said.



Walmart will sell 98¢ reusable bags at checkout carousels to cut down on plastic

The first plastic bag was found entangled with their equipment off the coast of Northwest Ireland, and the first trawl twine was on their equipment off the east coast of Iceland.

The findings are in line with what is known about the amount of plastic produced in the world.

A previous study found that between 4.8 million and 12.7 million metric tons of plastic entered the ocean in 2010 from people living within 50 kilometers (31 miles) of the coastline.

Global plastic production has quadrupled over the past four decades, a separate new study found.

That study, published Monday in the journal *Nature Climate Change*, found that if the trend continues, the making of plastics will comprise 15% of greenhouse gas emissions by 2050; by comparison, all of the world's forms of transportation now account for 15% of emissions.

"This is long-lasting damage. It is such an important problem to solve, but the only way to do that is to stop putting it in the ocean," said Jacqueline Savitz, who did not work on the new studies but serves as chief policy officer for North America for [Oceana](#), a nonpartisan nonprofit dedicated to protecting and restoring the oceans.



A dead whale containing 90 pounds of plastic is a message in a bottle

Savitz said she's been encouraged to see people try to reduce their carbon footprint by turning to alternatives like electric cars, but that also means petroleum companies are looking for alternative markets for their products. She's watched the growth of plastic manufacturing plants in Pennsylvania and Texas with increasing concern.

"Plastic is a cheap product to make, but it comes at a high price to our environment," Savitz said. "I can't even stand the thought of it, when I go to the beach and see all the plastic on the waves and in the sand. It's found in most every [bird stomach](#) and in sea turtles and whales that starve to death, and the problem is getting much worse."

Ostle said she has been encouraged by the increase in public awareness about plastic pollution.

"Many people now use reusable bags, recycle where possible and shop consciously by choosing to take food or drink items with less plastic," she said. "I very much hope that this awareness surrounding plastics will continue and spill over into other environmental issues such as our emissions."

Savitz agreed that "individual action can help, but we don't want the individual to feel like they are the problem. What we really want is for companies to give us choices of more plastic-free products or products that can be reused or refillable. We need to change the structure of our commerce to protect our marine health and our own."

Jen Christensen, [CNN](#), Tue April 16, 2019  
"8 million tons of trash goes into ocean a year".

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## Canada cleared to take National Climate Action

May 3, 2019



The federal government has a right to take national action on climate change — a problem that poses such a genuine threat to Canadians that it can be classified as an “emergency.”



That's the message the Saskatchewan Court of Appeal sent today when it ruled that the federal government has the power to set a minimum national price on greenhouse gas emissions.

**In a judicial first, the court found that “climate change is doubtless an emergency in the sense that it presents a genuine threat to Canada.”**

This part of the decision is a direct result of the tireless work Ecojustice lawyers put into representing the David Suzuki Foundation on this case — work that is only possible because of supporters like you.

On behalf of our clients, Ecojustice lawyer Joshua Ginsberg argued that the federal government should be able to introduce laws that unite all of Canada in the fight against climate change, specifically because climate change is such a pressing issue that it counts as a national emergency.

While the court found that Canada's carbon pricing law is not temporary enough to count as emergency legislation, it did agree that climate change itself is an emergency. As a result, Canada will be able to introduce new, time-limited laws to address climate change.

The science tells us that we only have 11 years to ward off the worst impacts of climate change. To do this, Canada must:

- Update its greenhouse gas emissions targets, which fall short of the international standards set out in the Paris Agreement
- Commit in law to halving emissions by 2030 and reaching net zero by 2050
- Enshrine these new targets in laws that empower the public to hold government to account on its climate commitments.

While Ecojustice lawyers processed today's decision, young people across Canada took to the streets to strike for their climate future. It is with these bold young leaders in mind that Ecojustice continues its fight to combat climate change, both through winning litigation and through pushing for new laws to bring those in-court wins to life.

Source: Ecojustice, Saskatchewan Court of Appeal, 2019-05-03

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## Naturalists' Space News

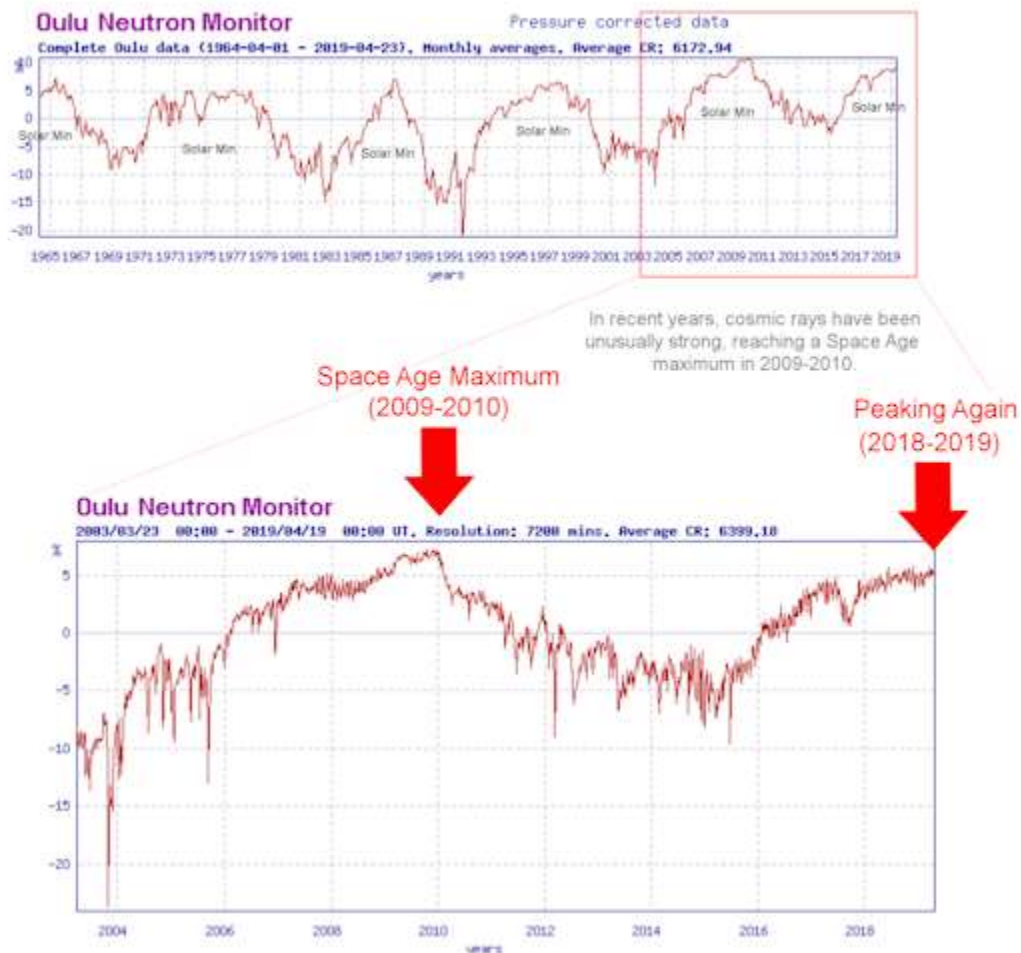
Solar minimum is here - but even now strangely beautiful auroras are dancing around the poles. Deep inside the Arctic Circle, the expert guides of [Aurora Holidays](#) in Utsjoki, Finland, can help you chase them. [Book now!](#)

**COSMIC RAYS ARE NEARING A SPACE AGE HIGH:** Ten years ago, NASA reported a "[perfect storm of cosmic rays](#)." During the year 2009, radiation peppering Earth from deep space reached a 50-year high, registering levels never before seen during the Space Age.

It's about to happen again.

Ground-based neutron monitors and high-altitude cosmic ray balloons are registering a new increase in cosmic rays. The Oulu [neutron monitor](#) in Finland, which has been making measurements since 1964, reports levels in April 2019 only percentage points below the Space Age maximum of 2009:

## Cosmic Rays on Earth since 1964



Source: The [Sodankyla Geophysical Observatory](#) in Oulu, Finland.

What's going on? The answer is "Solar Minimum." During the low phase of the 11-year solar cycle, the sun's magnetic field and solar wind weaken. Cosmic rays find it easier to penetrate the inner solar system. In 2009, the sun experienced the deepest solar minimum in a century. Cosmic rays reaching Earth naturally surged.

Ten years later, solar minimum is back with renewed weakening of the sun's magnetic field and the solar wind. Again, it's a "perfect storm." A panel of experts led by NOAA and NASA [recently predicted](#) that the current minimum would reach a nadir in late 2019 or 2020, likely matching the record-setting minimum of 2009. If they're right, cosmic rays will continue to increase, with a new record possible in the near future.

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