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LOGAN

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MAGPIE RIVER**
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AS A PERSON

**ALBERTA
COWBOY**
CONNECTS WITH
A SPECIAL HORSE



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AN IRISH MEMORIAL IN THE ST. LAWRENCE,
WALRUS DETECTIVES, BLACK SPRUCE BURNOUT,
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MARCH/
APRIL
2022

ON THE COVER

An aerial view of Mount Logan's main summit is awe-inspiring.

*Photo by Conrad Janzen/
Parks Canada*



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Canadian Geographic presents the winners of our annual photo competition

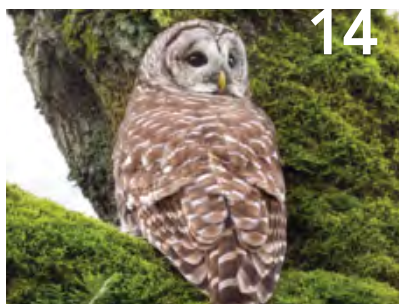
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Z 9

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Z 9

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¹ Among mirrorless cameras as of October 28, 2021, based on Nikon research.

² Among mirrorless cameras incorporating an image sensor with 30 megapixels or larger as of October 28, 2021, based on Nikon research.



WATCH

A SEAT AT THE TABLE

Ecologist Maydianne Andrade (shown), astronaut Jenni Sidey-Gibbons and astronomer Sara Seager work in different scientific fields, but they share a common view: that greater diversity in the STEM fields is needed to tackle today's complex problems. Watch an inspiring panel discussion on this topic moderated by science journalist Alanna Mitchell. cangeo.ca/women-in-stem



COMMENT

ON 'ANIMAL CROSSING' (NOVEMBER/DECEMBER 2021)



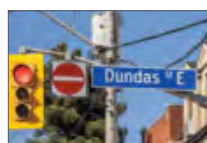
I suspect the image of a dead bear on the side of the road will result in some negative reader feedback. People don't like to see that kind of thing in

print because it makes them uncomfortable. The truth is, this is exactly what people need to see so the problem can be resolved. Every day in North America, an estimated average of one million animals are killed on our roads, but because we perceive these animals as having no economic value, the problem is ignored. The reality is these animals have a purpose, as well as a right to life, respect and dignity. Nothing deserves to die like that. Building roads through wildlife corridors and other areas rich in biodiversity and then running down the inhabitants in our vehicles is one of our time's greatest tragedies. As one of the voices in the article said, our recent efforts to mitigate this problem are great, but long overdue. There are a lot of problems we've created for our environment and ecosystems that will be

difficult to fix. Giving our animal friends a better chance at survival is something we can improve immediately with a change of attitude and some empathy.

*Toby Gorman
Peterborough, Ont.*

ON 'RENAMING PLACES' (CANGEO.CA)



I just read "Renaming Places: How Canada is Reexamining the Map." Good article. I agree with many others that it is never good to name any place after a person, no matter who they are

or what their achievements, as it might be problematic down the road. Stick to the names of natural landmarks such as Water Street or Elm Valley Public School. My biggest dismay is the name of Killbear Provincial Park in Ontario. Isn't it high time to change that appalling name? I think animal and environmental groups should speak up. Perhaps your magazine, as a wonderful representation of the beautiful things in Canada, could be an advocate for this?

*Barb Baszczyński
East Garafraxa, Ont.*

READ

GOING FOR A SONG

As bird species decline and shift ranges due to climate change, the very soundtrack of the Canadian wilderness is changing. What happens when recordings of birdsong become less about identifying birds and more about memorializing them? And what's being done to protect Canada's most iconic winged species? Meet the conservation scientists and volunteer Indigenous Guardians working together to track songbird populations in Canada's boreal forest. cangeo.ca/birdsong



Geo Travel

TRAVEL SPOTLIGHT: HIGH TIME FOR CANNABIS TOURISM?

As the misunderstood plant emerges from almost a century of prohibition, Canadian tourism operators are seizing their chance to provide opportunities for the discovery and safe consumption of cannabis. Read why some believe Canada could become known as a global cannabis destination. cangeotravel.ca/cannabis

COVER VOTE



34%



11%



31%



24%

It was a close race — the drama of the epic peak standing alone versus the drama of climbers making their push toward the summit of Mount Logan. In the end, voters chose the power of the mountain.

SOCIAL

#CAPTIONTHIS



This bighorn sheep with attitude was posted by Simone Heinrich (@simoneheinrichphotography), who captioned it Full Horn Friday. Readers came up with dozens of their own interpretations of the sheep's mood. Here are three of our favourite comments.

"Who needs more envelopes licked?"
— George Sanders

"My tongue matches the sky. So what?!"
— @petlvr34

"Looking for a flagpole to lick!"
— @iona.flora.fauna

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Can Geo Extra is *Canadian Geographic's* monthly newsletter — sign up to get our latest stories and news online.

OPPOSITE: NICK IWANYSHYN; THIS PAGE, TOP, LEFT TO RIGHT: IAN DORIS/CAN GEO PHOTO CLUB; KYLE THIESSEN/CANNANASKIS

Doug Walsh and his horse, Bunny. "The cowboy exclaims" is on page 46.



THE UNEXPECTED



SURPRISE! That was to be the theme of Aaron Kylie's editor's note for this issue. He was talking about the eclectic mix of feature stories, which includes a breathtaking scientific expedition to the summit of Canada's highest mountain, a touching profile of an old cowboy and the troubled

horse he won't give up on, and an in-depth look at what it means when a river is granted legal personhood. But then, just before our team broke for the holidays, Aaron delivered the ultimate surprise: he was leaving *Canadian Geographic*.

It's a momentous thing when a magazine's top editor vacates the position, and as of this writing, the future shape of the masthead is yet to be determined. But it's an honour to

step in and help steer the ship as we enter our 93rd year of publication — especially as the first woman to hold the title of editor-in-chief (surprise!). I've spent the past six years at Can Geo immersed in the world of social media and our websites, but I still have a profound love for print. Depth, breadth, time to think and imagine: this is what we need more of to combat the information overload of our day-to-day lives.

The stories in this issue deliver. Consider this your invitation to follow a group of researchers, step by painstaking step, to the roof of Canada; witness the intimate bond between septuagenarian Doug Walsh and his horse, Bunny; and listen to the voice of a river as it runs joyfully to the sea. You might be surprised. 🌐

—Alexandra Pope



To comment, please email
editor@canadiangeographic.ca
or visit cangeo.ca.



For inside details on the magazine, follow editor Alexandra Pope on Twitter (@XelaEpop) and Instagram (@xela.explores).

CELEBRATE CANADIAN

“Canadian Geographic is a national treasure, informing us of, and connecting us with, important global issues viewed through a Canadian lens. The Royal Canadian Geographical Society and Can Geo Education help me amplify my work to inspire the next generation of young explorers.”

—Michelle Valberg, RCGS Fellow
Canadian Geographic Photographer-in-Residence



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BIG PICTURE

Celebrating Canada's Grandeur

PHOTO BY JEAN-SIMON BÉGIN

A male sharp-tailed grouse performs its mating dance, called "drumming" because the birds tap their feet rapidly on the ground while fanning out their wings and tails. In the spring, male grouse gather in leks to strut their stuff in hopes of attracting a mate. The photographer, who captured this grouse on a lek in Abitibi, Que., was the grand prize winner in *Canadian Geographic's* 2021 Canadian Photos of the Year competition. Turn to page 54 to learn more about Bégin and see more winning photography.



Follow Jean-Simon Bégin on  @jsb_wildlife_photography.



EXPOSURE

Showcasing our photo community



PHOTO BY **ANGELINE HASLETT**

After spotting its nest near the top of a dead tree close to Abbotsford, B.C., the photographer captured this barred owl as it flew from perch to perch with its mate. Barred owls typically lay two or three eggs over a period of a few days.



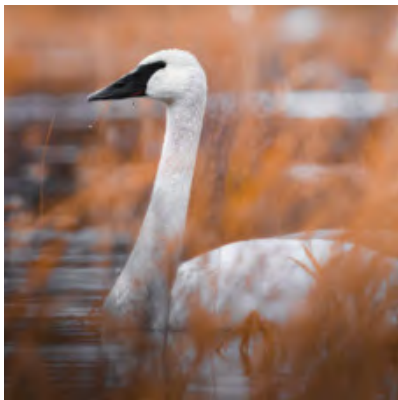
Join the Canadian Geographic Photo Club at photoclub.cangeo.ca and upload your best shots for a chance to be featured online or in the magazine!

IN A SNAP

Sharing Can Geo via Instagram



@tomcochrane Tom Cochrane
Rose Blanche, N.L.



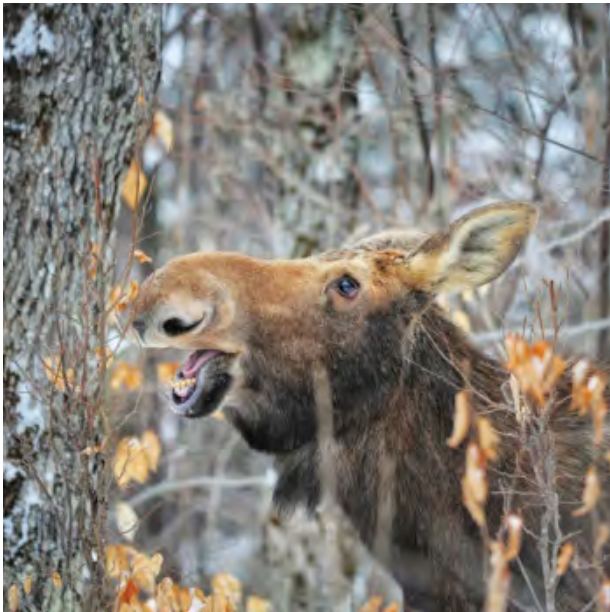
@islandwildlife Michael Buerge
Trumpeter swan, Comox Valley, B.C.



@theetiffanyann Tiffany Schaefer
Waterton Lakes National Park, Alta.



@justin.jasmins Justin Jasmins
City skyline, Toronto



@canoe_carrier Colin Bruce
Cow moose, Algonquin Provincial Park, Ont.



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Where are
Canada's major
pipelines and
transmission
lines located?

What
types of
energy facilities
are found in my
province?

Where does
energy in Canada
come from and
how does it get
to me?



HOW DOES THE ENERGY THAT POWERS OUR LIVES GET TO US?

Explore Energy IQ's new Interactive Energy Map to learn all about energy production and transmission in Canada! Visit energyiq.canadiangeographic.ca for more information about Canada's energy story.



Severn Cullis-Suzuki enjoys a walk along a Haida Gwaii beach. She believes we must mobilize our diversity and our creativity to fight for the environment.

Severn Cullis-Suzuki

The David Suzuki Foundation's executive director on her optimism for the future as she takes over the reins

INTERVIEW BY **DAVID MCGUFFIN**

A lifelong environmental and cultural organizer, Severn Cullis-Suzuki belongs to a global movement that aims to shift the human path toward sustainability and survival. The daughter of famous science broadcaster and environmental activist David Suzuki, she made international headlines at age 12, speaking at the 1992 Rio Summit (the United Nations Conference on Environment and Development). Her academic background in evolutionary biology and ethnoecology (Cullis-Suzuki is pursuing a PhD in linguistic anthropology on the Haida language) has helped shape her view that we must transform our economy — and our way of perceiving the world. In October 2021, she took office as the executive director of the David Suzuki Foundation. Cullis-Suzuki spoke with *Canadian Geographic* about her optimism for a sustainable future and how Indigenous knowledge can help us get there.

On following in her parents' footsteps

I watched my parents found the foundation in 1990, which was an exciting time for the environmental movement. The Amazon rainforest was very much in the public eye, and I got to travel to southern Peru with my family when I was about eight years old. I saw with my



Listen to the full interview with Severn Cullis-Suzuki on the Explore podcast, wherever you get your podcasts. And learn more about the David Suzuki Foundation at david Suzuki.org.

own eyes the incredible beauty of the Amazon and what it was like for people living in the rainforest. I also saw the destruction, so I was aware of the reality of what it means when we talk about destruction of the land and of the waters. Through my parents, I got to meet people working on the front lines to stop this destruction. It had a huge influence on me as a child. My parents showed me that you can take action and you *must* take action to advance social, political and environmental change. That spirit has been behind my activism for my whole life.

On youth activism

I feel so inspired and moved by what Greta Thunberg is saying, and so grateful that today's generation is answering the call in the way that they are. I also feel a great shame. We failed to prevent climate change from happening. And now we're in a much more compromised situation. Hearing Greta and her friends and colleagues speak the way they do is both inspiring and kind of devastating to me.

On the rights of nature

People who work at the David Suzuki Foundation are working towards their passion, which is social transformation. Even during the pandemic, climate change has not been forgotten. In fact, I think it's the opposite; concern has increased. We're really interested in exploring the rights of nature — rivers in New Zealand and India received recognition quite a few years ago as legal persons. In western capitalist society, a river is often seen as a resource and something to be utilized for irrigation or power. And yet in so many traditions, rivers are seen as sacred bodies that have their own autonomy and personhood. Establishing that in law is so exciting — it shows that we can start to change our entrenched legal systems. [Editor's



note: Turn to page 60 to learn about the Mutehekau Shipu (Magpie River) in Quebec, which achieved legal personhood one year ago.]

On alternate views

Capitalism has colonized the planet to a point where we can't imagine that there's any other way of human existence. But humanity brings such a diversity of cultures, languages and ways of looking at reality. There are other ways that we can exist. That is my inspiration when I think about how we're going to navigate the climate crisis. We need to harness humanity's imagination to figure our way out of this. There are other ways of being that have existed for millennia — far, far longer than this current paradigm. We have to remember that to free ourselves of this current context.

On language and the natural world

In English, we have pronouns that we use for the inanimate — we use "it" for things we think of as inanimate, as well as animals and plants. Indigenous languages have special pronouns for other lifeforms. These different pronouns convey a personhood or an identity and a sacredness to those things. So a river is not an "it." We can't even fathom these kinds of pronouns because they just don't exist in English. But in Indigenous languages, there are

Cullis-Suzuki, shown with husband Judson Brown and sons Ganhlaans Suzuki-Brown (middle) and Tiisaan Suzuki-Brown (right), at Haida Gwaii.

specific pronouns that denote our relationship to that entity. And that kind of thing completely changes how you know your world. It may be subconscious, but it changes the landscape of how you relate to nature. So you can look at a mountain and see a pile of rocks and minerals to mine or you could look at it and see a sacred god that should be revered and respected. That's a perspective that I have become totally enmeshed in and concerned about. I feel that language influences our attitude to the natural world and could potentially free us as we try to imagine something different.

On the path forward

We would do well to listen and learn from Indigenous Peoples. Their resilience gives me hope and inspiration for the greater sum of our human family managing to survive through climate change. We really need to look to Indigenous leadership to help us navigate this bottleneck we're in. Indigenous People have been experiencing a mass extinction event since Columbus arrived in the Americas, so they know how to survive. They need to be leaders in how we move forward. 🌱

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– David Piccini, Minister of the Environment, Conservation and Parks



BURN AFTER SEEDING

CLIMATE CHANGE HAS PUT BLACK SPRUCE in the line of fire. As the frequency and intensity of fires in Canada's boreal forest increases, black spruce are losing their resilience and ability to regenerate. Researchers from Wilfrid Laurier University in Waterloo, Ont., analyzed 1,500 burn sites across the country from the past 25 years: in 38 per cent of them, black spruce's ability to regenerate was reduced, and in 18 per cent the trees failed to regenerate. This is especially concerning because although black spruce rely on fire for regeneration — heat opens the trees' cones to drop seeds onto freshly burnt soil — the severity of many recent fires has left the soil too charred, short-circuiting the process.

100,000

THAT'S HOW MANY PHOTOS, taken near the Canadian and U.S. coasts between 2006 and 2018, were analyzed as part of a University of British Columbia study that recently identified a distinct group of transient killer whales. Dubbed the outer-coast killer whales, they are believed to be a subset of Bigg's killer whales and are found in deep-sea habitats between central California and Oregon, often feeding on large mammals, such as grey whale calves. Before this study, coastal and outer-coast transient orcas were thought to belong to a single population. But their differences, which include differing dialects, now appear to make them distinct. In all, the study identified and named 150 transient individuals, 124 of which are now considered part of the outer-coast subset.



Walrus Detectives

THE WORLD WILDLIFE FUND and the British Antarctic Survey are asking people to become "walrus detectives" by spotting walrus on satellite images as part of a five-year project to monitor Atlantic and Laptev walrus populations across Russia, Greenland, Norway and Canada. The climate crisis is causing walruses' sea-ice habitats to melt at a rate of 13 per cent a year, forcing them to swim farther and use more energy to catch increasingly scarce food. The data will also give insight into how walrus habitats are used over time, which can then be compared to climate factors, shipping and other potential disturbances to discover which issues are having the greatest impact on walrus lives. Register at wwf.org.uk/learn/walrus-from-space.



Bees to the RESCUE

A SMALL NATIVE BEE called *Osmia tersula*, or wide-banded mason bee, may be the answer to more bountiful harvests in Canadian greenhouses. Researchers at the Boreal Forest Experimentation and Development Center in Baie-Comeau, Que., are studying ways to make pollination systems in greenhouses more efficient. They're interested in this hairy bee because it has adapted to the climate, stays close to its nest and doesn't sting. The research is part of a provincial program to tackle food insecurity in northern Quebec.

"Fear of Feathers"

IT SOUNDS LIKE A TRUE-CRIME SERIES: some birds fake their own deaths, a new study suggests. It was previously thought that certain species of cavity-nesting birds put conspicuous light-coloured feathers at the entrance to their nests for decoration. But a team of Norwegian and Canadian scientists theorized that birds actually plant these feathers to trick rival birds into thinking predators are lurking. When the researchers tested their "fear of feathers hypothesis," they found all three species studied hesitated to enter nest boxes with white feathers at the entrance — perhaps buying time for the resident birds to return to, and protect, their nests.



OPPOSITE: RYERSON/CLARK/ISTOCK; THIS PAGE, CLOCKWISE FROM TOP: TONY JOYCE/CAN GEO PHOTO CLUB; YULIA BOGOMOLOVA/WWF-RUSSIA; MRGAO/ISTOCK; ROGER ENGVIK; EVE-CATHERINE DESJARDINS



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Grosse Île

During the mass Irish migration to Canada 175 years ago, some 100,000 people passed through the quarantine island — and more than 5,000 died there

BY **PATRICK TAYLOR**

An abandoned hotel, built in 1893 on the western shore of Grosse Île, Que.



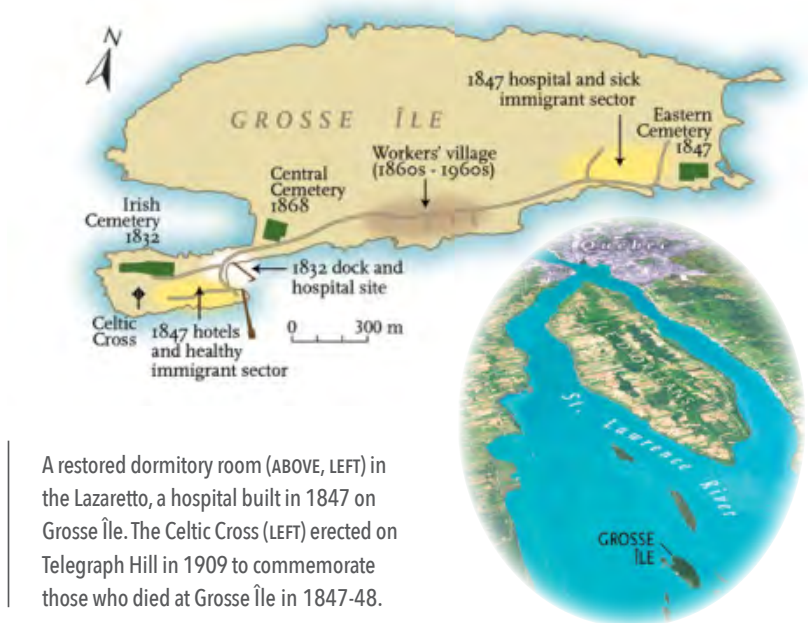
GROSSE ÎLE LIES in the Isle-aux-Grues Archipelago in the St. Lawrence River, 48 kilometres downstream from Quebec City. A compact gem of an island — just five kilometres long and 1.6 km wide — it's a botanist's paradise. Clumps of rare plants, such as the oddly named male fern and colourful Victorin's gentian, grow round the shores of small rocky bays, and fields of American bulrush dance in the breeze under the groves of

smooth-barked speckled alder that populate hectares of wetland. Balsam fir and red maple abound. And yet, beneath the natural beauty, there is an aura of sadness here.

In 1832, a cholera epidemic in Europe led to the uninhabited island being turned into a quarantine station for immigrant ships on their way to Quebec City. The original low white hospital buildings and, behind them, a small church, still stand, hiding

among the trees at what is now the Irish Memorial National Historic Site.

Why Irish, you may ask? With the catastrophic failure of the Irish potato crop in 1845 (An Gorta Mór, the great hunger, an indelible event in Irish history), tens of thousands of starving Irish fled their homeland, desperate to reach the New World. Life aboard these ships was grim, conditions unfit for humans. Passengers depended on a weekly allowance of seven



A restored dormitory room (ABOVE, LEFT) in the Lazaretto, a hospital built in 1847 on Grosse Île. The Celtic Cross (LEFT) erected on Telegraph Hill in 1909 to commemorate those who died at Grosse Île in 1847-48.

passengers, there were initially 84 cases on board. Soon more than 100 people had to be admitted to a hospital with capacity for only 150.

Within a week, 30 more vessels were waiting offshore to land their sick. By May 31, 1,100 people with fever were crammed onto Grosse Île, with 45,000 more immigrants expected to arrive soon. The squalor and suffering defy description, and providing medical attention proved nearly impossible.

Clearly the facilities could not cope, and by the end of the summer of 1847, the practice of using Grosse Île as a quarantine site was discontinued (although it was subsequently

on May 27, 1847, with 427 aboard. Passengers were made to quarantine on board and, by the end of their 15-day stint, just 150 people were still alive. Grosse Île's use as a quarantine station was taken over by an existing hospital and new specially built open sheds at Pointe-Saint-Charles, in southwest Montreal.

Today, the Celtic Cross stands on Telegraph Hill, the highest point on the island. Erected on the Feast of the Assumption in 1909 by the Ancient Order of Hibernians in America, one of its inscriptions in French, English and Irish reads, "Sacred to the memory of Irish immigrants who, to preserve the faith, suffered hunger and exile in 1847-48, and stricken with fever ended here their sorrowful pilgrimage."

The cross marks one end of a long meadow, which is bounded at the other by Cholera Bay. It is there the 5,294 victims lie.

If you visit Grosse Île, stand quietly and listen, for in the keening of the gulls and the pattering of the sky's pitying raindrops, the aura of sadness remains. ☹

THE CROSS MARKS ONE END OF A LONG MEADOW, WHICH IS BOUNDED AT THE OTHER BY CHOLERA BAY. IT IS THERE THE 5,294 VICTIMS LIE.

pounds (about three kilograms) of food and barely enough water to both drink and use for cooking. Sickness and death stalked those fleeing the Emerald Isle, now blackened by fields of rotting potatoes.

May 17, 2022, marks the 175th anniversary of the beginning of one of the saddest episodes in the recorded history of the American continent. The arrival of the "coffin ship" *Syria* at Grosse Île in 1847 was the harbinger of a massive epidemic of typhus fever-ridden men, women and children. Of the ship's 241

reopened as a quarantine station and continued to function until the 1930s). The sick and apparently healthy were isolated on ships instead. In one early horrible example, the *Agnes* arrived from Ireland

Patrick Taylor is a medical doctor and author best known for his Irish Country Doctor series, six of which have been New York Times bestsellers.

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Frozen feat

A personal account of the treacherous 1925 expedition to conquer Mount Logan, Canada's highest peak

BY JILL DELANEY

WHEN HOWARD "FRED" LAMBERT'S painful, frozen feet finally touched solid ground again on July 4, 1925, the expedition's assistant lead thought he would feel elated. It had been 44 days since he and his fellow mountaineers had made contact with anything other than snow and ice on their ascent of Yukon's Mount Logan. But having faced one crisis after another, Lambert could only manage a sense of relief at having made it out alive.

The 1925 Mount Logan expedition was born in an era of active mountaineering, when Europeans saw conquering summits as moments of national, colonial and imperial prestige. No settler had yet attempted to climb the remote behemoth deep in the traditional territory of the Kluane First Nation and the White River First Nation, in what is now Kluane National Park and Reserve. But the eight-person team assembled by the Alpine Club of Canada and the American Alpine Club was determined to beat it.

Lead captain Albert H. MacCarthy, assistant lead Fred Lambert, Alan Carpe, Henry S. Hall, Norman H. Read, Robert M. Morgan, Andy Taylor and W. W. Foster began their climb on May 18, after hiking about 140 kilometres from the town of McCarthy, Alaska, deep into the wilderness. At the mountain, much of their ascent was taken up with grinding slogs as they relayed supplies up and down the glaciers to various camps. In total, they climbed 24,292 metres, or roughly three to four times the height of the mountain.

By June 11, at King Col camp (5,090 metres), the team was exhausted and showing signs of elevation sickness. Lambert reported shortness of breath, and Morgan and Carpe both vomited during the night. "If Mac doesn't let up, there are a few that will not get through who otherwise could have done so," Lambert wrote in his diary. Discussions were held to try to convince MacCarthy to slow the pace.

The men planned to make it to the summit and back in four days, Lambert wrote. In reality, it took them another 10 gruelling days of climbing in clumsy snowshoes and crampons. Morgan, accompanied by Hall, had to turn back due to poor health. The remaining six continued to push ahead, up and down a few

switchbacks up the final steep, icy ascent. Finally, on June 23, "we are on the top of the highest point in the Dominion of Canada. [...] We all congratulated Mac and shook hands. [...] Carpe ran the Bell and Howell [a type of film camera] a few seconds, Read took some snaps, but we were reminded by Andy that there was a storm brewing."

They spent just 25 minutes savouring their achievement at Mount Logan's sunny summit before the weather began to turn. The temperature dropped, and a heavy fog settled in, obscuring their trail back to camp. "We are in real peril," Lambert noted. They hunkered down for the night, burrowing into the steep patch of hard snow.

The next morning, in pea-soup fog, the men had no choice but to keep searching for the way back down. In the process, both Taylor and Mac walked off cliffs — thankfully, they fell just several metres each and without serious injury. A few wrong leads and many wasted hours later, they finally located the trail.

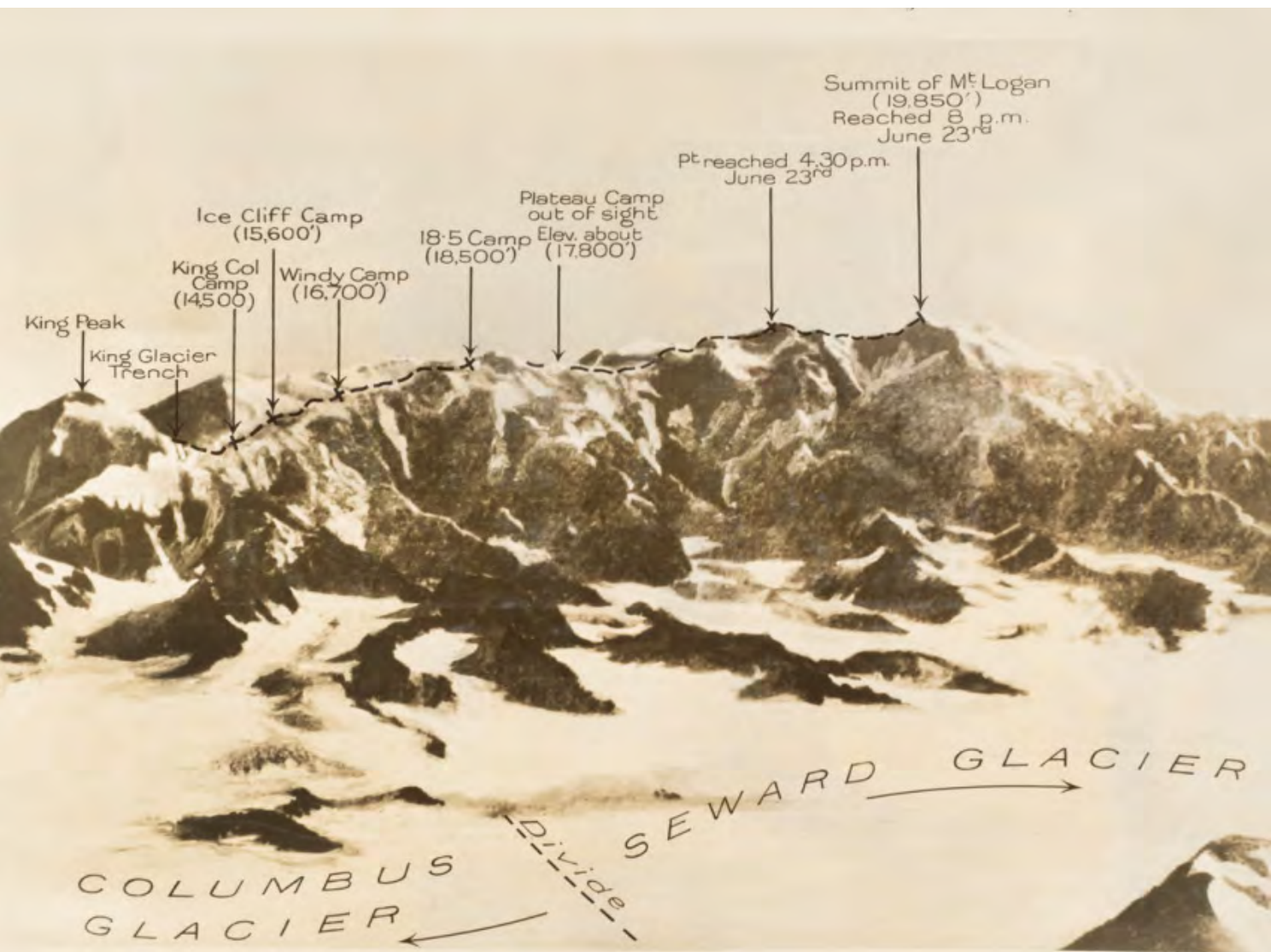
On July 4, 1925, the team made it off the glacier, and by mid-July they reached McCarthy, Alaska, once again. Lambert called the expedition "one of the strangest ventures of my life." After hiking 1,025 kilometres in 63 days, the men returned to their homes to much acclaim and publicity, with *The New York Times* naming Lambert one of the world's greatest climbers. 

With contributions from the University of Victoria's Mountain Legacy Project and Zac Robinson of the University of Alberta. This piece is adapted from the original version on the Library and Archives Canada blog (thediscoverblog.com).

Clockwise from TOP: A photograph showing the route of the 1925 Mount Logan expedition; team members working their way up the ice wall above King Col with King Peak towering over them; two members of the expedition looking out from King Ridge.



Read more stories about historic maps at cangeo.ca/topic/map-archive.



Sounding the alarm

Swim under the Salish Sea with southern resident orcas — and learn about the noise pollution threatening the health of these endangered cetaceans

BY **ABI HAYWARD**

ILLUSTRATION BY **KAT BARQUEIRO**

Don your headset, and enter the dome. Take a deep breath, and launch yourself into the depths of the Salish Sea in the northwest Pacific Ocean. As your eyes adjust to this underwater world, you suddenly realize you are not alone. For here, there be orcas.

Southern resident killer whales, to be specific. “Critical Distance” is an augmented reality experience at the Smithsonian in Washington, D.C., that allows participants to meet holographic versions of J-pod, a group of 24 endangered orcas living around the Georgia Strait, the San Juan Islands, the lower Puget Sound and the southern Canadian Gulf Islands. (The last population count in 2020 put the total southern resident killer whale population in the Pacific Northwest at just 73 individuals.)

This collective of orcas that surrounds you is a tight-knit family. There are mothers and children, grandmothers and aunts and cousins. They’re life-size, engaging in the same behaviours as the real J-pod. Immersed in their world, you join family members as they swim, play and hunt for salmon. All the while, they’re communicating with each other — and figuring out the seascape they’re swimming in — by echolocation. In your AR bubble, when you reach out and touch them, they glow.

“It’s pretty spectacular,” says Amy Zimmerman of Mayne Island, B.C., who wrote, co-produced and co-developed the AR experience. “It’s the first time anyone will ever be able to ‘swim’ with the southern resident orcas.”

But this interactive experience soon reveals a darker side to the killer whales’ reality. Gradually, boats start to pass overhead. At first, it’s just kayaks, which the orcas use for echolocation. But the vessels get progressively bigger and louder, disrupting the orcas’ sense of their underwater home. The whales start to lose their vision, which becomes distorted as the sound increases in volume. Your vision becomes similarly blurry. “It’s simulating what it’s like for them when they’re swimming with one another and they’re trying to hunt and echolocate and they essentially lose their sight,” says Zimmerman.

As the largest of the boats passes over, the noise pollution climaxes and the family of orcas can no longer see one another — and you can no longer see them. Standing in darkness, you better understand the breadth of the obstacles facing this incredible mammal — what it sees and, perhaps, how it might feel. But though “Critical Distance” is a disturbing experience, it’s also about hope and positive action. The power of AR provides a new way to engage the public with wildlife and get participants to think more deeply about how they might help. “Whether you live by the sea or whether you live inland, there’s always something we can do to help the orcas and our oceans as a whole,” says Zimmerman.

That’s why it’s so important to understand and experience what it means for orcas — and all cetaceans — when there’s a lot of noise under the ocean, Zimmerman explains. “More now than ever before, I feel that we really need to quiet the waters for them.” 

THERE ARE 24 ORCAS

in J-Pod — including three pregnant females. It’s hoped that three healthy calves might help bring the pod back from the brink of extinction.



This AR southern resident killer whale experience will be at the Smithsonian until June 2022 and is scheduled to come to Canada later in the year. It is produced by Vision3, Vulcan Productions and Microsoft.

An illustration at the top right shows a large black boat with a white wake colliding with a small orca. The impact is depicted with a large, jagged, red and orange splash, suggesting a violent collision. The background is a dark, textured blue.

NOISE POLLUTION

is just one part of the picture as to why these orcas are endangered. Their prey, chinook salmon, is decreasing in quality and quantity. Boat collisions are a hazard. And the whales suffer from chemical contamination, as a result of pollutants building up in their tissues.

A small illustration of an orca, shown in profile, swimming towards the left. It has a white belly and a dark back with a white patch near the tail.

THE BOAT SOUNDS

that players hear in the experience are real recordings from boat traffic.

A large illustration of an orca, shown in profile, swimming towards the left. It has a white belly and a dark back with a white patch near the tail.

ORCAS USE SOUND TO HUNT,

a bit like how bats use sonar, and to paint a picture of their oceanscape habitat. The whales make clicking sounds that travel like a beam of torchlight in the dark. These sounds echo off the swim bladder of a fish, for example, which the whale can process as the right shape and size for a chinook salmon.

An illustration at the bottom shows two people standing on a light blue, textured surface, looking up at a large orca swimming above them. The orca is shown in profile, swimming towards the left. The background is a dark, textured blue.

THE ORCAS IN THE AR EXPERIENCE

are animated based on videos and images of the actual whales in J-pod — they are the same size and bear the same markings. The calls they make are real recordings.

THE EXPERIENCE USES HOLOLENS2

technology, an AR headset developed by Microsoft.

ON THE MAP

Exploring Cartography

Watershed moment

Fifty years after the landmark Great Lakes Water Quality Agreement, what's changed?

BY **CHRIS BRACKLEY**

WITH TEXT BY **ABI HAYWARD**

Sailors used to call them the “Sweetwater Seas.” But after centuries of sustained siege (extirpation of beavers during the fur-trade era, sedimentation and wetland loss due to logging, waterborne disease epidemics during the 19th and 20th centuries, industrial pollution, invasive species and habitat destruction), the Great Lakes could no longer live up to their moniker. In 1968, the Buffalo River caught fire, as did the Cuyahoga and the Rouge in 1969. Magazine photographs showing the water in flames or contaminated with everything from sewage to taconite tailings, slaughterhouse residue to algal blooms, prompted a public outcry. An environmental movement was born.

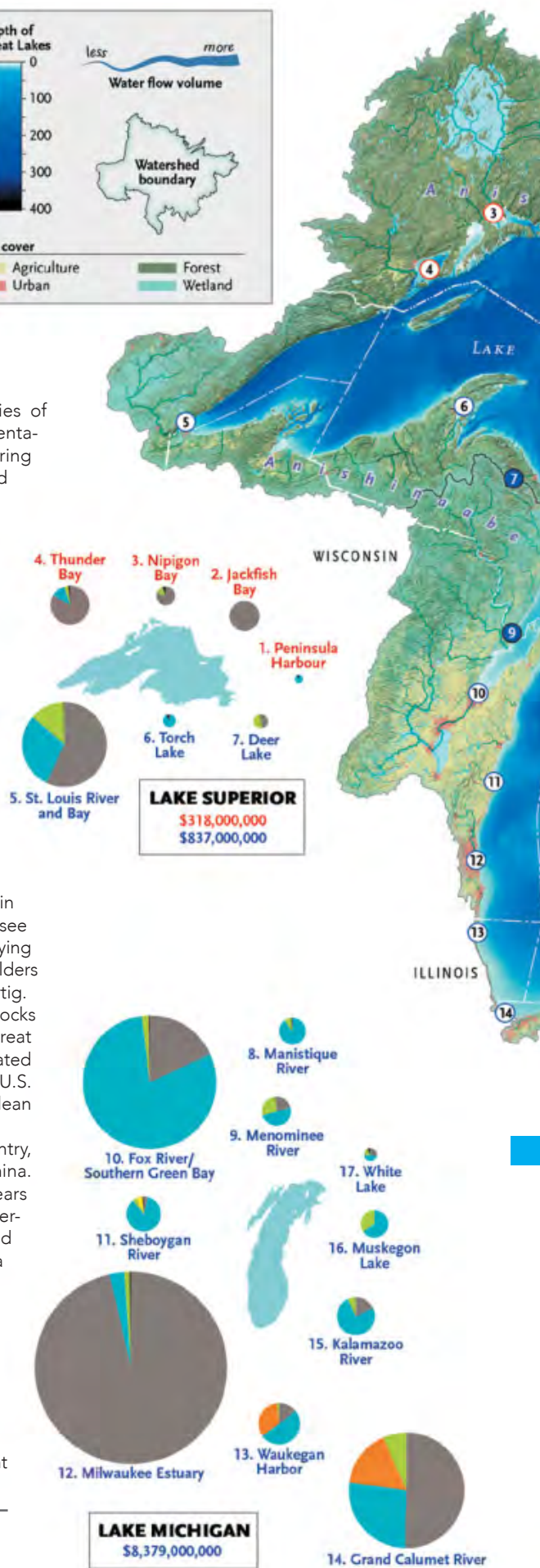
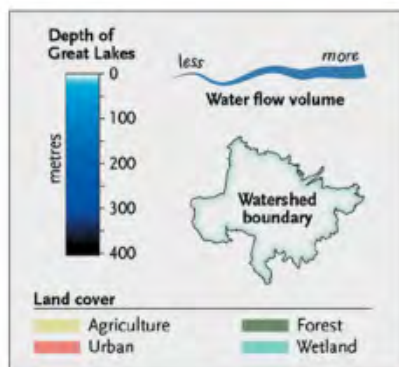
In the same year as the very first Earth Day, the Canadian government established the Canada Water Act, while the Americans enacted the U.S. National Environmental Policy Act of 1970. Two years later, the two countries signed the landmark 1972 Great Lakes Water Quality Agreement, a commitment to cooperate to restore and protect the Great Lakes. “It was revolutionary, right? And it's still an international model of multinational cooperation,” says John Hartig, a visiting scholar at the University of Windsor's Great Lakes Institute for Environmental Research. “That all happened because people started speaking out about pollution — and speaking in one voice.”

So, what's happened in the years since? After more than a decade of research, negotiation, shifting perspectives, goal-setting and law-making, a revised agreement in 1987 highlighted 43 of the most polluted areas in the Great Lakes: 26 in the U.S., 12 in Canada, and five binational (you can see these so-called “areas of concern” on the map). “They put a magnifying glass on those 43 areas and had a laser-like focus to bring stakeholders together to cooperate and reach agreement on the problems,” says Hartig.

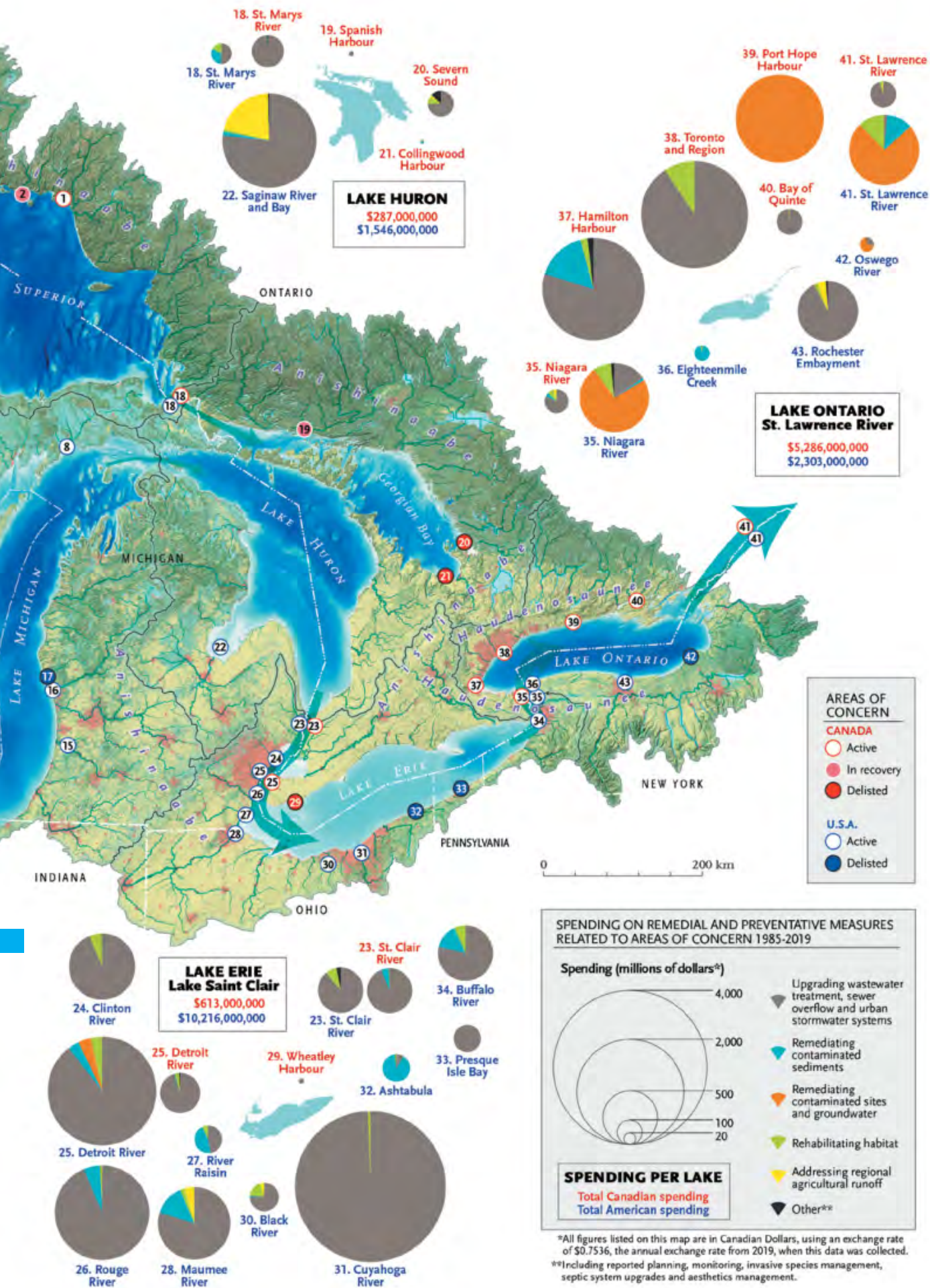
Still, dedicated funding took time. Canada was faster out of the blocks with the Great Lakes Cleanup Fund in the late '80s (which became the Great Lakes Protection Initiative in 2017). The U.S. didn't see major dedicated funding until after the millennium. However, by 2019, Canada and the U.S. had spent a total of C\$6.5 billion and US\$17.5 billion, respectively, to clean up and restore the Great Lakes.

It's a fair amount of money. But if the Great Lakes region were a country, it would have the third largest GDP in the world behind the U.S. and China. The combined US\$22.78 billion spent on cleanup over the last 34 years represents less than 0.4 per cent of the annual economic activity generated by this natural resource. And the Great Lakes Commission and Council of Great Lakes Industries estimate these investments will offer a threefold return. In the Toronto region alone, decades of cleanup and collaborative planning “have led to the revitalization of Toronto's waterfront with substantial economic and social benefits,” according to research published in 2020 by Hartig and colleagues — yielding jobs, tourism spending and tax revenues.

So far, three Canadian and six U.S. sites have improved enough that they're no longer listed as areas of concern. “It's really important to celebrate 50 years and recognize how far we've come,” says Hartig. “But, you know, the ultimate goal is sustainability. That's where we want to be, and we're not there. So, we've got more to do.” ☘



Read a feature story on how far the Great Lakes have come at cangeo.ca/ma22/great-lakes.





Alison Criscitiello and Rebecca Haspel
arriving at Camp Two at King Col, with
King Peak – Canada's fourth highest
mountain – towering in the background.

LAST ICY STAND

FOUR RESEARCHERS TEAM UP TO ASCEND MOUNT LOGAN,
MEASURING CHANGE AND RESILIENCE ON CANADA'S HIGHEST PEAK

BY ZAC ROBINSON



ZAC ROBINSON



ON MAY 15, 2021, under a clear and windless sky, Alison Criscitiello and I skied out onto Mount Logan's glaciated summit plateau. From the Yukon mountain's base, it had taken us and two friends — Rebecca Haspel, a geologist from Calgary with a serious talent for self-propelled adventure, and Toby Harper-Merrett, a Montreal-based climber and vice-president of the Alpine Club of Canada — nine days to reach this 20-kilometre-long expanse of snow and ice. At 5,000 metres, we were finally on the so-called "Roof of Canada." From the edge of the massif's high tabletop, Mount Logan's various subpeaks rose before us, adding depth and shadow to the dazzling white-and-blue expanse. To the north, a sea of mountains and ice stretched out before us as far as the

eye could see. The view was as breathtaking as the rarefied air.

But we hadn't the luxury to appreciate the scene. For we had just learned, via satellite communication, that the stable, high-pressure weather window we had enjoyed for much of our ascent was closing. At best, a couple of days remained — enough, perhaps, had our goal been to quickly tag the top, wave a flag and descend. But that wasn't the objective. We had come in service of science, to investigate climate and change at Canada's highest elevations and to lay the necessary groundwork for a future visit to drill for, and collect, ice samples from the mountain's summit plateau. After two years of planning, six months of training and 14 days of pandemic quarantine in Whitehorse, we were now, finally, exactly where

we needed to be. And time was suddenly against us.

As if climbing Mount Logan wasn't hard enough.

Located deep within Kluane National Park and Reserve in the southwestern corner of the Yukon, and within the traditional territories of the Kluane and White River first nations, Mount Logan stands unrivalled in physical mass, and perhaps in mountain grandeur. The massif boasts the largest base circumference of any non-volcanic mountain on

Zac Robinson (@zacrobinson_) is a historian, writer, climber and associate professor at the University of Alberta. He presently serves as the Chair of the Royal Canadian Geographical Society's Expeditions Committee.



Earth. Twelve distinct peaks rise from its summit plateau. Its many sawtooth ridges rake moisture — like “a cosmic comb,” one writer described it — from the almost countless, year-round storms produced over the Pacific Ocean (as the warm, wet air is deflected up the windward side of the wall of mountains, it condenses into storm clouds that drop their moisture before cresting the summits). Average summer temperatures on the summit plateau are sub-zero, and tremendous snowfall in the region produces an area of glaciation smaller only in size to those found in the polar regions of Antarctica and Greenland. Few places on Earth are as high, cold and remote as Mount Logan. All told, it’s a coveted prize for climbers around the world — and a unique site for studying climate change.



THE GENESIS OF OUR INITIATIVE

was decidedly less elevated.

Our story begins far from Mount Logan in the flat parkland expanse of central Alberta, on the floor of a university laboratory, in a warm puddle of ancient water. *The New York Times* called it “An Ice Scientist’s Worst Nightmare.”

Ice cores hold climate secrets of long ago. The long, cylindrical cores drilled from glaciers in high mountain and polar regions preserve information — gas bubbles, pollen, dust particles, trace elements and isotopes — that scientists can use to reconstruct the Earth’s past climate and air composition. The techniques to analyze ice cores, and the range of

CLOCKWISE FROM LEFT: An aerial view of the main summit on the southeastern edge of the massif’s summit plateau; left to right, Toby Harper-Merrett, Rebecca Haspel, Alison Criscitiello and Zac Robinson return after 19 days on the mountain; Haspel (left) and Criscitiello prepare to leave Base Camp.

information that can be extracted from them, are always advancing, so the collecting and archiving of these ice cores is vitally important.

A catastrophic freezer malfunction in 2017 at the brand-new ice-core lab at Edmonton’s University of Alberta damaged or lost roughly 10 per cent of its samples. The facility had been custom-built to house the world’s largest collection of ice cores from the Canadian Arctic, and the melt-down was heart-wrenching for the institution, its researchers and the

wider scientific community. Among the damaged samples was the oldest ice-core record ever collected from the north Pacific region, drilled in 2001 and 2002 by a team of federal government scientists on Mount Logan's plateau, on a wide glaciated saddle between Prospector's and Russell peaks. The sample, retrieved from drilling 180 metres deep, to bedrock, had provided scientists with a window into 16,000 years of climate history, making it one of the most valuable non-polar, high-resolution records of atmospheric climate change for the region.

In the incident's immediate aftermath, unrelatedly, the university hired Alison Criscitiello to manage the new ice-core facility. The Boston-born, MIT-trained chemist knew what it took to collect cores in extreme, hard-to-get-to places. She had drilled across the Canadian Arctic, in Greenland and in the Antarctic. As a climber, she would also soon come to know Mount Logan, successfully ascending the peak herself in spring 2018. Could

This view (RIGHT) from near the summit of King Peak captures the upper King Trench Route from the flat saddle of King Col (centre foreground), up the centre glaciated ramp to Prospector's Col, a small granite notch on the skyline (centre right) and the access point to the summit plateau. An area map (BOTTOM) shows the vastness of the range. The enlarged area is shown on pages 40 and 41.

locate an even better drilling site on Logan's plateau and thus yield a superior ice core.

But that important radar work would require an initial expedition to the mountain. For my part, as a historian, I also hoped to return to Mount Logan to try to repeat a series of photographs taken up high during various mountaineering ascents over the past century (see "Frozen Feat," page 26). The comparison of images, old beside new, might reveal something, I figured, about climatic warming at high elevations. My objective took a historical view; Criscitiello's was all forward-looking — but both



well known that the rate of temperature change — caused by increasing levels of greenhouse gases in the atmosphere — is amplified at high latitudes. This was driven home in 2010 when researchers first compared aerial photographs from the Canadian Land Survey in the 1950s with modern-day satellite images and found that of the 1,400 glaciers surveyed a half-century ago, 300 had disappeared. And nearly all others had shrunk. "It's a regional thinning rate that is greater than almost all other glacier and ice-cap regions," said geophysicist Nick Barrand, who was one of the study's lead authors.

There is growing evidence those rates of warming are also further amplified at elevation, meaning that the world's highest mountain ranges are warming more rapidly than their surrounding lowlands. That's a double whammy for Canada's high northern mountains. And this appears to be the case for Mount

A sea of mountains and **ICE STRETCHED OUT**
before us as **FAR AS THE EYE** could see.
The view was as **BREATHTAKING** as the rarefied air.

anyone who knows Criscitiello — cool, resourceful, energetic-to-the-max (the type of person who happily runs marathons, daily) — believe for a minute that plans for an ice-core rescue mission weren't soon to follow?

I first met Alison Criscitiello at a coffee shop near the university's campus early in 2019. We yakked about parenting, mutual climbing friends and our own research projects. All grin with tight curls suspended just below her distinguishing beanie toque, she explained how advances in modern-day, ground-penetrating radar could help her and her team

projects revolved thematically around change on Canada's highest peak. We cheerily resolved to team up.

But, within eight months, as the first wave of the global COVID-19 pandemic swept the country, all designs for a 2020 expedition — like pretty much everything else — ground suddenly and stunningly to a halt.



THAT RAPID CHANGE is occurring today across the Yukon's glaciated landscape is hardly a surprise. It's



TOP: AARON BEARDMORE, PARKS CANADA; CHRIS BRACKLEY/CAN GEO



LEFT: Alison Criscitiello (left) and Rebecca Haspel acclimatize at Camp One.

RIGHT: Toby Harper-Merrett takes the final steps to the top of Mount Logan's main summit.

Logan, at least according to a 2020 study that used an array of meteorological data to show that the air near the mountain's top was warming more rapidly than at its lower slopes.

Could we *see* this change on the mountain's upper slopes? On its snow- and ice-encrusted summit? Repeat photography would get us part of the way, but it wasn't until 2020 — remembered as our sedentary year of unhappy low-lying

penned an article for the *Canadian Geographical Journal* titled "Taking the measure of Mount Logan." It neatly laid out a near century-long preoccupation among surveyors and climbers to determine the exact height of the Yukon's Saint Elias Mountains. "An element of mystery often surrounds regions of very high altitude," wrote Holdsworth. "Mount Logan, the highest point in Canada, is no exception."

Most people **TAKE A REST DAY** before a summit attempt. We played **HIGH-ALTITUDE TIRE-PULL**. All in the name of **SCIENCE**.

postponement — that another line of investigation rose up before us. And this one, too, had a history.

In March 1975, Gerald Holdsworth, an eminent ice-core scientist who had long worked in the Canadian Arctic,

That mystery was finally laid to rest in 1992, when an expedition sponsored by the Royal Canadian Geographical Society established Mount Logan's official height, with the use of GPS technology, at 5,959

(+/-3) metres above sea level. In that year, the GPS — or global positioning system, a project that had been initiated in 1973 by the U.S. Department of Defense — was still three years away from being fully operational. This meant that the 1992 team, equipped with early-generation GPS receivers, had to carefully time their summit bid to coincide with the position of satellites orbiting far overhead. It was a remarkable feat. The expedition was a signature commemorative event for the 150th anniversary of the Geological Survey of Canada, as well as Canada's 125th birthday.

Since then, GPS technology has advanced significantly, especially in terms of its ease of use, reliability, accuracy and ability to process data. Today, high-quality receivers pick up *all* non-military signals from the much larger global navigation satellite system. That system encompasses the U.S. GPS, Russia's GLONASS, the European Union's Galileo and others. Combined with advances in data processing and analysis techniques, today's receivers provide incredible all-weather positions, including measuring the height of mountains within several centimetres. Modern instruments can also record data 24 hours a day. And with significant improvements in the modelling of sea level under mountains — the theoretical surface known as the geoid — elevation measurements are even more accurate.

For all of these reasons, Michael Schmidt, a longtime geophysicist with the Geological Survey of Canada and the indomitable team leader of the '92 expedition, asked

us if we'd be willing to remeasure the height of Mount Logan's main summit using modern global navigation satellite system receivers. And "it would not be surprising," Schmidt added, "to see a difference from 1992 as a result of the variability in summit snow and ice over time."



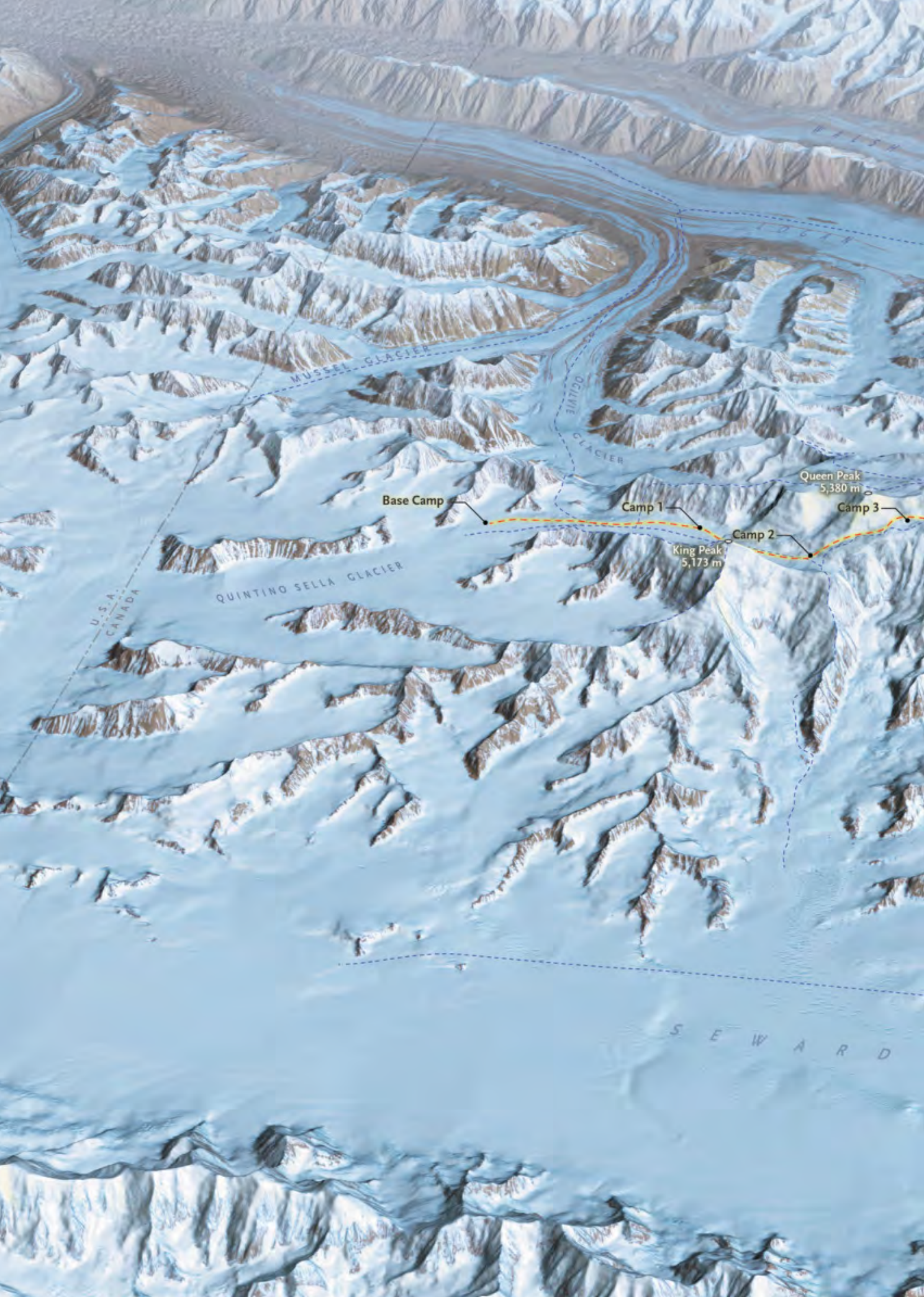
AS THE SPRING OF 2021 drew near, and despite continued waves of pandemic concern, the possibility of an expedition to Kluane National Park and Reserve improved. International travel restrictions, however, necessitated adjustments to our group's composition and size. The four American ice-core scientists on Criscitiello's team had to withdraw because of the border closure. We quickly looked closer to home for assistance, and enlisted our friends Rebecca Haspel and Toby Harper-Merrett. By mid-April our team of four was happily holed up in a Whitehorse rental unit to fulfil a two-week quarantine period, which we spent organizing and repacking gear, familiarizing ourselves with various scientific gadgets and keeping active as best we could.

The topic of change was central to much of our quarantine conversation. In particular, a contemporary aerial photograph enflamed our imaginations — and our concern. A day after arriving in still-snowy Whitehorse, Conrad Janzen — a Parks Canada visitor safety specialist from Banff who was participating in helicopter-rescue training with Kluane Park staff — shared with us a rare bird's-eye view of the upper portion of Mount Logan's King Trench Route. It was the route we were planning to ascend to access the mountain's upper plateau. The image came with a message: "things are changing." What used to be one or two potentially

show-stopping crevasse systems (deep, open cracks) across this portion of the glaciated route now looked like four or five. And the snow cover was remarkably thin. We shared the image with Schmidt, who now lives in Kluane's gateway village of Haines Junction, not far from our staging area on the shores

of Łù'àn Män (Kluane Lake). "I am totally amazed by the changes from 1992," Schmidt said in an email. "If you can believe it, we simply slogged up through the snow, wound our way around very few crevasses, with the return ski down cranking turns the whole way with no concerns at all!"





MUSSEL GLACIER

OCTINO
GLACIER

Base Camp

Camp 1

Camp 2

Queen Peak
5,380 m

Camp 3

King Peak
5,173 m

QUINTINO SELLA GLACIER

U.S.A.
CANADA

SEWARD

Schmidt's snowpack observations were echoed soon afterward by Sian Williams, the seasoned, second-generation outfitter at Icefield Discovery, a full-service air-charter company that has been transporting climbers to the base of Logan for decades. "Twenty years ago, we'd often have to dig out our five-metre-high cache marker out on the divide," noted Williams of the central accumulation zone that feeds a whole hub of glaciers in the region. "Now, we rarely get over two metres [of snow]."

While the image instilled a healthy dose of trepidation, it also gave us an upper hand, at least as far as navigation went. Once on the mountain, we often referred to the photograph, and with it, our journey thus proceeded happily, the first day morphing into



the next, as we pushed upward on skis, roped together, laden with heavy packs and sleds. We relished the physicality of it all, of finally being able to move after our prolonged delay. Eight days and three camps

later, we were dug in comfortably just below Prospector's Col, a small granite gap on the upper route and the entryway to the plateau.

It was here that we received the news that the weather was changing

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VIRGINIA FALLS, NAHANNI
NATIONAL PARK RESERVE
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Building a wind break (OPPOSITE) into which the tents would be placed. A photo from the 1925 expedition (LEFT) looking back at King Peak and the same view (BOTTOM LEFT) taken in 2021. Comparing images from former expeditions to the current landscape (BELOW).



for the worse. Haste was now required, or we risked getting stuck high on the mountain, exposed with little protection for an indeterminate period of time. There's nothing quite like necessity to bring about efficiency. Strong, capable and supportive climbing partners help, too.

blocks to protect our tents from winds. A scheduled heli-drop of survey equipment — by a very talented pilot using supplemental oxygen — went off without a hitch. Spin drift from the rotor blades had hardly settled before we were taking turns dragging a 100-megahertz

It's the **SHEER RESILIENCE** of this icy stronghold amid all the **PRONOUNCED CHANGES** occurring down slope and beyond, that's **WORTH NOTICE** — and quickly, too.

What ensued was a three-day barrage of methodical precision, a triaging of tasks and of committed teamwork, with all eyes glued to the horizon, nervously watching for massing clouds. We built our fourth and highest camp not far from the 2001-2002 ice-core drilling site and fortified it with snow

ground-penetrating radar system in a grid pattern, 15 football fields wide, back and forth across a portion of the plateau to discover the area with the greatest ice depth. Most people take a rest day before a summit attempt. We played high-altitude tire-pull. All in the name of science.

Our second and last full day on the plateau brought moderate winds. But with reasonable visibility, and no signs of imminent doom, we departed our camp in the early morning harbouring high hopes, a camera tripod and two global navigation satellite system receivers. It's a long and mostly flat trip from the western side of Logan's plateau to its main summit on the far eastern edge. We didn't even see the main summit until midday, after carefully side-hilling for hours around Philippe Peak (or West Peak as it's sometimes called), the second-highest summit on the massif. I kept the receiver batteries in the chest pocket of my inner jacket to keep them warm — the temperature never rose above -25 C. But the winds remained moderate, and so, at the base of the main summit, we quickly took stock, abandoned our skis in favour of crampons and



walked together up the final narrow snow ridge to the highest point in Canada.

Our time on Mount Logan's summit was short — no more than 35 minutes. It was just enough time to let the global navigation satellite system receivers collect the data to get an accurate height measurement, repeat some historical photographs, and slap a few high-fives. I lingered on the top longer than the others, trying in vain to shoot a clear 360-degree panorama, as the famous Swiss mountaineer André Roch had done when he summited during the mountain's second ascent in 1950. But alas, mists were rolling in from the south, my camera's shutter was sticking, and my fingers were cold.

Happy but weary, we returned to our high camp 13 hours after leaving

it. Our overall sense of urgency wouldn't really dissipate, though, until we exited the plateau itself the next day, just as cold winds rose and temperatures plummeted. Skis permitted a rapid descent. We were soon tent-bound with little visibility on the lower mountain, and would have to wait for a week before the plane could pick us up. We counted ourselves lucky.



CHANGE. ADAPTATION. RESILIENCE.

These are now perhaps the dominant leitmotifs of our times, ingrained in public and private consciousness, far and wide, as a result of the immense and immediate challenges brought about by the global pandemic. Climate change brings

with it even greater challenges for Canada and the world. And its effects are already visible everywhere, mostly.

Upon our return from the mountain in June 2021, we sent the summit data recorded by the global navigation satellite system units to Natural Resources Canada in Ottawa for analysis. The results put the summit height at 5,957 metres above sea level, a difference of two metres from the 1992 measurement. Is the mountain now two metres shorter? The data shows this isn't actually the case. In fact, the ellipsoidal height — the elevation above the reference surface used by GPS — is, amazingly, within a mere 20 centimetres of the 1992 measurement, testament to the extraordinary efforts made by the '92 team. The two-metre difference



instead comes primarily from an updated sea-level reference surface and geoid modelling in the area, the current thinking on where the average ocean's surface would lie, if extended inland underneath the massif. Ultimately, though, the change is trivial, not least because the snow depth on the summit is varying all the time.

In view of potential remaining errors in the latest geoid model, due to the ruggedness of the surrounding topography of Mount Logan, it is estimated that the height of 5,957 metres is accurate to — you guessed it — within two metres.

Repeat photography from up high tells a similar nickel-and-dime tale. For instance, the icy landscape André Roch gazed out upon from the main summit nearly three-quarters of a

century ago was, beyond the weather and the seasonal variance (his image was taken in mid-June, ours in mid-May), remarkably close to what we found. Even the feathered riming and crystalline wind lips adorning the summit ridge seemed to match up.

But it's the very lack of visible change up high on Mount Logan's cold snowy reaches, the sheer resilience of this icy stronghold amid all the pronounced changes occurring down slope and beyond, that's worth notice — and quickly, too. It's the other reason Alison Criscitiello seeks to return in the spring of 2022. Preliminary results from our radar survey show ice depths out on the plateau in excess of 300 metres. That's old ice, containing a datable climate record stretching back as far as 30,000 years.

A north-facing 180-degree panorama (TOP) taken by André Roch from the summit in 1950 and the same view (BOTTOM) in 2021. Zac Robinson repeated shots from the 1925, 1950 and 1969 Mount Logan expeditions.

It may also be “last ice,” in the same way that the region known as the Last Ice Area, spanning the top of Canada and Greenland, is predicted to retain year-round sea ice much longer than elsewhere. But just as with the Last Ice Area, “much longer” on Mount Logan is increasingly looking like not that long at all. And so the race is on to document — and learn from — 30,000 years of climate history before even Mount Logan begins to give in, the melting ice releasing the Earth's secrets before we have a chance to learn from this last icy stronghold. ❄️

THE COWBOY EXCLAIMS

THE BALLAD OF AN AGING VAQUERO
AND HIS TROUBLED HORSE, BUNNY

BY **MARCELLO DI CINTIO**
WITH PHOTOGRAPHY BY **GUILLAUME NOLET**





Cowboy Doug Walsh trains his horse, Bunny, on his ranch in Alberta's foothills. Walsh's horsemanship style is heavily influenced by the centuries-old vaquero training method.



When I arrived at his Millarville ranch, Doug Walsh was digging trenches with a tractor in the soft sod along his property line. It was June 2020, and Walsh planned to plant a few rows of windbreak trees, along with some chokecherry and Saskatoon bushes for the local birds. The morning was hot, even for spring in the Alberta foothills, but Walsh kept the sleeves of his plaid shirt buttoned. He wore blue jeans and a battered cowboy hat. Walsh looked lean and spry. Only the slightest stoop in his back betrayed his 70 years.

I'd come to Walsh's property because I wanted to learn about vaquero horsemanship, and Walsh is one of the few practitioners in Canada. But mostly I wanted to meet Walsh himself. And I wanted to meet Bunny, his horse.

Vaquero horsemanship originated in medieval Spain. *Vaqueros* from Mexico brought the tradition into California and Texas at the end of the 16th century. The word *vaquero* is a Spanish transliteration of "cow" — or *vaca* — and "man." (In Spanish, then,

cowboys are actually *cowmen*.) For centuries, the *vaqueros* have been admired for their riding and roping skills. The ultimate goal of vaquero horsemanship is to produce a "finished" horse: an exceptionally responsive animal that is a true partner to its rider. Finishing a horse can take years.

According to Walsh, the vaquero tradition might have disappeared in North America were it not for the efforts of famed Oregon horse trainer Tom Dorrance. "He just rejuvenated the whole thing," Walsh told me. Walsh first met Dorrance at a clinic hosted by the Willow Springs Ranch west of Nanton, Alta. Walsh was in his 30s at the time. Dorrance was 83 and a legend. "I thought I knew a little bit about horses, and I did. But, man, when I saw what that guy could do with a horse," Walsh said. The soft feel Dorrance demonstrated with his horse seemed like something spiritual to Walsh, something much deeper than simply training an animal to be a mode of transportation. "Whatever it was that Tom was doing, I knew that I

needed that. I spent the rest of my life trying to get it."

I followed Walsh from his property line to where Bunny, a black and beautiful quarter-horse, nibbled on pasture grass. Walsh placed a blue halter over Bunny's head and led her into a round pen built of hand-hewn logs. Walsh didn't mount Bunny, but stood in the centre of the pen holding the end of the lead loosely in his fingers.

Then Walsh led Bunny through a series of exercises in the ring. A vaquero-trained horse will react to nearly imperceptible cues. Walsh never tugged on the rope at all. His movements were so subtle I almost missed them entirely. But Bunny didn't. A slight lift of Walsh's arms set

Writer Marcello Di Cintio (@DiCintio) is the author of four books, including 2021's *Driven: The Secret Lives of Taxi Drivers*. Guillaume Nolet (@guillaumenolet) is a photographer known for documentary-style narratives that portray society, culture and rural life.



Clockwise from OPPOSITE: Walsh introduces Bunny to groundwork exercises on his ranch; he and Bunny get ready before a cattle drive; Walsh, shown changing a record at his ranch, finds peace in music, literature, poetry and leatherwork.

Bunny off on a trot. A light swing of the rope and Bunny changed direction. Walsh made a tiny lateral step and Bunny stopped altogether. I marvelled at how she so deftly responded to the smallest of signals. There was something almost magical happening. A human-equine telepathy.

Then Walsh and Bunny did something I won't forget. "Marcello's over there," I heard Walsh whisper to Bunny. "He's a pretty good guy. You're a pretty good horse. I'd like you to go and say hello to him." With another gentle sway of the rope, Bunny turned to face me. She stepped slowly forward until her face was a few inches from mine. Then she put her nose over my shoulder. I felt my breath catch, amazed, and as I stroked Bunny's forehead, I could feel Walsh smiling at us.



Walsh was nine years old when he decided to be a cowboy. It was the winter of 1959, and he had just come home from the outdoor rink in Calgary's Elbow Park where he'd played "50 million games of shinny. No breaks." After taking a hot shower, Walsh sat down in front of his father's

stereo system and laid "Cool Water" by the western group The Sons of the Pioneers on the turntable. "Then I flopped down on the couch. I listened to those old songs and said, 'I gotta have that.'"

Walsh did not come from cowboys. His birth mother was the privileged daughter of a Montreal steel magnate, and his father a bohemian artist

who bartended for beatniks in San Francisco during the late 1940s. Neither was parent material, at least not in 1950 when Walsh was born. His adoptive parents weren't horse-people either, though Walsh's father did work as the team physician for the Calgary Stampeders football team.

After completing high school in the city, Walsh enrolled in a geology program at the University of Calgary. He worked on the big oil rigs in Alberta's foothills for a few years and mined coal near Great Bear Lake in the Northwest Territories. But his cowboy dreams never left him. "When I was working in the mines and on the rigs and roughnecking and everything, I was hoarding every penny I could get my hands on," Walsh said. "And I didn't waste a penny. I didn't go drinking and I didn't go gambling and I didn't make trips to Hawaii." By the time he was 27, Walsh had saved enough to pay cash for a quarter section north of Waterton, Alta., with the intention of starting a horse ranch. He bought his first horse, a paint mare, two years later.

Walsh didn't get down to Waterton as much as he'd hoped, though. "It is too far away," Walsh said. "So I started looking around for another piece of land." In 1982, he bought the 16 hectares he has now in Millarville, Alta. He built a log cabin by hand on the property with plans to bring it down to Waterton, but decided it wasn't worth the effort. The cabin now houses Walsh's hand-hewn longbows and arrows, and his impressive collection of Scotch whisky. About 50 bottles, most with only an inch or so of whisky remaining, line the cabin's shelves.

Walsh eventually married "a great gal," but they've since divorced. They had a daughter, Montana, who's 27 and lives in the village of Hussar, about an hour and a half east of Millarville. Now Walsh lives alone.

I called Montana and asked if she thought her father was lonely. "I

honestly don't," she told me after a pause. "I think he enjoys the life of solitude. That's why he's out there in the first place."



Walsh doesn't know how or when Bunny lost half her tongue, but he has a theory. When she was a two-year-old colt, and before she belonged to Walsh, someone probably rode Bunny with a snaffle bit. Then something spooked her. "She is so sensitive," Walsh said. Bunny likely threw her rider, ran off, stepped on the reins and pulled back. This would have sliced her tongue. "I betcha anything that's what happened."

After Walsh bought Bunny, he "cowboyed off her pretty hard" for a couple

I didn't understand why Walsh persevered with a horse as difficult as Bunny. He had other horses, after all.

of years, working her in rough country and in the pens. She proved to be a reliable horse and never threw anyone. Something, though, wasn't right. The emotional damage caused by her mysterious injury lingered. "I could feel trouble," Walsh said. "I always felt there was something there."

Then, three years ago, Montana visited the ranch and decided to take Bunny for a ride. "I was alone 'cause my dad was at the lake," she said. Knowing Bunny was "a bit of a spooky horse," Montana called one of Walsh's neighbours to ride with her in case something went wrong. Something did; Bunny bucked Montana off within two minutes.

Montana wasn't hurt, but Bunny came undone. That one incident surfaced all of Bunny's buried trauma. The next time Walsh put a halter on her, Bunny bolted. "We were going from here to Texas nonstop. She totally lost her mind," Walsh said.

"So, Montana did me a favour. I didn't realize what a dangerous horse I was riding."

Walsh decided he needed to start over with Bunny. He started training her as if she were a colt who'd never been ridden before, not an adult mare he'd been riding for two summers already. "If a horse has had one bad experience, it might take you 20 good experiences to undo that one bad one. Or it might take you 2,000. I don't care. I got to get there," Walsh said. "I am trying to get all that baggage out of the old noggin."

But Bunny is a gifted horse. "She'll track. She'll side pass and roll back," Walsh told me, assuming I understood his horseman's lexicon. "Her leads are perfect. She'll transition nice." However, Bunny doesn't do well outside the familiar confines of the pasture. Walsh can sense her fear. "You can see it in her head position. Her tongue. She's looking for something to jump at and spook at." When her natural sense of self-preservation kicks in,

Bunny panics. And a panicked horse is dangerous.

Tom Dorrance taught Walsh that to effectively train a horse in the vaquero tradition, a cowboy must break all the horse's problems into pieces and work on them one at a time. One of Bunny's primary issues is that she's "troubled under the chin." Sensing anything unfamiliar in the space below her head causes her stress.

Walsh showed me how he is trying to solve this problem. He laid a plastic feed bag on the ground beneath Bunny's head and gently coaxed her to step on it. Bunny resisted. The colour of the bag and the sound of the plastic under her hooves made her anxious. Eventually, though, she took a few tentative steps onto the bag. After a few tries, Walsh decided she'd had enough. "That's the secret," he said. "Don't ask for too much. Get out when



things are good.” Walsh worked with Bunny for 100 straight days before she stepped on the bag the first time. Patience is key in the vaquero tradition. “The vaqueros have a saying,” Walsh told me. “For the horse, there is always tomorrow.”



I returned to Millarville a couple of days later to watch the beginning of an annual cattle drive.

Three hundred head from nearby ranches, ears tagged, waited in pens to be driven to the mountain grazing lands where they would spend summer and fall. The bulls, whose low rumbling resembled the distant thunder we expected that morning, got to ride in trailers while the 250 cows would be escorted down Highway 762 by Walsh, Bunny and a gathering of local cowboys and cowgirls.

Earlier that morning, I helped Walsh load Bunny onto her trailer — which is to say I held the trailer gate open while Walsh led her inside. Then I watched him unload Bunny in front of the cattle pens. Families from nearby ranches arrived. Their dogs dashed about while the cowboys passed around cartons of Tim Hortons doughnuts and morning cream sodas. The penned cows moaned their complaints. Bunny snorted, unsettled by the clamour, and Walsh looked worried. She’d thrown him during last year’s drive, and Walsh hoped she’d be calmer this year — bolstered by all the work he’d done with her the past several months.

Late in the drive, though, Bunny threw Walsh again. He’s not sure what spooked her. Walsh wasn’t hurt. He wasn’t angry. He was heartbroken. “It’s just the fact that she didn’t feel good enough about me to get her through that, whatever it was that troubled her there,” Walsh told me

Walsh and Bunny work cattle at a friend’s ranch in Foothills County, Alta. Bunny’s confidence is fragile and one wrong move can throw out several weeks of careful training.

later. He likened the feeling to giving a troubled friend advice that they decide to ignore. “They just go on and do something completely different. That’s what it felt like,” Walsh said. “You feel abandoned by the horse and disappointed. You’re just doing everything you can to help them out, and they throw anyway.”

Regardless of the setback, Walsh believes he can finish Bunny. And he won’t stop working with her. “A lot of people would probably normally give up or ask for help,” Montana told me. “I think it’s a good representation of his character. He hasn’t given up on Bunny.” Still, she worries about her father sometimes. “He’s not really a spring chicken



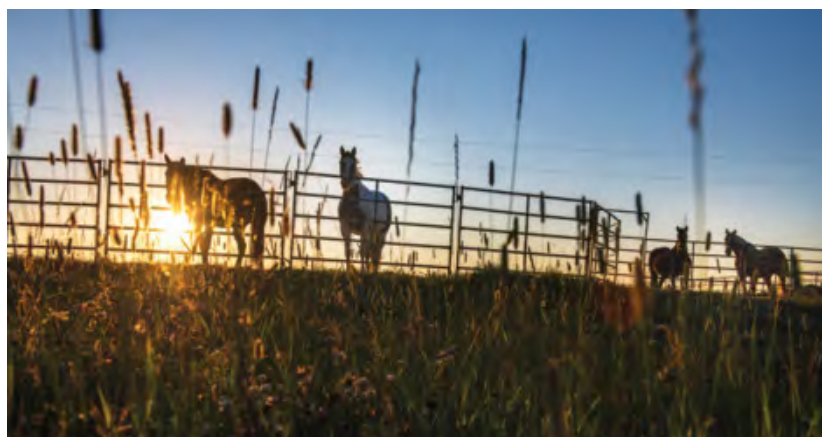
Walsh teaches Bunny to move in sync with him. His horses (RIGHT) are silhouetted in the early morning light inside the arena at his ranch.

anymore,” she said. “It’s not that great for a 70-year-old man to get bucked off a horse like that.”

I felt I was missing something. I didn’t understand why Walsh persevered with a horse as difficult as Bunny. He had other horses, after all. Walsh told me he didn’t know Bunny’s challenges when he bought her, but once he started working with her, he was determined to carry on. “I’m not gonna let this go,” he said.

But there was something else, too. Bunny is a special horse. “You should see her run,” Walsh said. “It’s like her feet aren’t even touching the ground. She is so elegant and free, and her mechanics are perfect. It is a sight to behold. I’ve written poems about her. Maybe I should show them to you.”

Three weeks later, a manila envelope full of handwritten poems arrived in my mailbox. Walsh doesn’t have a computer or internet connection at his home, so he couldn’t email me. “I’m gonna need those back when you’re done,” he told me on the phone. “I want to show them to my mother.”



Some of the poems were in French, which he studied in grade school, and Spanish, which he learned during the year he spent drilling wells in Patagonia. “I dabble in both languages,” he said. “I try to keep it going.”

Among the pages, I found an ode to Bunny called “The Cowboy Exclaims.” And in it I found the heart of the connection between an aging cowboy and his troubled horse. After describing her gait as “an actual piece of the sky,” Walsh wrote:

*N’ ever’ time I see it,
After I’m thru,
Bein’ choked to the point of tears,
I start to get Greedy
N’ I Hunger, for just a piece...
...Gawd, I need a piece of that,*

*to fill up my last few years.
I don’t need to possess it — contain it.
Don’t want to ever own it outright.
But dang.
If it could just be a piece.
coerce it
seduce it
be one with it
— embrace it
— with every bit of my might
Then maybe she would make me
somethin’
Somethin’
I’d completely like
Then maybe,
just maybe, I too,
(Cuza’ her; n’ with her)
Could be somethin’
Somethin’ that is ...
...JUST RIGHT 🌀*

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CANADIAN PHOTOS OF THE YEAR 2021

CANADIAN GEOGRAPHIC PRESENTS THE WINNERS OF ITS ANNUAL PHOTO COMPETITION

A caribou, silhouetted by the setting sun, shakes off water in a spray of golden droplets. Lightning sizzles over the Edmonton skyline during a spring thunderstorm. A woman pauses to sip hot chocolate outside a snowy corner store in downtown Montreal — a perfect snapshot of urban life. These are just a few of the outstanding images selected from among nearly 7,000 entries to *Canadian Geographic's* Canadian Photos of the Year competition as the best of 2021. Canadian Photos of the Year is a fresh take on our annual photo competition, which ran for 36 years. For the first time, we were pleased to award one individual a grand prize of \$5,000, naming Jean-Simon Bégin Canadian Photographer of the Year. Read on to see the photos that most impressed judges Jenny Wong, Christian Fleury, Scott Forsyth and George Kourounis.

CANADIAN PHOTOGRAPHER OF THE YEAR 2021 JEAN-SIMON BÉGIN

Jean-Simon Bégin wants to do more than just take beautiful pictures. He wants to change the world.

The Quebec City-based wildlife photographer and painter has been exploring the wilderness of Canada's largest province, camera in hand, since he was a teenager. Now 31, he is harnessing the power of photography to raise awareness of some of Quebec's most special regions and animals.

Bégin's work stood out for its beauty, originality and storytelling. In September 2021, he undertook two expeditions to Nunavik, in Quebec's far North, to document the efforts of residents to develop sustainable tourism in the region. His second trip, to Kuujuaq on Ungava Bay, happened to coincide with the fall migration of the Leaf River caribou herd. When he wasn't shooting catch-and-release fishing at Leaf River Lodge, Bégin was out on the land, watching the caribou crossing the river. "I was completely mesmerized by how fantastic this place was," he says. "I took some great pictures, but I also had some really *formidable* moments of just me hiding in the bush with 10 caribou walking a few metres away from me."

Bégin, who has previously self-published two books of photographs, is now working on a third volume about Nunavik that he hopes will encourage southerners to discover the region's cultural heritage and biodiversity. He also contributes images free of charge to provincial media in the hopes of attracting more eyeballs to stories about the

plight of Quebec's threatened woodland caribou.

"It's easy to make a beautiful picture, but if you can make a beautiful picture that expresses an issue, you will for sure succeed in changing something," he says. "I don't want to just be seen as a good wildlife photographer; I want to bring something better to the world."



A pair of caribou cross the Leaf River in Nunavik, located in the northernmost part of Quebec, during their autumn migration.



A caribou, silhouetted by the setting sun, shakes off water after crossing the Leaf River in Nunavik, Que.



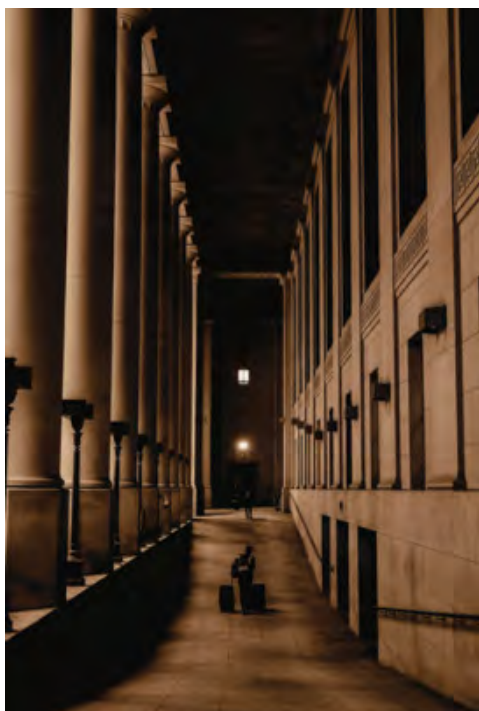
Muskoxen graze in the morning light near the village of Umiujaq, Que.



CITY LIFE | WINNER

Richard Labelle

A woman pauses to enjoy a hot chocolate while walking her dog on a snowy day in Montreal's Mile End neighbourhood.



CITY LIFE | HONOURABLE MENTION

Leanne Hay

A traveller walks with their bags out of Toronto's Union Station.



CITY LIFE | RUNNER-UP

Arjay Tadena

The 505 streetcar makes an early morning run around Toronto's Yonge-Dundas Square during the city's first snowfall of the 2020-21 winter season.



EPIC LANDSCAPES | WINNER

Peter Baumgarten

Streaks of sunlit clouds over Providence Bay on Manitoulin Island, Ont., echo the island's stratified rock formations.



EPIC LANDSCAPES | RUNNER-UP

Michael Winsor

The winter sun rises on the open barrens of Gros Morne National Park, N.L.

EPIC LANDSCAPES | HONOURABLE MENTION

Sandrine Chiarena

The sun-kissed peaks of the Three Sisters are perfectly reflected in the Bow River on a peaceful morning in Canmore, Alta.





WILDLIFE IN ACTION | WINNER

Dave Sandford

A polar bear almost seems to heave a sigh as it waits outside Churchill, Man., for sea ice to form on Hudson Bay.



WILDLIFE IN ACTION | HONOURABLE MENTION

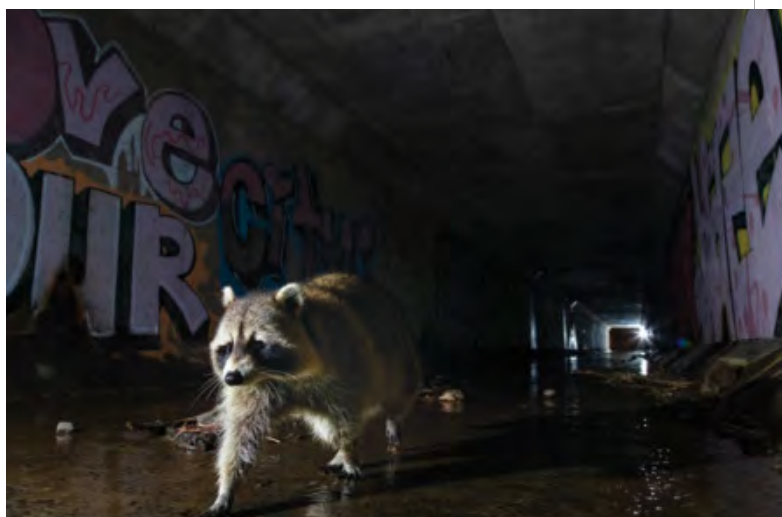
Andrew Budziak

A raccoon uses a culvert under Highway 407 in Mississauga, Ont., to safely cross between two green spaces.

WILDLIFE IN ACTION | RUNNER-UP

Dennis Liu

A male fox carries a mouthful of prey back to its kits in Toronto's Tommy Thompson Park. The kits' mother was killed by a coyote, leaving the father to feed the family.

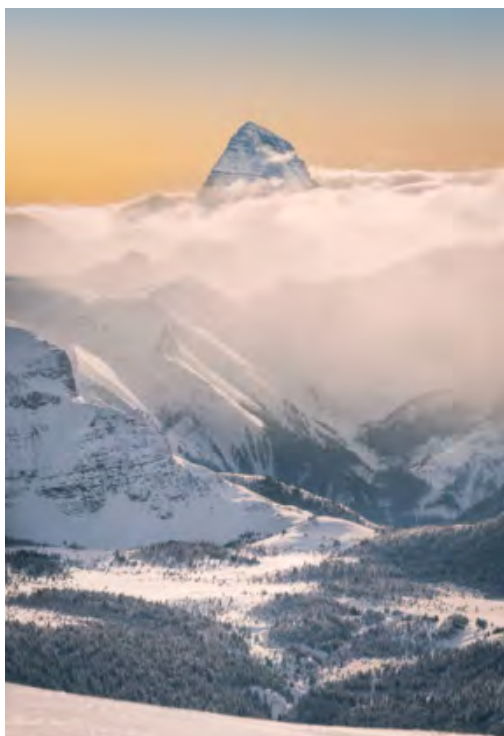




WEATHER, SEASONS AND SKY | WINNER

Jeffrey van Soest

Lightning bolts strike above and around the city of Edmonton during a spring thunderstorm. The photographer stitched together several images to show the intense electrical activity associated with the storm.



WEATHER, SEASONS AND SKY | RUNNER-UP

Will Lambert

A cloud inversion shrouds the iconic peak of B.C.'s Mount Assiniboine at sunset.



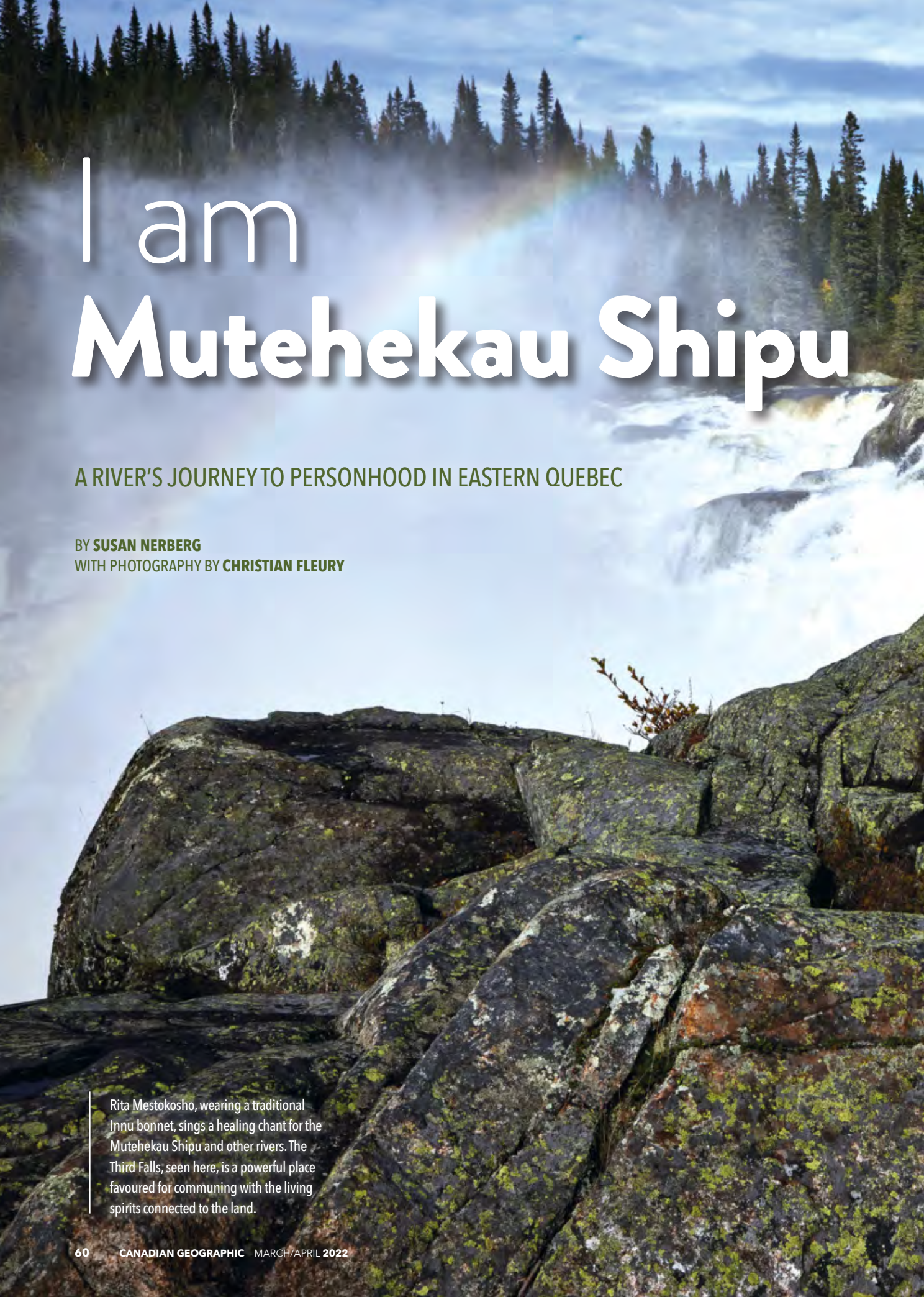
WEATHER, SEASONS AND SKY | HONOURABLE MENTION

Jeff Wizniak

Lightning lances out of a supercell thunderstorm near Belle Plaine, Sask.



Subscribe to our Photo Club newsletter to be notified of upcoming competitions. cangeo.ca/newsletter.



I am Mutehekau Shipu

A RIVER'S JOURNEY TO PERSONHOOD IN EASTERN QUEBEC

BY **SUSAN NERBERG**

WITH PHOTOGRAPHY BY **CHRISTIAN FLEURY**

Rita Mestokosho, wearing a traditional Innu bonnet, sings a healing chant for the Mutehekau Shipu and other rivers. The Third Falls, seen here, is a powerful place favoured for communing with the living spirits connected to the land.





I'm on my way to meet the sea when I hear the voice. It's faint at first, a few stray notes climbing on the mist from a waterfall. As I approach the precipice creating the cascade, I see a human on a rocky outcrop. Wearing a red and green bonnet of the type Innu women have worn for centuries, she's beating a drum. She sings. I've heard this chant before, especially in the time since humans with pale faces and neckties started coming to these forests with plans to divert me and other rivers. They said it was for progress. But for me, my progression was slowed down the moment they led me into that concrete box with sluices. Who is she pleading with, this sister? Then I hear it. She's singing a healing chant — for me, the river — for all of us, for the planet. I hear, even though my voice is louder than her words. I roar. That's how I know I am.



“We’ve always known the river is alive. Our ancestors have always said that,” says Innu activist, poet and

educator Rita Mestokosho as she swaddles her deerskin drum in a fleece blanket. “The river is like the blood that runs in our veins. If the river is sick, we will also be sick. That’s why we need to protect her.” The waterway she’s talking about is the Mutehekau Shipu (spelled differently in different dialects of Innu-aimun), also known as the Magpie River, a nearly 300-kilometre ribbon that swirls through a pristine area of the Côte-Nord region in eastern Quebec. For Mestokosho and the people of Ekuanitshit, an Innu community located on the Gulf of St. Lawrence, the river has always been family. In February 2021, the world was introduced to Mutehekau Shipu when the people of Ekuanitshit and the regional municipality made a joint declaration granting the river legal personhood and rights — the first resolution of its kind in Canada.

The province’s mightiest rivers have already been dammed (or damned, depending on who you ask) by Hydro-Québec, the fourth-largest

Mutehekau Shipu’s personhood declaration applies only to the waterway, not the watershed, something the locals hope to change in the future.

hydro-power producer on the planet, but the Innu Council of Ekuanitshit, the community’s governing body, hopes the Mutehekau Shipu’s personhood status will keep her safe from a similar fate. “The difference now is that the other people in the region also stood up,” Mestokosho says. “This time, we stood up for the river together.”

The “other people” who joined the Innu Council of Ekuanitshit in their defence of a free-running Mutehekau Shipu are the Minganie regional

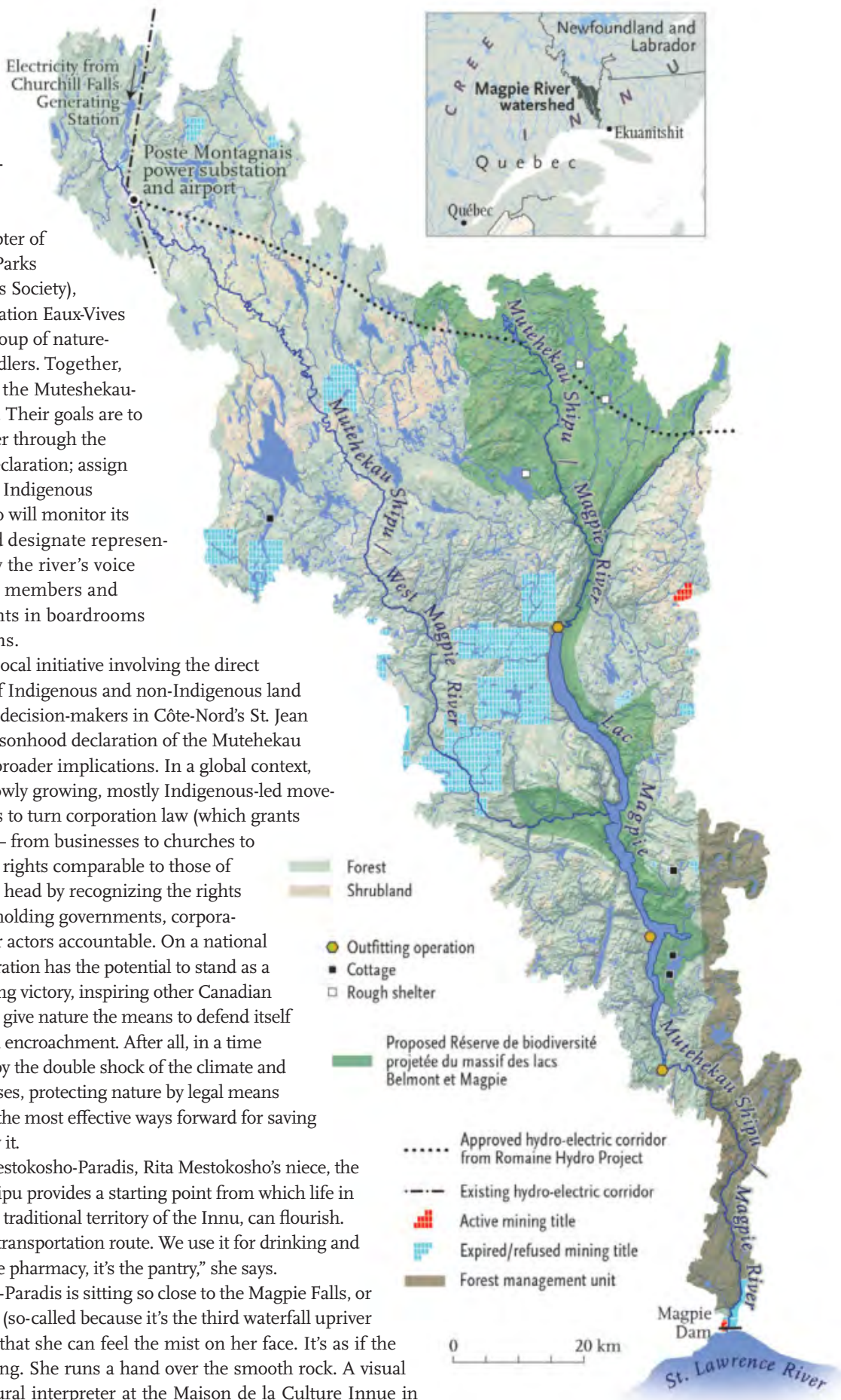
Susan Nerberg (@susan_nerberg) writes about science, the environment, nature and the outdoors. Her work has appeared in *The Globe and Mail*, *Hakai Magazine* and *explore*. Christian Fleury (christianfleury.com) is a Montreal-based editorial and commercial photographer.

county municipality, SNAP Québec (the province's chapter of the Canadian Parks and Wilderness Society), and the Association Eaux-Vives Minganie, a group of nature-lovers and paddlers. Together, they make up the Mutehekau Shipu Alliance. Their goals are to protect the river through the personhood declaration; assign stewardship to Indigenous Guardians who will monitor its well-being; and designate representatives to carry the river's voice to community members and uphold its rights in boardrooms and courtrooms.

While it's a local initiative involving the direct participation of Indigenous and non-Indigenous land defenders and decision-makers in Côte-Nord's St. Jean region, the personhood declaration of the Mutehekau Shipu carries broader implications. In a global context, it's part of a slowly growing, mostly Indigenous-led movement that aims to turn corporation law (which grants corporations — from businesses to churches to NGOs — legal rights comparable to those of persons) on its head by recognizing the rights of nature and holding governments, corporations and other actors accountable. On a national level, the declaration has the potential to stand as a precedent-setting victory, inspiring other Canadian jurisdictions to give nature the means to defend itself from industrial encroachment. After all, in a time that's marked by the double shock of the climate and biodiversity crises, protecting nature by legal means may be one of the most effective ways forward for saving life as we know it.

For Lydia Mestokosho-Paradis, Rita Mestokosho's niece, the Mutehekau Shipu provides a starting point from which life in Nitassinan, the traditional territory of the Innu, can flourish. "The river is a transportation route. We use it for drinking and cooking. It's the pharmacy, it's the pantry," she says.

Mestokosho-Paradis is sitting so close to the Magpie Falls, or the Third Falls (so-called because it's the third waterfall upriver from the sea), that she can feel the mist on her face. It's as if the river is breathing. She runs a hand over the smooth rock. A visual artist and cultural interpreter at the Maison de la Culture Innue in Ekuanitshit, she's come here with her aunt to honour the river and their ancestors,



MAP: CHRIS BRACKLEY/CAN GEO; MAP DATA: SHELTERS/FOREST MANAGEMENT UNIT/HYDRO CORRIDOR, PROPOSED BIODIVERSITY RESERVES FOR THE MASSIF OF LAKES BELMONT AND MAGPIE, THE KNOILLS OF LAC GUERNESE, AND THE COLLINES DE BRADOR. GOVERNMENT OF QUEBEC, 2007. <https://numerique.banq.qc.ca/patrimoine/details/32327/17619727/DOCREF-266PKQVRSVHWQXGBX>; MINING CLAIMS: https://gestim.mines.gouv.qc.ca/ftp/cartes/carte_quebec_eng.asp#2 (DATA TIME STAMPED JAN 10/2022)



Lydia Mestokosho-Paradis (ABOVE) says protecting the river also means protecting medicines, like Labrador tea (RIGHT), which have been used since time immemorial.

following a tradition of showing all living beings that you remember and care about them. The personhood designation, she hopes, will prick the consciences of those who want to stem its flow. “They don’t understand the vision that the river is alive. But how can you see a corporation as a person, an entity with moral rights, and not see a river in the same way?”

If they still don’t get it, she urges them to come and see for themselves. “Bring your children, your wife, your husband; look at what this place is. People in government need to come here before making decisions,” she stresses. As if to underscore her point, the sun pokes through the clouds, spilling enough light to draw a rainbow in the mist. “Do you really want to be the person who destroyed ancient portages and animals and their habitat for money?”



Early morning is my favourite time of day. That’s when the Labrador tea lets its dew-drop cloak slip from its leaves, soaking the air and the caribou moss at its feet with a fragrance that reminds me of spruce resin. It’s also when moose cows and their calves come by to drink. Travelling this route in the morning opens my senses to the rhythm that divides the night from day, but it’s only later that there’s enough light to make out the old portages that have brought people to me since time immemorial. In the afternoon, ravens call out to one another — and perhaps to other animal spirits — from the trees. They swoop and soar, playing in the wind like I play among the rocks. I slow down for a closer view of the mountainside, where aspens wave their golden hands at the sombre spruce. As the daylight starts to fade, I wrap myself in pastel scarves unfurled by the sky: pink, orange, yellow. The evening flatters me.



The sun is getting ready to slide behind the treetops when Sylvain Roy arrives at his hike-in chalet on the Mutehekau Shipu. An avid whitewater paddler and *plein-air* enthusiast, he started coming here in the 1990s as a paddling instructor at a Montreal canoe club. The river soon became a favourite destination for whitewater excursions; it was on one such getaway that he decided to do a side trip, hiking upstream until a roaring sound led him to a constriction in the river: the Magpie Gorge, or Fourth Falls. The moment he saw the river crash through the canyon, then shape-shift into a slow-moving, swimmable basin downstream, Roy was sold. Power and serenity coalesced in a single gesture cradled by hills made rugged with a stubble of spruce. He knew immediately he wanted to wake up here on as many mornings as possible for the rest of his life.

But some of the characteristics that make this the perfect spot for Roy’s rustic, off-grid cottage also make it vulnerable to exploitation. “The biggest



threat to the river is Hydro-Québec,” says Roy. As he pours hot water for coffee, the rising steam mimicking the spectacle outside, he explains that the Mutehekau Shipu is blessed with an abundance of whitewater thanks to its tumbling down a particularly steep gradient of the Canadian Shield. He nods toward the gorge, where the flow is so dangerous that outfitters taking guests on weeklong expeditions portage to the basin below. If a dam were to be built downstream of his cottage, Roy’s hill-top chalet might remain above water, but the access trail and most of the lot would be inundated. It would spell the end to fishing from nearby islands and picnicking by the waterfall; it would deport the moose cows and their calves to unknown territories.

Hydroelectric projects are a constant threat. Built in 1961, the only existing generating station on the Mutehekau Shipu strangled the First Falls just north of Highway 138. It was upgraded in 2007 to increase its energy output; the expansion flooded a section popular with white-water kayakers, including Roy. Then, in its 2009-2013 strategic plan, Hydro-Québec targeted the river for a hydroelectric “complex” that would churn out some 850 MWh, enough

electricity to power roughly 290,000 homes. That scheme — and the spectre of the massive, four-dam project that had just broken ground on the Unamen Shipu (commonly known as the Romaine River), an hour and a half’s drive east on the 138 — set off alarm bells among Innu, paddlers and environmentalists.

River protectors of all stripes staged a flash mob outside Hydro-Québec’s head office in Montreal in September 2017, demanding an end to all future

provincial government that prompted the creation of the Muteshekau-shipu Alliance in 2018. “We wanted to create a protected area, including the river,” says Pier-Olivier Boudreault, SNAP Québec’s conservation director and one of the alliance’s de facto coordinators. But, says Boudreault, because protected areas, such as national parks, wildlife conservation zones and migratory bird sanctuaries fall under governmental jurisdiction, “we decided to take matters into our own hands and use the tools at our disposal.”

That made sense, considering rivers, with their strong cultural and spiritual significance to Indigenous Peoples, are at the vanguard of the most important rights-of-nature legislation that has been passed internationally. In Ecuador, a lawsuit by residents of the Vilcabamba River stopped a harmful road construction project in 2011. In Colombia, a court decision based on the country’s constitution protected the Atrato River from mining. And New Zealand’s Whanganui River was declared a legal person in 2017 (see “Nature’s law” on page 71). After studying these and other examples, and with no move-

‘The river is like the BLOOD THAT RUNS IN OUR VEINS. If the river is sick, we will also be sick. That’s why we need to PROTECT HER.’

plans to dam the river. The utility responded by taking Mutehekau Shipu out of its near-term proposals but made no promises for the future (as of September 2021, it still wouldn’t rule out a hydroelectric project on the river). While the Innu, the Minganie regional county municipality, SNAP Québec and Eaux-Vives had already built consensus around a common vision for the river, it was a lack of commitment from Hydro-Québec and the

ment from Hydro-Québec and the provincial government, the alliance decided the best mechanism for protecting the Mutehekau Shipu would be legal personhood. As a complementary tool to this declaration, the alliance is working to have the river recognized as an Indigenous protected area.

The Muteshekau-shipu Alliance called on the International Observatory on the Rights of Nature, a Montreal-based non-governmental organization



that offers legal advice and does policy research with a focus on securing legal rights for nature, to draft a

15-page resolution to declare the river a legal person with nine rights (see sidebar), including the right to flow

and the right to sue. Boudreault explains that to create the final resolution, lawyers from the International Observatory used case law that cited the precedents set by previous rights-of-nature cases such as the Vilcabamba and Whanganui rivers. But because the Canadian Constitution doesn't enshrine rights for nature as a legal entity the way it upholds rights for humans and corporations, Boudreault cautions that "there could be legal challenges to the personhood status."

David Boyd understands better than most people how complicated rights-of-nature cases can be. A UN special rapporteur on human rights and the environment and an environmental law professor at the University of British Columbia, he is "cautiously optimistic" the resolution could be a game changer for the Côte-Nord region — and for the rest of



RIGHTS OF THE RIVER

It took two years of back-and-forth between the Muteshekau-shipu Alliance and the International Observatory on the Rights of Nature to finalize the resolution that grants legal personhood to the Mutehekau Shipu. The document details nine specific rights:

- to live, to exist and to flow
- to respect for its natural cycles
- to evolve naturally, to be preserved and protected
- to maintain its natural biodiversity
- to maintain its integrity
- to perform essential functions within its ecosystem
- to be free from pollution
- to regeneration and restoration
- to take legal action



Clockwise from ABOVE: For Rita Mestokosho, Innu rights and the rights of nature go hand in hand; Mestokosho's patch commemorating the 1973 Wounded Knee Occupation in South Dakota, which fought for Indigenous treaty rights; Sylvain Roy makes coffee at his cottage by the Magpie Gorge; the community of Ekuanitshit.

Canada if the precedent is set. "It's groundbreaking in a Canadian context; it's revolutionary," he says. "But it's difficult to say how revolutionary; it's impossible to say at this point how courts will interpret the law." While it passed in both the Innu and municipal councils, giving it legal protection, it's not directly on par with Ecuador and Colombia, where

nature has constitutional status. Still, says Boyd, "Hydro-Québec would be taking a great risk if they think they can proceed with a dam under this law." Canada's "Protection of Aboriginal Rights" provision in section 35 of the Constitution Act, 1982 may confer constitutional status on Mutehekau Shipu's personhood declaration. And the country's adoption in June 2019 of

the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), though not legally binding, spells out Canada's commitment to free, prior and informed consent — conditions that imperil a hydroelectric power project on the Mutehekau Shipu.

But Boyd also makes clear the law is revolutionary from a cultural perspective. "Canadian culture has — with



Mutehekau Shipu, seen here at Magpie Gorge, or the Fourth Falls, means "the river where water flows between square rocky cliffs" in Innu-aimun.

the exception of Indigenous Peoples — treated nature as property. This declaration is saying very clearly that that is not the worldview of Indigenous People and it shouldn't be the worldview of Canadians in general," he says. "Nature is far more than just a basket of resources; it's an extraordinary, wondrous community that we're incredibly fortunate to be part of. All Canadians need to rethink our fundamental relationship with nature if we are going to achieve a sustainable future."



I love the feeling of flying over the land, of skimming the bedrock and using it to leap, reaching for the sky. This freedom allows me to speak with the frankness of thunder (that's how I know I am). I laugh when the boulders invite me to wrestle them because, if you ask me, I usually win. But I also feel sad sometimes, especially when I think of my sister, Unamen Shipu, whom the newcomers insist on calling La Romaine. She doesn't fly anymore, her silver wings clipped and silent. Remembering her is important; remembering is a survival skill. That's why I decide to commit to memory this October morning when a helicopter lands on one of my islands. Out step a young woman and the Chief who leads their village; I've seen them both before. She takes a seat on a log I tossed on this little island for her ancestors to sit on many years ago. Her voice is clear, a blue sky that could stave off any storm, "The word Innu means 'human being'; we are all Innu. We stride forward on one single portage, and we need to stay united to stop individualism and colonialism — to stop breaking the planet. We are only passing through here." It gives me hope to know she's got my back. She's got all our backs. I'm free to meet the sea.



Shanice Mollen-Picard closes her eyes. Wrapped in silence, the sun lapping her face, she lets the river trickle into her mind. "I hear the water. I hear the river say shhhhh. I hear that she's alive," she whispers. "I hear fish under the surface. And there's a mystery. I always wonder, is it a salmon?" For Mollen-Picard, an Ekuanitshit resident and a coordinator for the campaign to personify and protect

Shanice Mollen-Picard (TOP) hopes her young son will be able to fish and canoe on a free-flowing river. The only generating station on the Mutehekau Shipu (ABOVE) at the First Falls, near the Gulf of St. Lawrence.

the Mutehekau Shipu, that mystery would become a nightmare if an industrial project were to block the salmon from swimming upstream and stop rafts from floating with the

Jean-Charles Piétacho, Chief of the Innu Council of Ekuanitshit, has seen the ravages of hydroelectric projects on other rivers and is determined to keep Mutehekau Shipu safe.



Uapukun Mestokosho, an Innu environmental activist and water defender, has represented her community twice at United Nations Indigenous assemblies, once with her short film *Shipu*. “To protect the river is to protect my home,” she says.

current. Through fishing and rafting, the Mutehekau Shipu has provided her and other Innu a way to reconnect with the land in a time when the legacy of colonialism and modern technological distractions have robbed them of those links. “I want youth to be able to keep paddling down this river,” she says. “I want my son to be able to fish here in the future.”

To keep people and fish going with the flow, the river’s personhood resolution includes the creation of an Indigenous Guardian program, in the works by Mollen-Picard and the rest of the Muteshekau-shipu Alliance. “The Guardians will be our eyes and ears on the land; they’re going to gather data on fluctuations in the water, climate change and what species they see,” Mollen-Picard says, adding that the Guardians will also look for evidence of caribou, a species the Elders used to see around here. She believes the future of economic development in the region lies in recreation and tourism, not hydroelectricity, with the river being a key driver. She stresses that a dam here would destroy the last powerful river in Nitassinan, recalling how the Unamen Shipu has been lost to the Romaine hydroelectric project. “The portages our Chief once did are no longer accessible. He saw the river before the changes, before flooding destroyed habitats for animals. The animals have left, the trees have fallen — and yet people say the project had no negative effects.”

The Chief she’s talking about is Jean-Charles Piétacho, who has led the Innu Council of Ekuanitshit since 1991 (he was re-elected in September 2021). He’s been standing by, listening to Mollen-Picard and the river. For him, nature is where the heart is; it’s home. When the Romaine project was announced,



NATURE’S LAW

The Canadian Constitution’s Charter of Rights and Freedoms does not include nature, something that would have strengthened the Mutehekau Shipu’s personhood declaration. How does Canada stack up against other jurisdictions when it comes to enshrining the rights of nature? We asked David Boyd, the UN special rapporteur on human rights and the environment, for the three strongest examples globally.

NEW ZEALAND

New Zealand has passed two laws in favour of nature: the rights of a river and the rights of an ecosystem. The legal personhood of the Whanganui River was formalized in 2017, three years after the Te Urewera ecosystem was granted the same rights. But what’s most exciting to Boyd is that “things are effectively changing on the ground in New Zealand – they’re moving forward with implementation.” The legal personhood granted to Te Urewera and the Whanganui River, as well as to Mt. Taranaki in the Whanganui watershed, are a reality thanks to a government commitment to reconciliation through adopting Maori traditional knowledge and worldviews.

ECUADOR

In 2009, Ecuador became the first nation in the world to protect nature in its constitution. While the country is still mining and drilling for oil and gas, Boyd says this dramatic recognition signals hope. Because of its constitutional status, “it’s the highest and strongest rights-of-nature law in any country,” he says. A 2014 amendment to the criminal code included crimes against Pachamama (Mother Earth), and 2016 saw a further legislative strengthening of the rights of animals and nature. In 2021, Ecuador’s constitutional court upheld the rights of nature by banning mining in a protected forest area.

COLOMBIA

To reverse the heavy pollution and damage inflicted on Colombia’s Atrato River by illegal mining, the country’s constitutional court in 2016 declared the river a legal person with rights to, among other things, protection, conservation and restoration. And in 2018, the Supreme Court of Colombia recognized the Amazon ecosystem as a legal person. “Colombia is exciting – it’s a place where there have been at least 10 different court cases that have recognized the rights of nature,” says Boyd. “Now, they’re in the process of working out what that means and how it’s going to change people’s relationship with nature.”



he and a group of Elders set out to record the portage routes that would be flooded — to write history and commit their home to memory through interviews with Elders and research. “We also had this idea to redo the portage routes, to know where and how our ancestors travelled. So my aunt, a group of Elders and I went on the river for two and a half months,” he says.

The group of 15 went as far as where the fourth dam is today, doing 67 portages along the route,

adding that the Romaine project did little for the Innu of Ekuanitshit; its only legacy is a trail of destruction. Politicians and representatives of Hydro-Québec said it would develop the region’s economy and infrastructure. “We were promised jobs, money, contracts, but that didn’t materialize on the scale we hoped. The energy is not for us, it’s for sale,” he says, referring to the complex’s output being largely for export to markets outside Côte-Nord and Quebec. “That’s why

For the Innu of Ekuanitshit, Mutehekau Shipu is a sister who carries and uplifts the voices of the ancestors. They insist the river must not become “another Romaine.”

‘I want YOUTH to be able to keep PADDLING DOWN THIS RIVER. I want my son to be ABLE TO FISH HERE IN THE FUTURE.’

including one that took them a whole day. “It was a good trip; we learned and found portages and places where people had cabins and where they used to meet. Those are all inundated now,” Piétacho says,

environmental protection now is more important than the economy. We don’t want the Mutehekau Shipu to become another Romaine.”

Remembering becomes a survival skill for people and rivers alike.

Piétacho and Mollen-Picard climb into the helicopter that dropped them here. As its rotors pick up speed, they push the water out from the island, creating a halo of drop-lets. It’s fitting for a river — an entity, a person — who’s sacred to so many, as an ancestral home, a place to connect with nature, a life source, an adventure destination. From high above the Mutehekau Shipu, Piétacho leans his head against the helicopter window. Tracing the river’s path across the landscape, he reads her message that it’s crucial to remember. He doesn’t look away until the helicopter veers east toward Ekuanitshit. It’s as if he’s etching the river’s shape in his memory. There, she will always be safe, flowing freely across the land. 🌀

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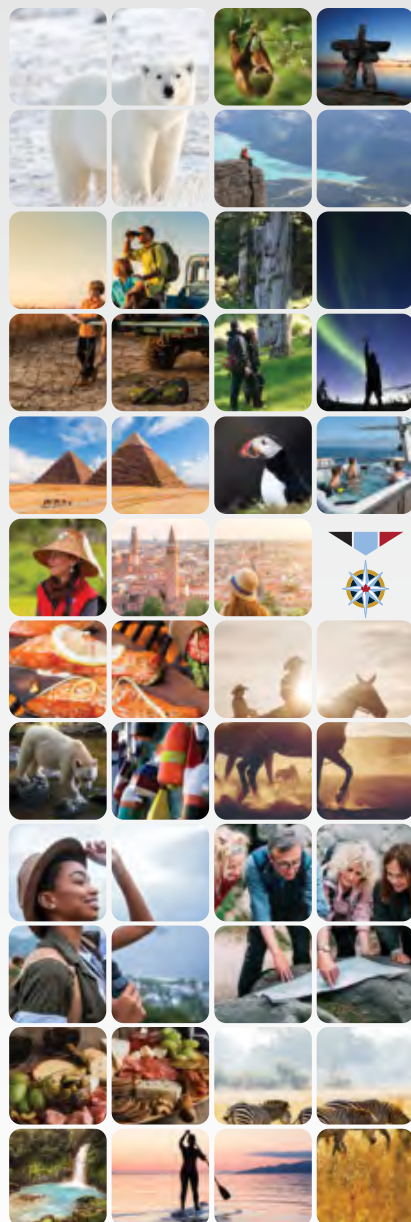
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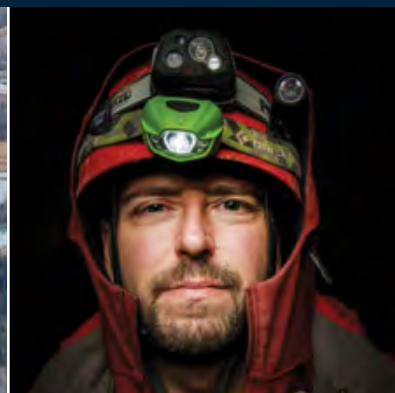
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**INTRODUCING THE INAUGURAL TREBEK INITIATIVE GRANTEES:
PROGRAM SUPPORTS EMERGING ENVIRONMENTAL STORYTELLERS**

Launched in 2021, the Trebek Initiative is a new grant program to help promote and shape emerging Canadian explorers, scientists, educators and photographers into storytellers who will ignite “a passion to preserve” in all Canadians. In its inaugural year, the initiative awarded eight grants totalling nearly \$365,000.

Caver Christian Stenner was awarded funding for a project exploring the Mount Meager volcanic complex, Canada’s only active volcano. Stenner and team will survey the extent of the caves in the mountain’s glacial ice and help deploy a NASA rover originally designed to study icy bodies in the solar system.

Environmental activist Kehkashan Basu now has the opportunity to study how best to include environmental education in schools to teach

students to become stewards of the environment, while professor Jessica Kolopenuk received support for an Indigenous science and technology research and training program that builds and supports Indigenous-driven and Indigenous-controlled technoscience projects.

Photographer Pat Kane was funded to create a photo essay exploring food insecurity and its impact on people living in the Northwest Territories and Nunavut, while photographer TJ Watt received support for a project documenting B.C.’s old-growth forests — their incredible grandeur and ongoing destruction.

Also on the West Coast, Rhiannon Kirton got a grant for a research project on ungulate populations in B.C.’s Columbia Valley, while back in the North, Shelly Elverum received

The Trebek Initiative awarded eight grants in 2021. The recipients include (clockwise from LEFT) Rhiannon Kirton, Christian Stenner and Kehkashan Basu.

support for a mentorship program for Inuit youth to help reshape the narrative of Arctic exploration. Finally, photographer and educator Sara Hylton received a grant for a multimedia project exploring the significance of water to four Indigenous communities in three provinces.

The late Alex Trebek had a passion for geographic literacy and supported both the RCGS (where he served as Honorary President until his passing in 2020) and the National Geographic Society. Applications for 2022 grants will open this spring. For more information, visit trebekinitiative.com. 🌐

—*Can Geo Staff*



FEATURED FELLOW: KIM CAMPBELL



In this 2009 photo, former prime minister Kim Campbell is flanked, left to right, by former prime ministers Paul Martin, Joe Clark and Brian Mulroney.

Hers is a life of firsts. And The Right Honourable Kim Campbell, Canada's first — and only — female prime minister, continues to advocate for breaking down barriers. Growing up, Campbell never imagined a career in politics. She did, however, dream of opening doors for women. She has done that as a politician and, in the years since, through both diplomatic and academic roles. She is a sought-after speaker on issues ranging from leadership to gender, Canadian-American relations to climate change. Here, Campbell shares her thoughts on women in leadership.

On what led her to politics

My first husband was a mathematician and he served on the school board [in Vancouver]. When he decided to run for city hall, his colleagues asked if I would join the school board. I was interested in making a difference through politics, and I thought, “Well, I can run, and if I get elected, I’ll see if I have the temperament for it.” I was elected, and I enjoyed it. That was the beginning of my career in elected office: the school board, then the legislature of B.C. and, finally, Parliament.

On creating a “new normal”

When I was starting out, there weren't a lot of women. I had a variety of

responses — some colleagues were very enthusiastic, some were prepared to tolerate women in the House as long as there wasn't a big change in the normal course of things, and others were resentful. People had a sense of what a prime minister looked and sounded like, and I didn't fit the model. That's why it's important to have more participation by women. You have to be there to change people's sense of what is normal. For the first few people — whether you're a woman or a person of colour or non-prototypical in any way — you're expanding the range of possibility.

On her female role models

My mother encouraged my sister and me to believe girls could do anything. There weren't a lot of women leaders in my time. I was convinced there were lots of women who could have done those things, but there weren't many who had the chance to do them. I admire Charlotte Whitton, who was the first woman to be mayor of Ottawa. She was the one who said that a woman has to be twice as good as a man in order to be thought of as half as good.

On career highs

Every time I had an office, I tried to use it for some positive purpose. I wasn't interested in getting elected just to be

there; I tried to make a constructive difference. When I was justice minister we rewrote the sexual assault law. When I was prime minister, I saw what it meant to so many people — particularly to women and young women, but even to men. To be the vehicle that gave people a sense of new possibilities for women was very, very meaningful and very rewarding, and I'm grateful for that experience.

On the importance of female leadership

When women are not in positions of power, it becomes a justification to many people for excluding them or not respecting them. That is an affront to the dignity and autonomy of every woman. When people feel they are entitled to treat us as unimportant, then every woman suffers. It has a ripple effect. It makes it easier for people to assume that women don't belong in the places where decisions are being made — and they do belong. It's completely outrageous for men to be making decisions about women's lives, particularly in areas where they have no idea of what women experience. Generally speaking, much is lost if women — and other excluded and marginalized people — are not present at the table. ☸

—Interview by Amy Thompson



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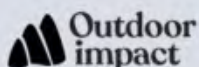


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RCGS/Eva Capozzola/Pascale Marceau, 2021

HAPPY TRAILS

Walk this way! Prince Edward Island's newest tourism draw is the 700-kilometre Island Walk. Inspired by the (for now) more famous Camino de Santiago in Spain, the perimeter trail takes walkers along P.E.I.'s famous rosy beaches, past picturesque towns, through farmland and forest. Writer Darcy Rhyno offers up an insider's review in the all-Canadian travel section in the May/June issue.



COMPETITIVE SPIRIT

Ready, set, click. Our Canadian Wildlife Photography of the Year competition launches March 1! We're looking for incredible shots of wildlife from coast to coast to coast — and offering cash prizes for the winning photos.



WILD TIMES

The *Best Wildlife Photography 2022* special issue is visual storytelling for the animal lover. Every year, the Can Geo editorial team has the rewarding job of curating the nearly 150 amazing wildlife images from our 15,000-member-strong *Canadian Geographic* Photo Club and the @cangeo Instagram community for this collector's edition. Intriguing, magical and sometimes just plain beautiful, this is a must-have. On newsstands in August.

CROWNING GLORY

Her Majesty Queen Elizabeth II, Queen of Canada, celebrates her Platinum Jubilee in 2022, becoming the first British monarch to celebrate 70 years on the throne. *Canadian Geographic* marks the milestone in the May/June issue with a collectible poster map and stories that delve into how the long-reigning royal has inspired everything from Canadian place names to Canada's honours system.



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Amy Stuart

Childhood memories of Greenwich in Prince Edward Island National Park remain engraved in the author's mind



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hashtag #ShareCanGeo.



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(facebook.com/cangeo).

Memories are imperfect and can fade over time — this has been a repeating theme in many novels I have written over the years. I see this in my own life, in that as I get older many details about my childhood have started to fade away or become less clear to me. But the memories I have created in Prince Edward Island feel entrenched in my mind.

When I was a child, Greenwich wasn't part of a national park yet. It was a quiet, little-known spot where you'd drive up, park your car and walk about a kilometre over rolling sand to get to the beach. During the day we'd swim in the water, and at night we'd make bonfires. It was an expansive, white sand beach stretching for kilometres and there would never be anybody on it because nobody knew about it.

As I walk along the northwestern shore, I am surrounded by bright green grasses that blow in the wind. There's a particular smell to those grasses that transports me back to being that 10-year-old kid again.

When I visit Greenwich with my three children, I see them doing the same things I did when I was young. It feels like history repeating itself. During a recent trip, my family went snorkelling and were surrounded by tiny crabs, lobsters and jellyfish. It felt like my kids were getting to experience those same joyful moments on that beach.

When I watch my children run down to the water just as I did all those years ago, I get emotional because of how transporting this place is and how clear those memories are. 🌊

—As told to Samantha Pope

AWAKEN YOUR SENSES IN KAWARTHAS NORTHUMBERLAND

Take a scenic drive across the rolling hills of Kawarthas Northumberland and explore enchanting sights, seasonal sounds and immersive experiences designed to arouse each of your five senses. Home to fertile farmland, vibrant cultural sites and an abundance of outdoor attractions, this picturesque region is the perfect destination for a spring road trip.



Taste sweet maple syrup

March marks the arrival of maple syrup season in Kawarthas Northumberland and visitors can sample the sweet nectar of springtime throughout the region. Local restaurants, resorts and bakeries offer locally-sourced maple items on their menus for a true tree-to-table experience. And with over 25 maple syrup producers in Kawarthas Northumberland, you are sure to have a delicious time.

See vibrant local artworks

Whether enjoying art virtually, in person, en plein air or browsing local shops, art and culture buffs will be wowed by the creativity and local talent on display. Drive along the Kawartha Lakes Art and Heritage Trail to discover artisans from across Peterborough and the Kawarthas, or take in Northumberland's many art galleries.



Smell fragrant spring flowers

As the seasons change, the fragrant scent of wildflowers wafts through the air. Roll down your windows and inhale aromatic purple blooms along the Lilac Driving Tour in Northumberland or explore flower shops and greenhouses as part of Peterborough's self-guided Garden Route. Wild flowers and breathtaking views are plentiful on one of the Kawartha Lakes Scenic Drives; the Lovely Lakeside or the Rolling Hills Route are among two to try.

Touch friendly farm animals

Spring is the perfect time to get up close and personal with adorable farm animals. Kawarthas Northumberland is your agri-tourism destination. Here you'll find picturesque farms that are home to traditional animals, as well as unique ones such as alpacas found at Haute Goat, Wanderlight Alpaca and Salem Alpacas. Animal lovers of all ages can connect one-on-one with fuzzy alpacas during a hands-on grooming session and snap a selfie during a guided stroll.



Hear the sounds of nature

Outdoor enthusiasts will find plenty of opportunities to listen in on nature's seasonal awakening in Kawarthas Northumberland. Whether you prefer a leisurely stroll or a high-intensity hike, the region's multi-use recreational trails and conservation areas provide a scenic acoustic setting for the springtime symphony of chirping birds, babbling waterways and rustling trees in the warm breeze.

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