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# features

CONTENTS

32

## WORLD BEATER

A celebration of Wood Buffalo, Canada's biggest national park, and a land of more than one superlative

Photography by Paul Colangelo, with text by Sabrina Doyle, Jessica Finn, Carys Mills, Michela Rosano, Nick Walker and Harry Wilson

## 44 “ALERT: THERE HAS BEEN A CHILD REPORTED MISSING IN YOUR AREA.”

How the Missing Children Society of Canada is using modern personal communication technology and social media to help find missing kids

By Omar Mouallem

### ON THE COVER

The Birch River, part of the Peace-Athabasca Delta, meanders through Wood Buffalo National Park, the largest protected area of its kind in Canada.



## 50 UNDER PRESSURE

Canada once committed to protecting 10 per cent of its waters by 2020 through the creation of marine protected areas. Just what are they, how do they work and how do they make a difference?

By Alanna Mitchell

## 64 THE GRANDFATHER CANOE

Despite being restored nearly a decade ago, one of the nation's oldest birchbark canoes can't be seen by the public. The sad and frustrating tale of an iconic craft.

By James Raffan

64



# departments

## CONTENTS



26

- 12 BIG PICTURE  
Celebrating Canada's grandeur
- 14 EXPOSURE  
Showcasing CanGeo's photo club
- 16 IN A SNAP  
Sharing CanGeo via Instagram
- 29 POLAR BLOG  
Mapping the Van Tat Gwich'in routes
- 30 ON THE MAP  
Exploring cartography
- 63 NATIONAL BIRD PROJECT  
Snowy owl



77

## DISCOVERY

- 19 INTERVIEW  
Historian and author Carolyn Harris on the Charter of the Forest
- 20 INFOGRAPHIC  
Understanding the Bay of Fundy's tidal power potential
- 22 WILDLIFE  
Sick sea stars, squirrels and more
- 24 HISTORY  
A railway map's allure and celebrating 85 years of *Canadian Geographic*
- 26 PLACE  
A station for a northern nation



22

- 81 NEXT ISSUE  
October 2015, *Canadian Geographic* tests your geo IQ with an Arctic quiz

## 72 YOUR SPACE

- COMMENT  
Your feedback
- COVER VOTE  
Choosing our cover
- TRENDING  
The buzz from CanGeo's social media sites
- WHAT'S THIS?  
Recognize this mystery object?
- WHERE'S THIS?  
Can you identify this landmark?



- 82 OUR COUNTRY  
Christine Sinclair on why she loves to unwind in Sechelt, B.C.

## 77 YOUR SOCIETY

News from The Royal Canadian Geographical Society

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EVERY SINGLE ONE OF  
**YOUR FACIAL HAIRS**



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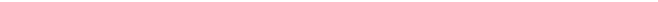
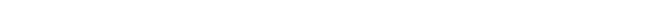
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CONTENTS

## MARINE MAP

Explore Canada's marine conservation areas using an interactive map and by reading a personal story by acclaimed science journalist Alanna Mitchell.

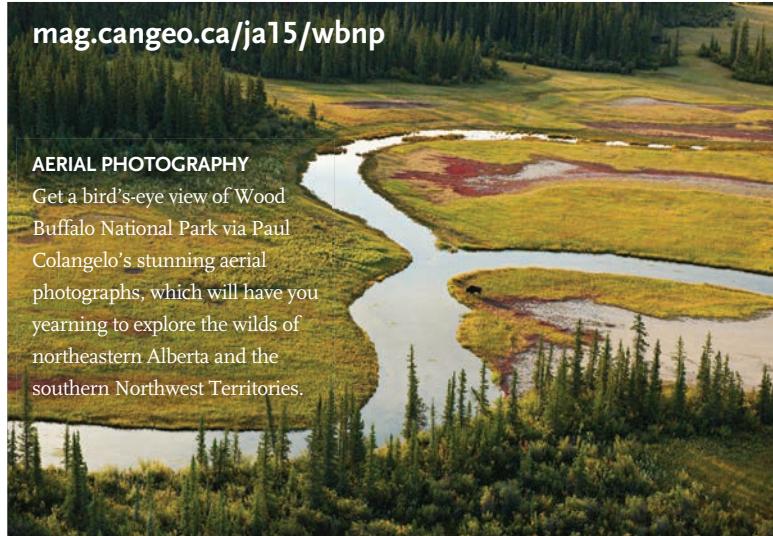
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[mag.cangeo.ca/ja15/wbnp](http://mag.cangeo.ca/ja15/wbnp)

## AERIAL PHOTOGRAPHY

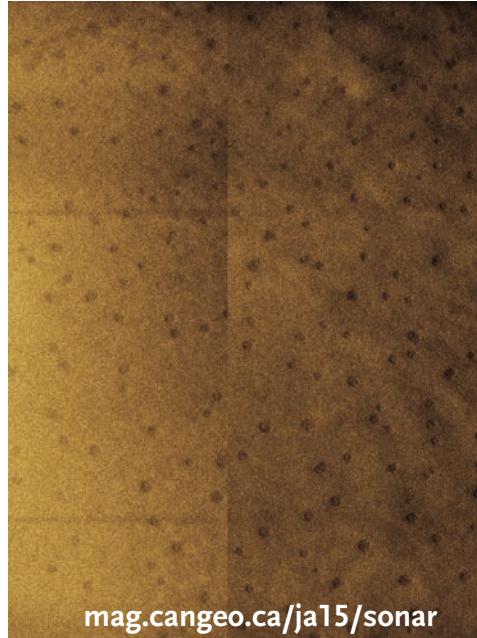
Get a bird's-eye view of Wood Buffalo National Park via Paul Colangelo's stunning aerial photographs, which will have you yearning to explore the wilds of northeastern Alberta and the southern Northwest Territories.



[mag.cangeo.ca/ja15/arctic](http://mag.cangeo.ca/ja15/arctic)

## HARE RESEARCH

What could be causing the 10-year cyclic fluctuation of the Yukon's snowshoe hare population? Find out from Charles Krebs, the zoologist who's been trying to answer that question for 42 years.



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## SONAR SCANS

Wondering what's at the bottom of the top of the world? See sonar images of the Arctic Ocean floor and read about the curious things found there.

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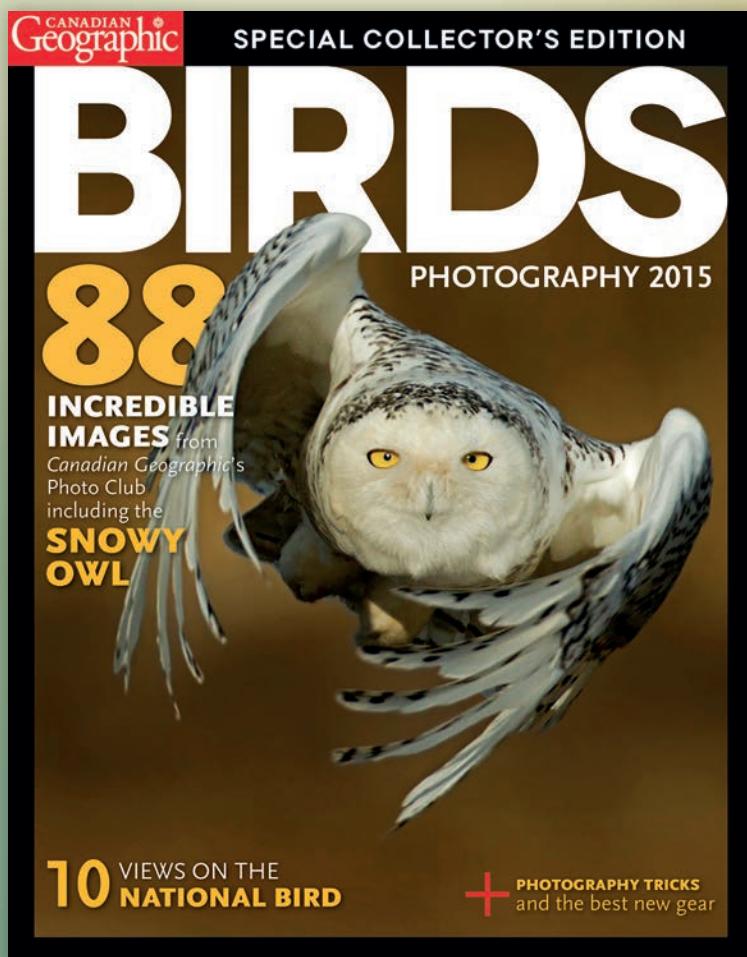
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## EDITOR'S NOTEBOOK



### Marine land?

GIVEN THAT CANADA boasts the longest coastline in the world (some 243,000 kilometres), one might assume that Canadians would have a correspondingly great interest in and knowledge of the waters surrounding our nation. The reality, unfortunately, is that many of us know little about our country's marine environment. Thousands of kilometres of it remain largely uncharted. And mystery surrounds the habits and habitats of even the largest of Canada's — and the world's — animals, the blue whale (ABOVE), a species bigger than any of the dinosaurs. We have only vague estimates of its population and we don't know where it breeds or when it mates.

This is all to say that there's a huge part of Canadian geography that's little-known and seemingly underappreciated. Given that this magazine's mandate is to make Canada better known to Canadians and the world, we're redoubling our efforts on that front when it comes to our marine environment. In this issue, for instance, you'll find a story on the future of Canada's marine protected areas ("Under pressure," page 48) by renowned environmental journalist Alanna Mitchell. Mitchell dug into the topic of marine protected areas to help us spread the word about what and where they are and why they matter. Today, Canada protects less than one per cent of its marine territory, compared with about 10 per cent of its terrestrial area. Time we dove a bit deeper, no?

—Aaron Kylie

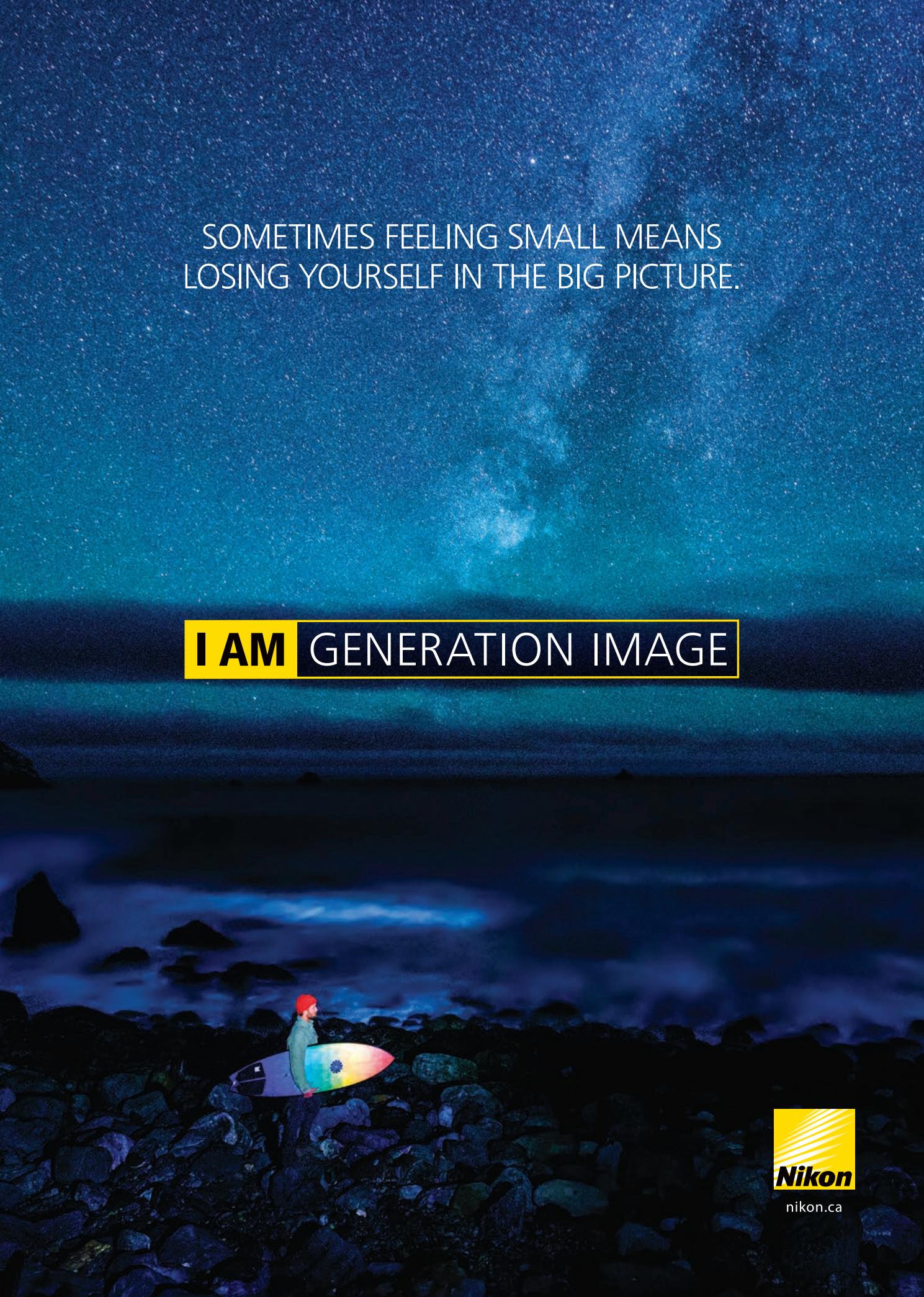


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For inside details on the magazine and other news, follow editor Aaron Kylie on Twitter (@aaronkylie).

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SOMETIMES FEELING SMALL MEANS  
LOSING YOURSELF IN THE BIG PICTURE.

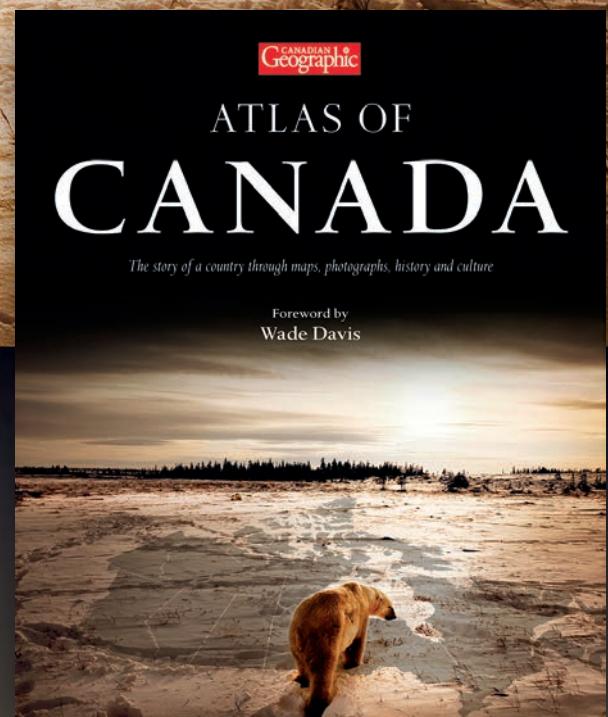
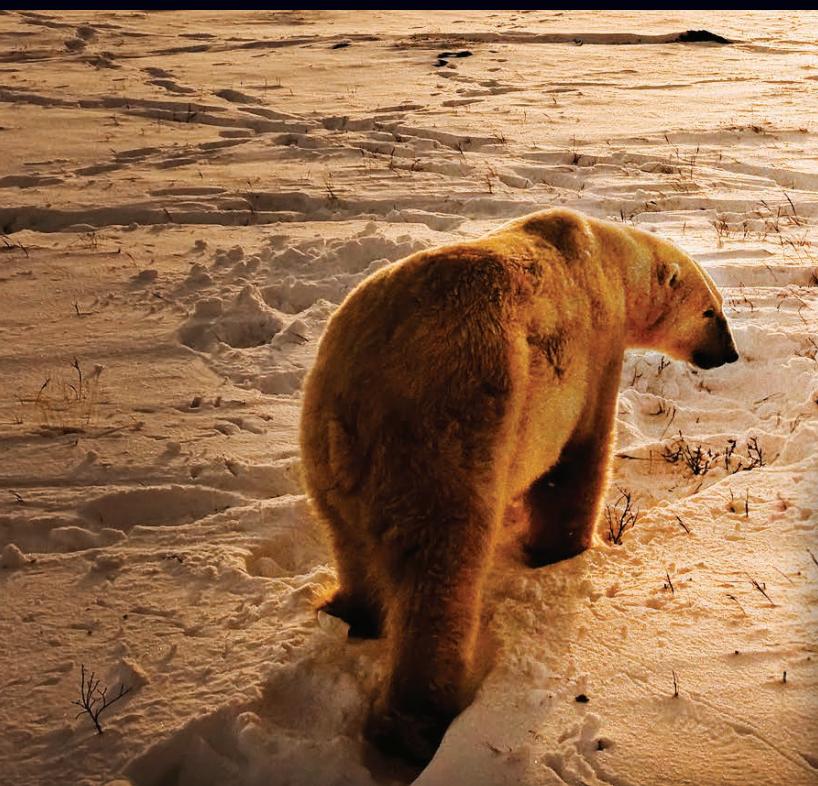
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PHOTO BY IAN McALLISTER

A grey wolf stares into the camera lens as it wades into the water in British Columbia's Great Bear Rainforest. Wolves that live on this part of the province's coast rely on the ocean for a significant part of their diet, feasting on herring eggs and hunting salmon, harbour seals and Steller sea lions.



Think you've got a keen eye? Then enter your best wildlife shot in *Canadian Geographic's* annual Canadian Wildlife Photography of the Year contest at [wpy15.canadiangeographic.ca](http://wpy15.canadiangeographic.ca).

# big picture

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# exposure

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PHOTO BY LOUIS GABRIEL KÉROACK  
Rocher Percé, off Quebec's Gaspé Peninsula, can be reached on foot at low tide. Along with Île Bonaventure (seen in the background), this 450-metre-long block of limestone is part of a federal migratory bird sanctuary, protecting colonies of seabirds including more than 50,000 breeding pairs of northern gannet.



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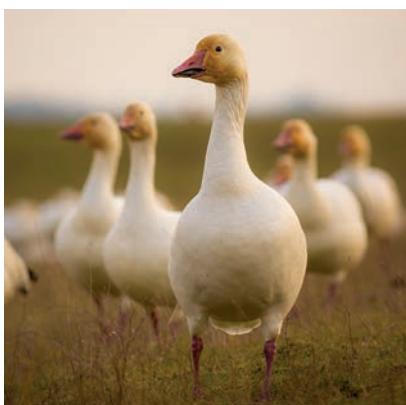
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Sunrise, Lac des Arcs, Alta.



@mikecleggphoto Mike Clegg  
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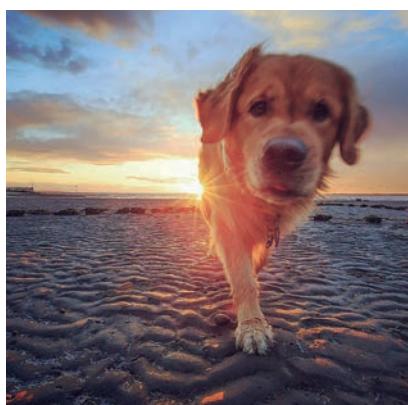
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Avenue Road and Highway 401, Toronto



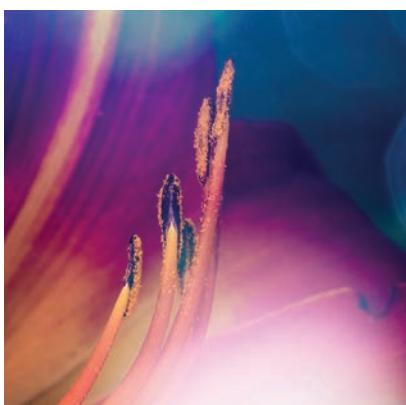
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Snow geese, Garry Point Park, Richmond, B.C.



@k\_girl883 Karine Scott  
Canoes at sunset, Val-d'Or, Que.



@theadventuresofsuperneo OJ Elec  
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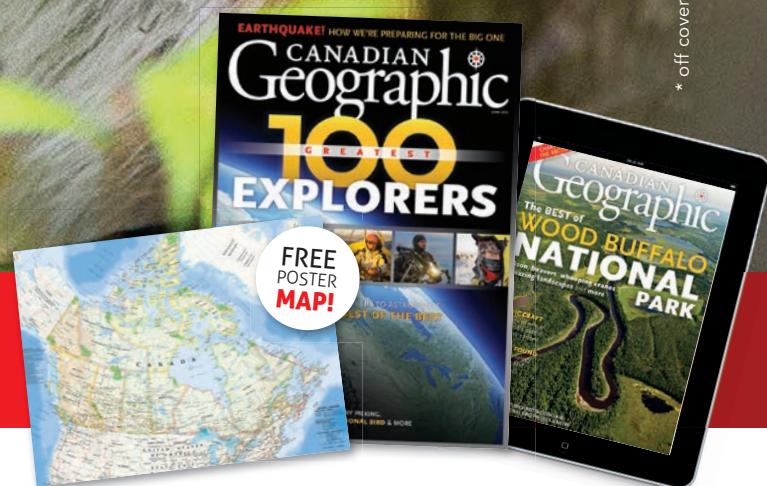
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# Carolyn Harris

The historian and author talks about the Charter of the Forest, a 798-year-old document now touring Canada

INTERVIEW BY LEAH GERBER

Copies made in 1300 of the Magna Carta, a document that helped shape democracy when it was created 800 years ago, and the Charter of the Forest, which in 1217 established common ownership and stewardship of public land, are now on the four-city Magna Carta Canada 2015 tour ([magnacartacanada.ca](http://magnacartacanada.ca)). Carolyn Harris, whose recent book *Magna Carta and Its Gifts to Canada: Democracy, Law, and Human Rights*, explains why the less well-known Charter of the Forest matters.

#### On the purpose of the charter

The Magna Carta had alluded to the “evil customs relating to forests” that would be abolished. The Charter of the Forest laid out exactly what these customs were — for instance, you could lose life or limb or be mutilated if you were a commoner who hunted large game in the forest — and how they would be addressed, and drew up a new relationship between the people and the use of forest resources.

#### On what the charter changed

There was a convention that hunting game such as deer was the prerogative of the Crown. The charter didn’t get rid of this — the monarch’s exclusive right to large game wasn’t abolished until 1971 — but it did ameliorate the punishments for poaching, which were extremely disproportionate. It also moved decision-making to a community level and emphasized consensus among neighbours rather than the arbitrary, top-down approach. For example, the charter states that members of communities may dig ditches or make hedges or remove trees provided they do not harm their neighbours. You can still see echoes of that approach today in the idea of public access to Crown land, the idea that we’re all supposed to benefit from it and that the community should be involved in deciding what happens to natural resources. In England, there are still forest courts that make and amend bylaws according to the precedents set by the charter.

#### On whether the charter has been neglected

A number of environmentalists and thinkers today have raised the idea that the concept of resource development not harming a neighbour has been forgotten. They say that just as the Magna Carta had a revival in the 17th century with the circumstances leading up to the English Civil War, the Charter of the Forest today needs to have a revival with the issues involving ecology and environmentalism.

#### On the charter’s most compelling section

For me, it’s the final clause, which begins, “These liberties concerning the forests we have granted to everybody.” At a time when English society was governed by a strict social hierarchy, it’s striking that the charter was envisioned as a series of reforms that would improve the lives of people from all social backgrounds.

 Take our Magna Carta and Charter of the Forest quiz at [mag.cangeo.ca/ja15/charter](http://mag.cangeo.ca/ja15/charter).

# DISCOVERY

INFOGRAPHIC

## Fundy forces

Energy developers are testing their mettle in the world's top tides

By Nick Walker and Calvin Dao

If you pit your tidal power technology against the Bay of Fundy and succeed, your device will likely stand up to any of the world's big surges. That's why starting this summer, energy developers will anchor their turbine prototypes to the ocean floor in the bay's Minas Passage, where the narrowing coastline creates a fast-moving funnel effect — the ultimate tidal testing ground.

The turbines will be hosted by the non-profit Fundy Ocean Research Centre for Energy, or FORCE, which will

provide real estate and infrastructure for the technology in its four underwater, 200-metre-wide grid-connected berths (the only sea floor in Fundy with a Crown lease for energy development), while doubling as a research institute with an environmental watchdog mandate. This graphic shows the four tidal-power prototypes that have so far been signed up for testing at FORCE.

For awe-inspiring images of and 10 facts about Fundy's tides, visit [mag.cango.ca/jal5/fundy](http://mag.cango.ca/jal5/fundy).



**THE TIDES**  
With a vertical of about 15 metres, these tides are the world's highest and among its most powerful. Around 160 billion tonnes of water flows in and out of the Bay of Fundy each tide — more than four times the estimated flow of all freshwater rivers on Earth.

### THE GENERATORS

Unlike Nova Scotia's "barrage"-style Annapolis Royal tidal generating station, which operates much like a dam, the devices to be tested by FORCE are "in-stream" generators. Like wind turbines, they use the kinetic energy of currents to turn an impeller, producing electricity (but with more predictability than wind).

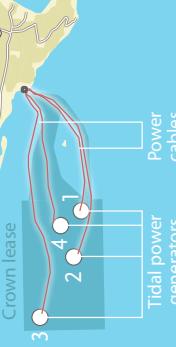
### THE PASSAGE

About 14 billion tonnes of water reaches the Minas Passage, where the sea floor rises, the coastline pinches and flow speeds up to about five metres per second (18 kilometres an hour) from one to two metres per second. Current hosting capacity of FORCE 5 MW (4,500 homes) Capacity of FORCE by 2016 20 MW (18,000 homes) Nova Scotia's goal for power generation in the Minas Passage 300 MW (270,000 homes) 2,500 MW (22,250,000 homes) Electricity that can be extracted from the Minas Passage without significant threats to the natural environment 6,000-8,000 MW Estimated energy in the Minas Passage 50,000 MW Estimated energy in the Bay of Fundy

### Cape Split

### POWER POTENTIAL

Current hosting capacity of FORCE 5 MW (4,500 homes) Capacity of FORCE by 2016 20 MW (18,000 homes) Nova Scotia's goal for power generation in the Minas Passage 300 MW (270,000 homes) 2,500 MW (22,250,000 homes) Electricity that can be extracted from the Minas Passage without significant threats to the natural environment 6,000-8,000 MW Estimated energy in the Minas Passage 50,000 MW Estimated energy in the Bay of Fundy



M I N A S   P A S S A G E



Scots Bay

40 m (average depth, low tide)

### 1 PS2

Company: OpenHydro  
Device: Open-centre single-rotor turbine on a subsea base  
Size: 16-metre-diameter rotor  
Production: 2 MW  
Deployment: Summer 2015



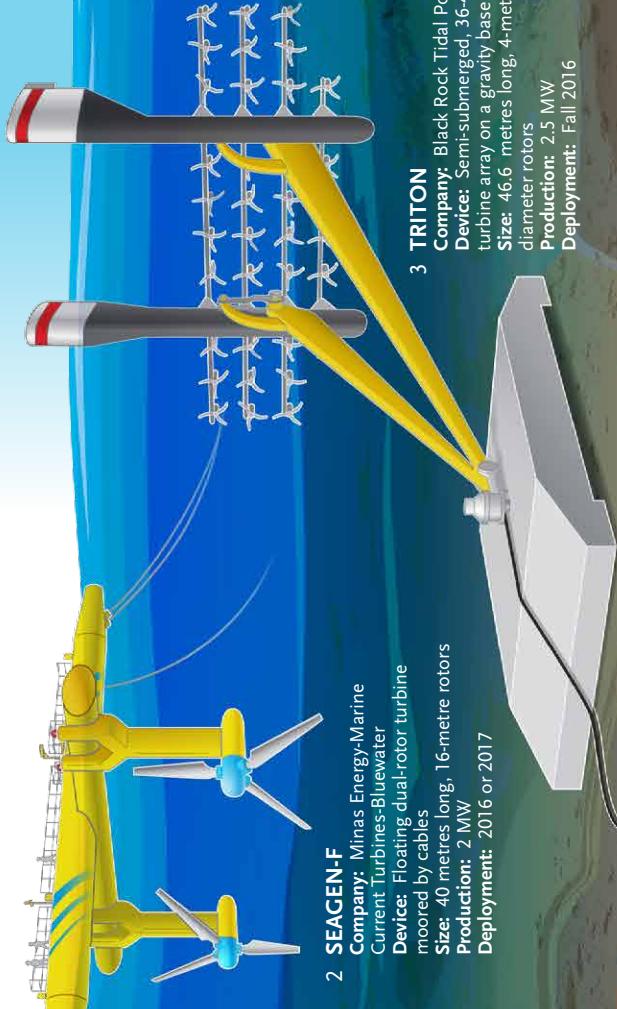
### 2 SEAGEN-F

Company: Minas Energy-Marine Current Turbines-Bluewater  
Device: Floating dual-rotor turbine moored by cables  
Size: 40 metres long, 16-metre rotors  
Production: 2 MW  
Deployment: 2016 or 2017



### 3 TRITON

Company: Black Rock Tidal Power  
Device: Semi-submerged, 36-40 turbine array on a gravity base  
Size: 46.6 metres long, 4-metre-diameter rotors  
Production: 2.5 MW  
Deployment: Fall 2016



### 4 AR1500

Company: Atlantis-Lockheed Martin-Irving Shipbuilding  
Device: Single-rotor turbine on a subsea foundation  
Size: 18-metre-diameter rotor  
Production: 1.5 MW  
Deployment: 2017





# THANK YOU!

2014-2015 CG Challenge sponsors



TOP: BONNIE FINDLEY/CANADIAN GEOGRAPHIC; OTHERS: CHRYSIA CHUDZAK/Canadian Geographic

Many thanks for all that you do for these geographic geniuses... it is so refreshing to acknowledge their intelligence in such a fantastic way! I appreciate Google and Alex Trebek's donations tremendously.

Melony O'Neill, teacher  
Calgary

On behalf of Malhaar and my entire family, I would like to thank you for an excellent job at the Geo Challenge. Your organization skills were impeccable, with excellent and caring staff. Needless to say, Malhaar found the whole experience very rewarding.

Madhavi Moharir, parent  
Toronto

I can't thank you enough for all the work that you did to make this possible. I really enjoyed myself. Please let everyone know how grateful all of us contestants are. I wouldn't trade this experience for anything else. You really made all the competitors feel accomplished and special. I do hope I will be seeing you next year in Ottawa as well.

Sameer Esmail, national finalist  
Vancouver

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# DISCOVERY

WILDLIFE

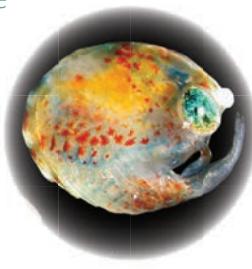


“**Wildlife sees no passports, and wildlife sees no borders.**”

Leona Aglukkaq, the federal environment minister, explains in an interview with the CBC the difficulty of protecting species at risk that cross international boundaries. In April, Canada signed an agreement with the United States and Mexico to protect migratory bats, several species of which face a variety of threats, including the fatal white-nose syndrome.

85

**The number of years** Jessica Waller looked ahead when she adjusted the conditions of the water in which she tested lobster larvae while trying to determine what impact climate change could have on the crustacean. The University of Maine student's preliminary results show that the larvae's growth slows in the warmer and more acidic waters expected by 2100.



## THE THUNDERDOME

**THE THUNDERDOME**

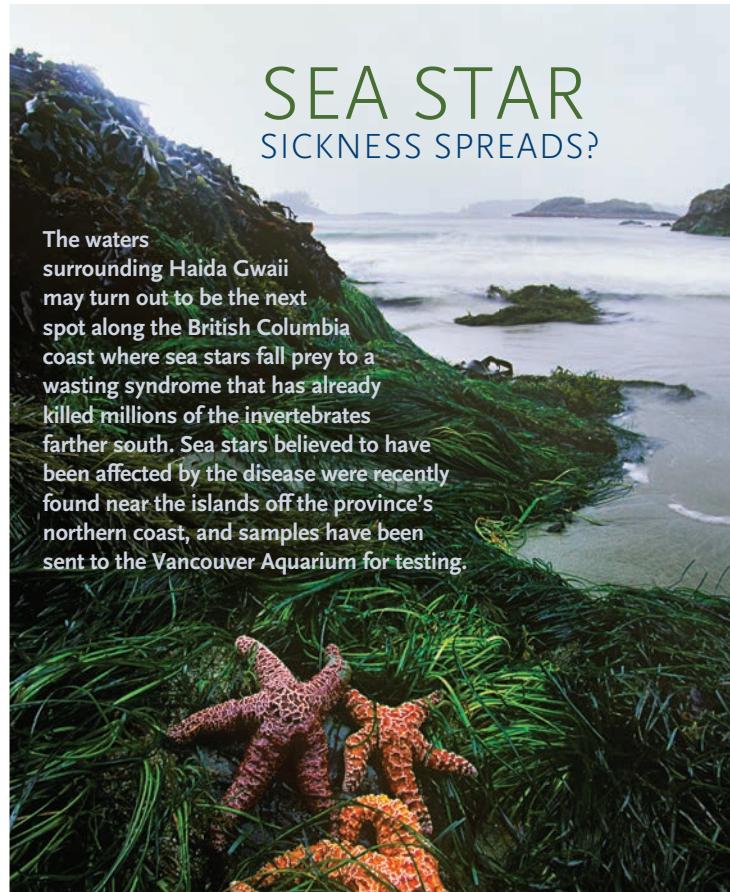
The nickname given to the box in which University of Alberta biologists placed young red squirrels in order to assess the rodents' personality. After a set amount of time, a mirror was placed in the box, and the behaviour of a squirrel, reacting to what it believed was another squirrel of similar size, was recorded. Researchers found that the squirrels' aggression level changed over time. "Young squirrels have really extreme personalities," said Amanda Kelley, who led the study. "But as they mature, their behaviour becomes more average. Really aggressive squirrels tone it down over time, while meek ones become more hostile."



Visit [mag.cangeo.ca/ja15/wildlife](http://mag.cangeo.ca/ja15/wildlife) to read more about each of these stories.

## SEA STAR SICKNESS SPREADS?

**The waters surrounding Haida Gwaii may turn out to be the next spot along the British Columbia coast where sea stars fall prey to a wasting syndrome that has already killed millions of the invertebrates farther south. Sea stars believed to have been affected by the disease were recently found near the islands off the province's northern coast, and samples have been sent to the Vancouver Aquarium for testing.**



**“This legislation will ... protect Canada’s waterways and fisheries from this harmful, unnecessary ingredient.”**

John McKay, Liberal MP for Scarborough-Guildwood, in a statement announcing his private member's bill that aims to "end the sale of personal care products containing microbeads in Canada." Microbeads are tiny plastic particles that act as an exfoliant and are found in items such as shower gels and toothpaste. They're so small, however, that wastewater treatment plants can't filter them out, meaning the non-biodegradable beads end up in waterways, where they can enter the marine wildlife food chain.

CLOCKWISE FROM TOP: JARED HOBBS; CHRIS CHEADLE/ALL CANADA PHOTOS; AMANDA KELLEY; © ALISTAIR DOVE/ALAMY



# SABLE ISLAND

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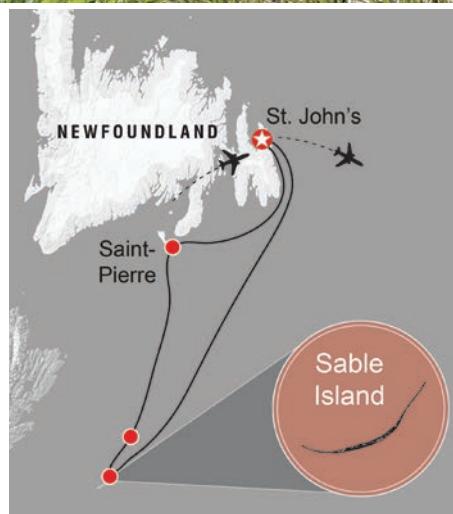


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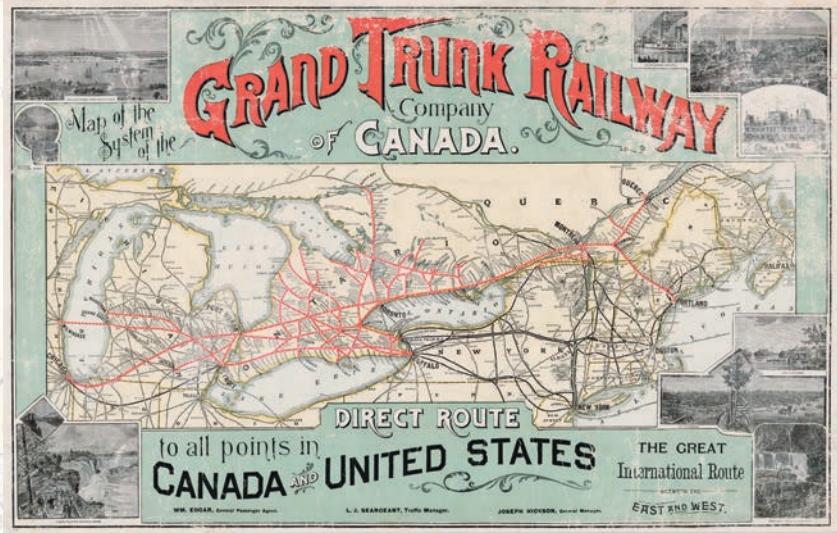
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# DISCOVERY

## A railway's allure

Richly illustrated and detailed, railway route maps helped spark the imagination and wanderlust of Canadians in the late 1800s

By Harry Wilson\*



### THEY DON'T MAKE 'EM LIKE THIS ANYMORE.

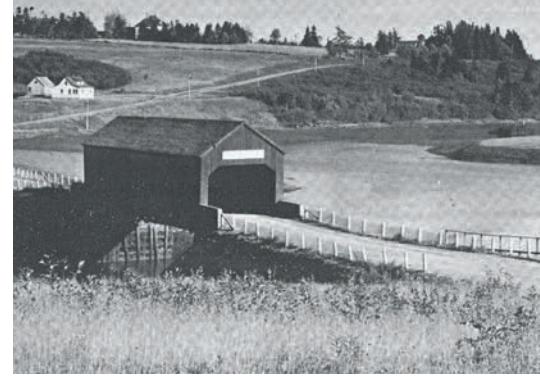
With its bold lettering and scarlet tendrils of track reaching through two provinces and eight states like some vast vascular system of steel, this late 19th-century map of the Grand Trunk Railway recalls the early glory days of rail travel in North America.

The map was probably produced around 1887, a period when rail tourism was just taking off in North America, and travellers could reach a host of destinations, including those depicted in the map's vignettes. It was common during this time for railway companies to create attractive maps such as this one and use them to attract passenger traffic, a crucial source of income for many railroads.

The vignettes paint romantic versions of Niagara Falls, Toronto, Great South Falls (near Bracebridge, Ont., and today known as Muskoka Falls), Lake Couchiching (next to Orillia, Ont.), Montreal, Quebec City and Portland, Maine. The appeal of bucolic locales such as Lake Couchiching and Great South Falls to travellers is clear, but the map's images also play up the modern marvels in more cosmopolitan stops such as Montreal, where passengers could see the impressive span of the Victoria Bridge across the St. Lawrence River and the grand Bonaventure Depot.

Still, even in the 19th century, the tourist infrastructure that had built up around the railway wasn't always appreciated. As Isabella Bird wrote of Niagara Falls (then known as Manchester in the United States) in her 1856 travelogue *The Englishwoman in America*, "A whole collection of mills disfigures this romantic spot, which has received the name of Manchester, and bids fair to become a thriving manufacturing town! And even on the British side, where one would have hoped for a better state of things, there is a great fungus growth of museums, curiosity-shops, taverns, and pagodas with shining tin cupolas."

\*with files from Sara Viinalass-Smith, early cartographic archivist, Library and Archives Canada



## FOR THE RECORD

A look back through the archives as *Canadian Geographic* turns 85

In 1805, American bridge builder Timothy Palmer put a roof on Philadelphia's new Schuylkill Permanent Bridge, and North America's first covered wooden bridge was born. For the next 100 years, covered bridges were built in the thousands in northeastern North America (mainly by small communities, farmers and businesses), with most of Canada's more than 1,400 sprouting over rivers and streams in the forested farmland of Quebec and New Brunswick. And, as Montrealer Jacques Coulon explained in his August 1969 *Canadian Geographical Journal* cover story "Covered bridges in Canada," roofs and siding weren't just for looks and hiding young lovers (though they were also called "kissing bridges" for that reason): they sheltered bridge decks from sun and rain, raising life expectancy from 10 to 80 years, and much longer with maintenance.

But if a roof postponed decay, it couldn't save the structures from being knocked down or bypassed in favour of modern highways and concrete bridges or being abandoned. By the summer of '69, about 400 remained in Quebec and New Brunswick combined. "Always picturesque and just rare enough to arouse interest," wrote Coulon, "covered wooden bridges seem growing in popular appeal at the very time they are dwindling in number."

Today, fewer than 200 covered bridges survive in Canada. Yet Coulon would be happy to know that preservation societies did take action in Quebec and New Brunswick, and provincial governments instituted policies to help protect these century-old links — still there for travellers willing to explore the secondary roads.

—Nick Walker



See a larger version of this map and more railway maps from Library and Archives Canada's collection at [mag.cangeo.ca/ja15/railway](http://mag.cangeo.ca/ja15/railway).



Read more stories from the magazine's archives at [cangeo.ca/blog/throwback](http://cangeo.ca/blog/throwback).

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## A station for a northern nation

More than half a century after it was established, the Kluane Lake Research Station remains a leader in Arctic studies

By Calvin Dao



The Kluane Lake Research Station and airstrip (LEFT), which is home for Sian Williams, the facility's manager, whose tasks include setting temperature moorings in the lake (ABOVE).

**WHEN SIAN WILLIAMS** steps outside her cabin near the southern edge of the Yukon's Kluane Lake in the spring, she can hear the song of the white-crowned sparrow, the honking of geese and swans, and waves washing ashore. She can see the front ranges of the Saint Elias Mountains to the south, or turn north and face a boreal forest home to bears, wolves and caribou, and the mountains of the Ruby Range.

It's landscapes such as these that make her say, "I feel very lucky to live here."

Williams is the manager of the Kluane Lake Research Station, the only field facility of the Arctic Institute of North America, a University of Calgary-based organization celebrating its 70th anniversary this year.

To passers-by, the station, about 220 kilometres northwest of Whitehorse just off the Alaska Highway, looks like an unassuming scatter of 16 cabins, some beside the research station's airstrip,

some closer to the lakeshore. Visitors who take the time to stop in, however, soon learn of the 54-year-old station's important contributions to Canadian Arctic studies in disciplines such as anthropology, archeology, biology, botany, climatology, geology, glaciology and hydrology.

This wide variety of studies is possible because of the station's location, right on the doorstep of Kluane National Park and Reserve, a UNESCO World Heritage Site that contains some of the world's largest non-polar ice fields when combined with the adjacent Alaskan Wrangell-St. Elias and Glacier Bay national parks and preserves, and British Columbia's Tatshenshini-Alsek Park.

This setting, coupled with almost 24 hours of daylight during the summer, allows scientists to conduct research throughout the entire day, including vegetation surveys and zoologist Charles Krebs' ongoing 42-year fieldwork on the

snowshoe hare, which is primarily nocturnal and crepuscular.

After losing federal funding in 2012, the institute (which is now funded by the University of Calgary, donors, members, Kluane Lake Research Station user fees and competitive grants) has struggled to commit to longer-term projects at the station, but Williams is confident it will continue to run one way or another. For her, there is value to just being in the field, something that continues to draw former students back to the remote region. "They say to me, 'That was one of the most memorable summers of my life and I just want to bring my kids back here to show them where I was,'" she says. "We might be studying the natural world, but it's the experience that people have while doing that that's important."



Learn more about Charles Krebs' snowshoe hare study at [mag.cangeo/ja15/arctic](http://mag.cangeo/ja15/arctic).

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# Mapping the Van Tat Gwich'in routes

**HOW ONE NORTHERN FIRST NATION IS PRESERVING ITS ANCESTRAL KNOWLEDGE OF THE LAND**

BY JOHN BENNETT

**AN INTRICATE NETWORK** of trails and water routes overlies the northern Yukon's Old Crow Flats, the ancestral homeland of the Van Tat Gwich'in. These are the pathways the people of this northern First Nation have used for millennia to move around their territory, hunting, fishing, trapping, gathering berries and plants, coming together in gatherings and travelling into the Northwest Territories and Alaska to visit relatives and trade. Until recently, the maps of most of these routes existed only in the minds of those familiar with them, but the Van Tat Gwich'in have changed that. Their ambitious Van Tat Gwich'in Navigation Systems Project, now in its final stages, makes an enormous amount of knowledge about the routes readily available.

Anthropologist Shirleen Smith has been working for the Van Tat Gwich'in

for more than 15 years. "People's patterns and modes of travel have changed over time," she explains. "The trails and routes are important because they give access to the places people still need to go. The elders could see that the knowledge of many of the routes was in danger of being lost, because most young people don't know them."

Directed by a local heritage committee, Smith and Van Tat Gwich'in researchers began in 2011 by talking with the experts. "We interviewed older people who remembered the routes that are no longer used, and active hunters who regularly use trails. Middle-aged and younger people who had been raised by their grandparents were also a good source."

Four years later, 37 routes have been travelled by foot, boat, snowmobile or helicopter; GPS coordinates

Left to right: Joel Peter, a Van Tat Gwich'in elder, Joseph Bruce and David Frost reopen the Vihsrainjik route to Chuu Tl'it in February 2012.

have been recorded, the trails have been mapped, and there are hundreds of photos, videos of the trails and a long list of place names. Gwich'in and English trail markers now identify important features such as burial sites and mark the head and foot of portages. Some abandoned trails will be reopened, but as Smith says, unprecedented overgrowth or "shrubification," an effect of climate change, has made this more difficult.

The success of the Van Tat Gwich'in projects, says Smith, is a testament to the people on the heritage committee and the elders who preceded them. "They want accurate information for themselves and are determined to get it. They're recording their cultural heritage, not as an academic exercise, but as living knowledge that people can use."



Polar Knowledge  
Canada

Savoir polaire  
Canada



This is the latest in a blog series on polar issues and research ([cangeo.ca/blog/polarblog](http://cangeo.ca/blog/polarblog)) presented by Canadian Geographic and Polar Knowledge Canada, a new federal research organization that combines the former Canadian Polar Commission and the Canadian High Arctic Research Station project of Aboriginal and Northern Affairs Canada. Learn more at [canada.ca/en/polar-knowledge](http://canada.ca/en/polar-knowledge).

# on the map

EXPLORING CARTOGRAPHY

## Seafloor scenes

How an innovative sonar technology may help map parts of Canada's previously uncharted Far North

BY VINCENT MYERS

Massive "scours" caused by drifting icebergs scar the Arctic seabed (IMAGE 3). Some ruts are more than 25 metres wide and kilometres long, and may be hundreds of years old. Other images reveal phenomena such as large areas covered in pockmarks (BACKGROUND IMAGE) — possibly caused by gas deposits — reminiscent of a lunar landscape.

In August 2014, a team of scientists, engineers and navy personnel from Defence Research and Development Canada (the research arm of Canada's Department of National Defence) captured these sonar images of nearly 30 square kilometres of seabed in the central Canadian Arctic's Victoria Strait, a remote and often ice-covered underwater environment that has never been seen, far less charted.

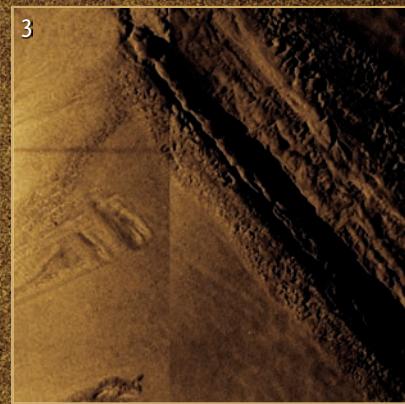
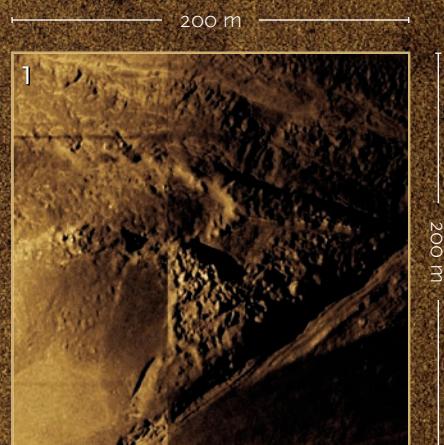
The researchers, part of the 2014 Victoria Strait Expedition searching for Sir John Franklin's lost ships HMS *Terror* and *Erebus*, used the aptly named *Arctic Explorer*, a torpedo-shaped autonomous underwater vehicle carrying the latest in military R&D equipment — a state-of-the-art synthetic aperture sonar (SAS) system. Originally designed to detect and classify underwater mines, it is able to survey for more than 18 hours before recharging, and creates ultra-high-resolution imagery over very large areas. DRDC produced these first images of a previously unmapped zone near the place where Franklin's ships were abandoned almost 170 years ago.

*Erebus*, of course, was later found southeast of Victoria Strait, in Queen Maud Gulf, but what *Arctic Explorer* captured seems to conjure up an extra-terrestrial world. In addition to huge scours and other geological formations, the team observed interesting physical phenomena involving internal waves of fresh water from melting sea ice, which travel slowly down through the salt water, causing sound to bend in such a way that the fresh water creates ghostly ripples in the sand. The frigid -1.5 C water of the Arctic Archipelago creates an ideal environment for sound propagation, contributing to unparalleled sonar image quality and range.

There is potential that these images and accompanying bathymetric data, which meets the standards of the International Hydrographic Organization, could be used with other data to create the first detailed charts of the area. The 2014 Victoria Strait Expedition highlighted the need to map and explore these waters, part of an Arctic region in which human activity is increasing. These challenges are inspiring Canadian industry, government and academia to develop technologies that can operate in one of the most difficult environments known to humankind.



For an interview with DRDC defence scientist Vincent Myers and more SAS images, go to [mag.cangeo.ca/ja15/sonar](http://mag.cangeo.ca/ja15/sonar).

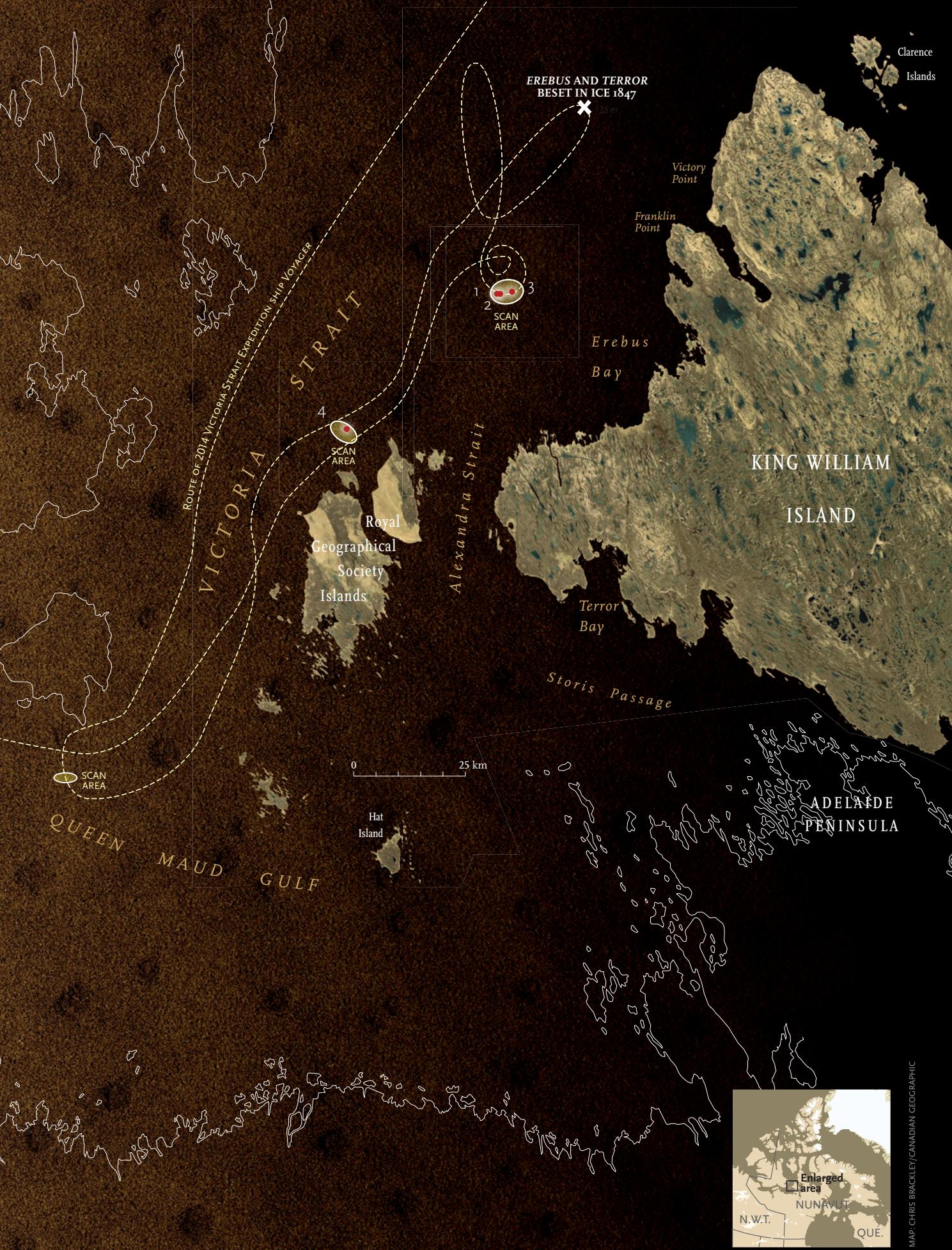


4 Background image



CANADIAN GEOGRAPHIC EDUCATION

Visit [cgeducation.ca/resources/tiled\\_maps](http://cgeducation.ca/resources/tiled_maps) for a printable tiled map of the circumpolar Arctic.





# WOOD BUFFALO

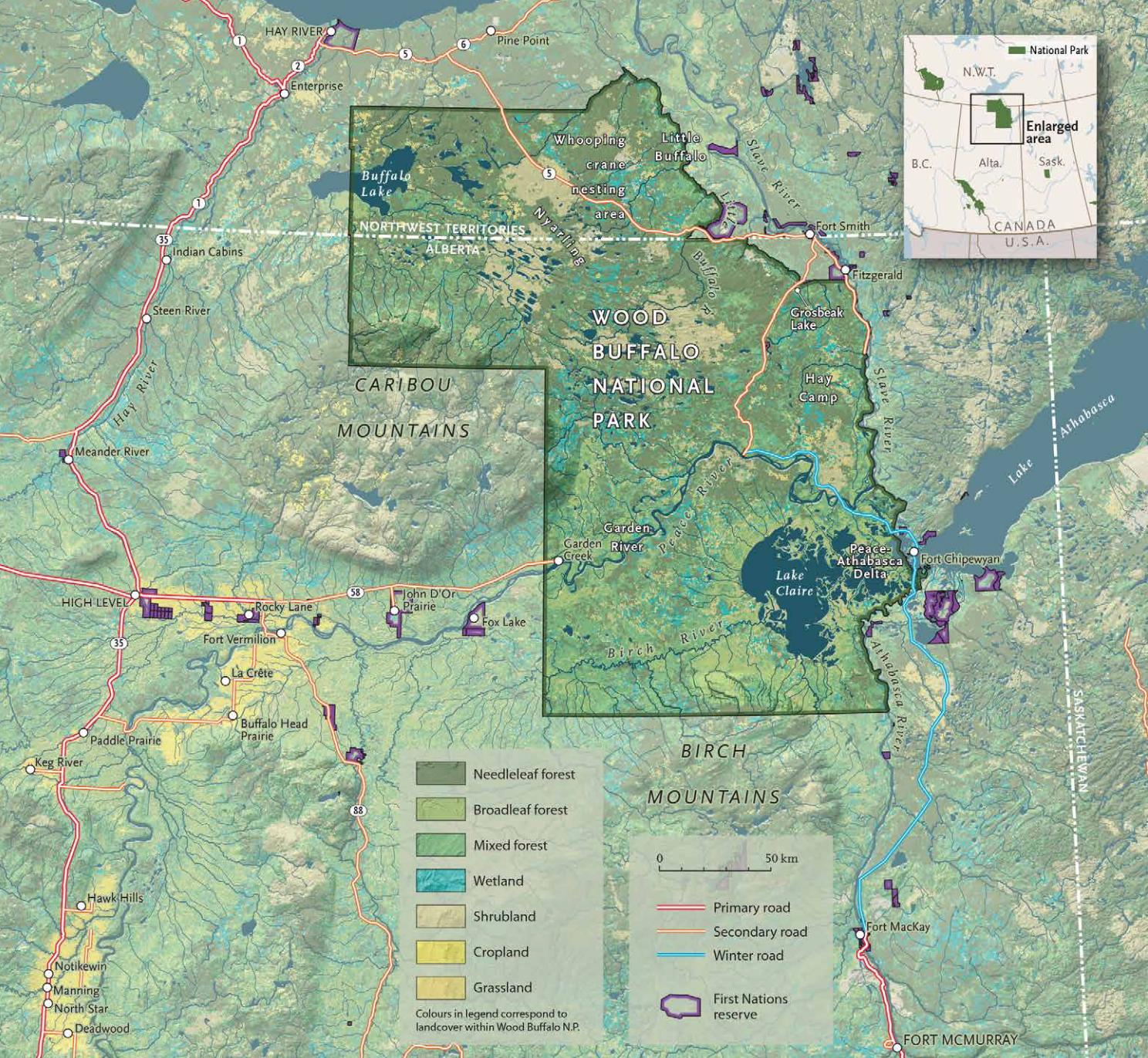


A celebration of Wood Buffalo, Canada's  
**BIGGEST** national park, and a land  
of more than one superlative

PHOTOGRAPHY BY PAUL COLANGELO

An aerial photograph of a vast wetland area. The landscape is characterized by numerous winding, dark blue-grey waterways that meander through a patchwork of green and brown land. The green areas appear to be dense vegetation or grasslands, while the brown areas could be mudflats or drier soil. The overall scene is one of a healthy, dynamic ecosystem.

RIO



**T**HE LARGEST WILD HERD of wood bison roams coniferous and aspen forests and meadows here. The sweeping northern wetlands are the only natural whooping crane nesting grounds left on Earth. This can seem like a boundless place: even the hardiest backcountry adventurers can canoe the rivers and lakes from the Peace-Athabasca Delta and trek boreal woods, karstland and shining salt plains for weeks without reaching park limits. To showcase the wild riches of Canada's largest national park — which crosses the Alberta–Northwest Territories border, contains the traditional lands of five Cree and Chipewyan First Nations, and is a UNESCO World Heritage Site and the world's largest dark sky preserve — *Canadian Geographic* sent photographer Paul Colangelo into its wilderness and spoke to park management experts, scientists, guides and locals about what makes Wood Buffalo National Park so awe-inspiring.





Rivers, including the Slave (THIS IMAGE) and the Peace (BELOW), are a key part of the park's ecosystem, as is its namesake animal (OPPOSITE, crossing road).



## Water

### **STUART MACMILLAN, resource conservation manager**

At least once every year, my family and I visit Grosbeak Lake. It's part of the salt plain system in the park, which formed from salt water percolating from underground deposits left by an ancient inland sea. At the lake, there are also weirdly shaped boulders that were deposited on the mudflat 10,000 years ago when the glaciers receded. They're being eroded by the effects of the salt, by water freezing and thawing and by other environmental impacts. The reason the area is so striking is that to access the lake, you walk through the boreal forest. As you get closer, you can see the lake through the trees, looking bright white because of all the salt. Your first reaction is that it's a bunch of snow. On a sunny day, it's like you're in a completely different world.

—As told to Carys Mills

## Bison

**LANA CORTESE**, ecologist

There are around 3,000 bison here, in five subpopulations: in the delta, southeast of the Peace River, including around Lake Claire; Garden River, in the southwest; Hay Camp, which is east-central; Little Buffalo, in the northeast; and Nyarling, in the northwest. In the past, the population was stable and increasing, but the results of the 2014 survey indicate a decline from 2009. A number of things could be influencing the population, including habitat change, predation and changing climate, and we have plans for studies to try to identify the cause.

One fascinating thing about the bison is their relationship with wolves. This is one of the only places in the world where a predator-prey relationship between the two has persisted through time, which demonstrates the truly wild nature of the ecosystems and species here.

—As told to Harry Wilson



Clockwise from THIS IMAGE: a bison on the park's salt plains; a bison at rest among the trees; two whooping cranes in their nesting habitat; a close-up of the same two birds.

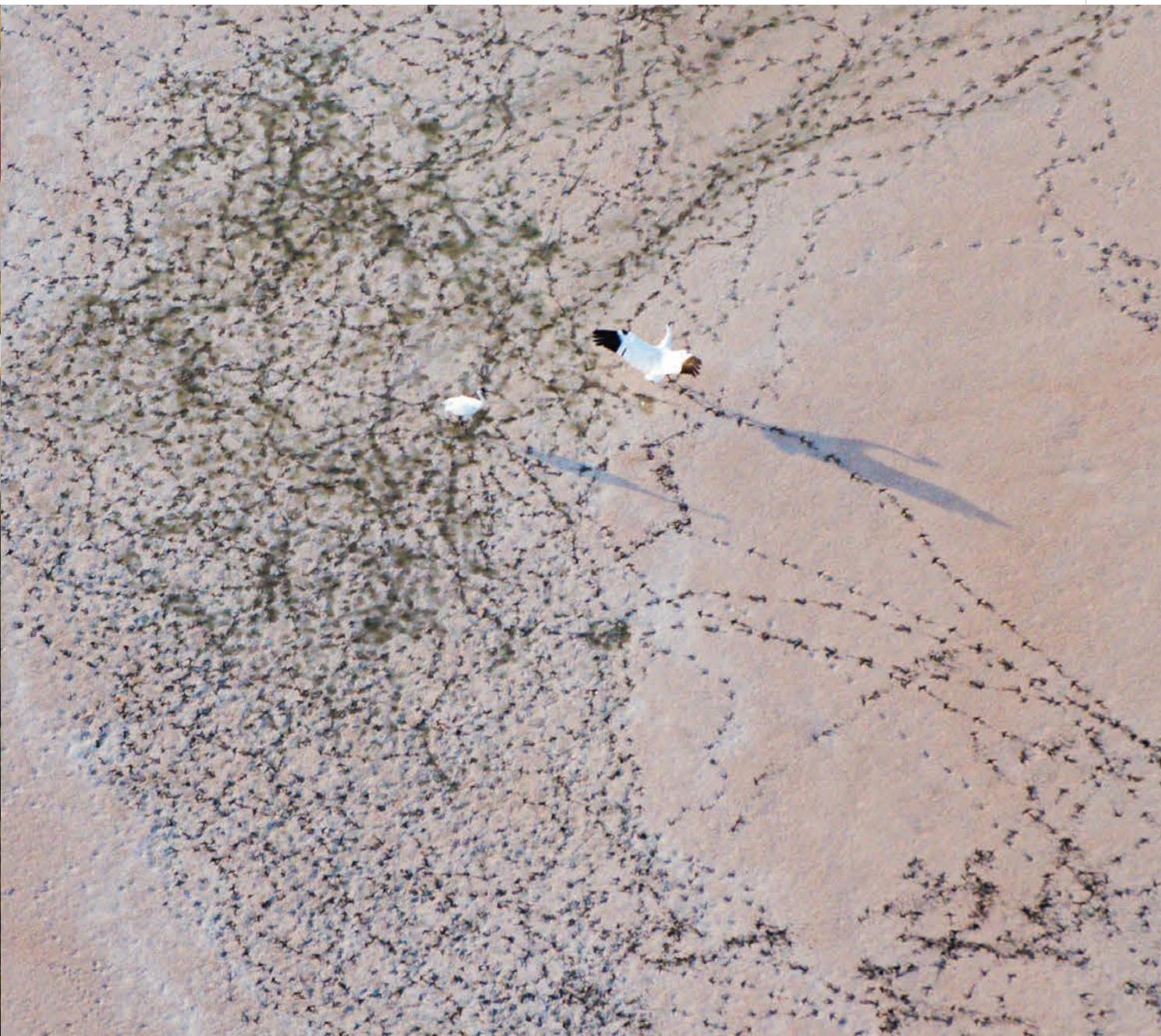


## Whooping cranes

RICHARD ZAIDAN, visitor experience manager

Wood Buffalo was established 32 years before we even knew the whooping cranes were here. Their summer breeding area is very isolated, so it was luck that they were protected by a national park. You can't just walk in to see them, because it's so marshy and wet. At one point, the park had the only whooping cranes in the world, with just over 20 individuals. Last year, there were 82 nests — the most on record — and now there are 308 birds — Earth's only self-sustaining wild flock. They nest, raise their young and fly almost 4,000 kilometres to the Gulf of Mexico and Texas to winter. It's pretty rare even for staff here to see them, but four years ago, I saw my first crane at the salt plains, which you can drive to. Since then, there have been cranes there quite consistently.

—As told to Jessica Finn





## Wetlands

**JASON STRAKA, ecologist**

As I was bumping over the frozen Peace-Athabasca Delta on my snowmobile this past winter, my eyes were searching the ground for muskrat lodges. The delta is an interesting place. It can feel like it goes on forever, and it's got some real environmental issues: there's oilsands development upstream and a hydroelectric dam nearby. Two Cree guides go with me to help spot these muskrat dens and, together with the Fort Chipewyan community, they've helped my team identify a dwindling muskrat population. The fieldwork we conduct over our three-day treks across this landscape will help determine why that's happening. For me, this tour is also another kind of learning experience; the guides, each over the age of 50, have such immense knowledge of this land and how to live on it. I'm lucky to get a glimpse of that.

—As told to Michela Rosano





Clockwise from THIS IMAGE: a forest fire is left to burn; pine cones, which don't release their seeds until triggered by fire; birds feed on the shore of Lake Claire; the salt plains.



## Wildfire

**JEAN MORIN, fire management officer**

Wildfires have been shaping the landscape of the park for thousands of years. It's a fire-prone, fire-dependent ecosystem larger than Switzerland, so we can let some fires go with minimum interference, which benefits the landscape and helps maintain ecological integrity. Fire season really starts when lightning season starts, usually in late spring. Depending on how much it rains later in the season, about 500 square kilometres is burned every year by an average of 31 fires, and I would say 99 per cent are lightning-caused.

We do smoke-patrol flights to monitor fires; we suppress them near roadways, facilities and communities; and we ignite our own fires when necessary to kill the momentum of wildfires by bringing them to natural features, such as water sources or bogs, on our own terms.

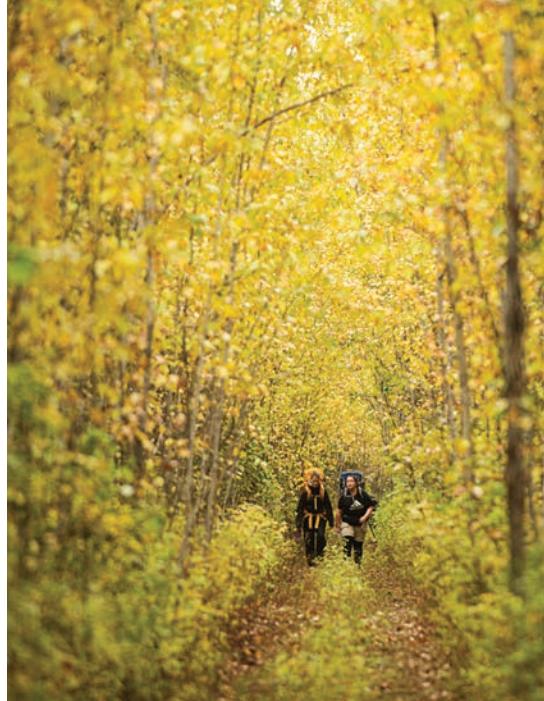
—As told to Nick Walker

## Locals

### ROBERT GRANDJAMBE JR., Mikisew Cree trapper and guide

Our traditional lands are in the park, and I've been trapping on them since I was six. Now I work three months each year as a millwright, but for eight months, I'm preparing for trapping and hunting, or I'm out on the land, or I'm cleaning hides or maybe making moccasins and a fur hat for when the snow falls. My trips are usually seven weeks at a time, and I push about 150 kilometres every three days. One of the only people I ever cross paths with on the traplines is my father. It's good to run into him; I like to think he taught me well. It's unfortunate there aren't more people out there. Sometimes I get to guide, show visitors how significant the delta is, show them where I pick duck eggs, where whooping cranes nest and where bison use migratory paths hundreds of years old. I show them this is a place worth treating with respect.

—As told to Nick Walker





Clockwise from THIS IMAGE: the northern lights illuminate the sky; a hunter takes aim (the park is traditional territory for some First Nations and Métis people, who are permitted to hunt within its boundaries); two elementary school students hike through the woods.

## Dark Sky

**TIM GAUTHIER**, partnering, engagement and communications officer

Every single human culture in history has endeavoured to make sense of what they saw in the night sky. As the proud home of the world's largest dark sky preserve, the park is the perfect place to follow in their footsteps. Not only is it located in a belt of prime aurora activity, but the complete absence of artificial light also reveals the staggering depth of the cosmos. You see the Milky Way as just a vast grey river, or see crystal-clear views of Jupiter or Saturn. You can see the Andromeda Galaxy and star clusters. It's humbling, and when people come out and see it for the first time they're simply agog. Our annual Dark Sky Festival is growing fast, but any experience here can really open you up to the wonders of science. You just have to look up.

—As told to Sabrina Doyle

**Smoke from forest fires lingers over the landscape of Wood Buffalo National Park. Fires play an important ecological role in the park, and are often allowed to burn naturally.**



CANADIAN GEOGRAPHIC EDUCATION

Visit [cgeducation.ca/resources/in\\_the\\_classroom](http://cgeducation.ca/resources/in_the_classroom) for a lesson plan relating to this feature, as well as more learning resources from other stories from past issues.

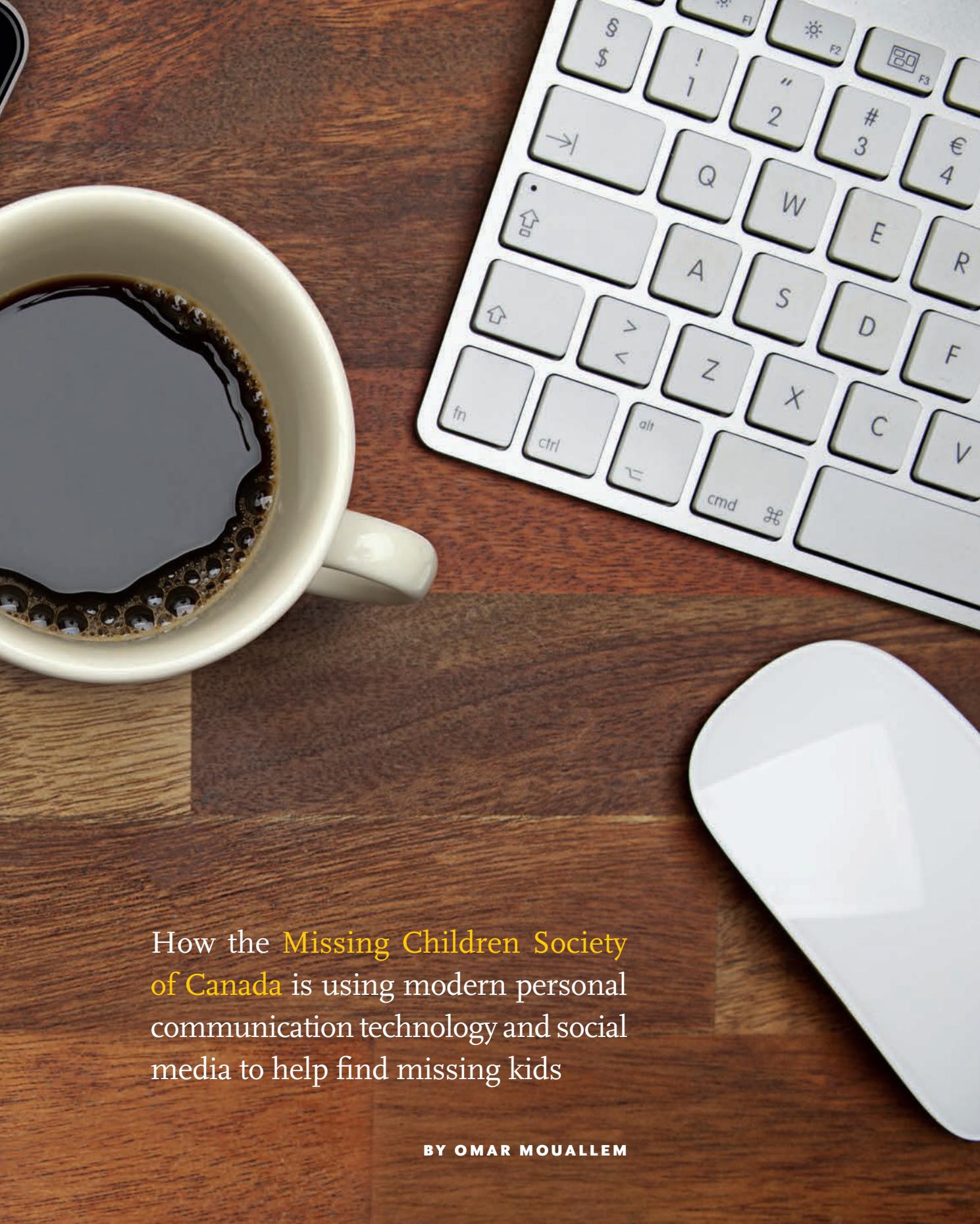


Paul Colangelo ([paulcolangelo.com](http://paulcolangelo.com)) is an award-winning environmental documentary photographer whose work has appeared in magazines such as *Maclean's*, *Outside* and *Mountain Life*. See more of his stunning photos of Wood Buffalo National Park at [mag.ca/geo.ca/ja15/wbnp](http://mag.ca/geo.ca/ja15/wbnp).

9:20  
Wednesday, May 27

CodeSearch now  
There is an Urgent Child Search  
Alert in your area. Please enter the  
CodeSearch app for more details.  
slide to view

‘ ALERT:  
THERE HAS BEEN  
A CHILD REPORTED  
MISSING IN YOUR AREA. ’



How the Missing Children Society of Canada is using modern personal communication technology and social media to help find missing kids

BY OMAR MOUALLEM

**O**NE MORNING IN LATE SUMMER 2013, A FEW THOUSAND PEOPLE ACROSS WESTERN CANADA WOKE UP TO THIS ON THEIR SMARTPHONE'S HOME SCREEN: "ALERT: THERE HAS BEEN A CHILD REPORTED MISSING IN YOUR AREA."

They opened the beckoning app to a photo and physical description of a 14-year-old Calgary girl. She'd disappeared from her home while the city slept and now police had good reason to believe she was somewhere along the Trans-Canada Highway 1, en route to Vancouver, with a much older man she called her boyfriend.

Others in the region learned about her from widespread media coverage — in print, radio, blogs, social media, or from their own social media statuses, automatically generated in the middle of the night by the Missing Children Society of Canada. The society has helped law enforcement and families recover missing kids for three decades, but gone are the posters that once adorned telephone poles and highway rest stops. Now the society leads the "world's first online search party" by applying the full pressure of social media, mobile technology and GPS, with the ability to geo-target alerts anywhere police think an endangered child might be.

In this particular case, it was the first time the society had used all three of its recently developed platforms — a news release service with a 1,000-channel reach in the search area, the public's social media feeds and its own app — collectively called the Search Program or "Milk Carton 2.0," a tribute to the dairies that put faces of the missing on breakfast tables throughout the 1980s. Within a few days, portraits of the teenager and her companion were seen on the devices of 1.36 million people, most of them concentrated within southern Alberta and southern British Columbia.

It was an unusual use of the technology built for child abductions because the girl hadn't been abducted. She was, like 74 per cent of the more than 40,000 kids reported missing in Canada every year, a runaway. But the 31-year-old man she was with — unbeknownst to her — had a violent criminal past. "We use this tool when there's a significant safety concern," explains Insp. Cliff O'Brien, who led the Calgary Police Service's investigation in this case and contacted the MCSC. "This case, with a predator, was well over the threshold. This wasn't young love."

**"GEOGRAPHY IS CRITICAL,"** says Amanda Pick, the chief executive officer of the MCSC, sitting in her northeast Calgary office. Finding a child, she explains, is all about reaching the right person in the right place, where an abductor could be making off with a victim. She points out the window to an industrial road. "It's me getting that information to him, on that street corner right there, while that car is driving by."

Pick, 42, dressed in a stylish black sweater and matching Fitbit,

looks like she could head a technology company, but it was a decade in non-profit fundraising and management that brought her to the society in 2010. It was ailing then, surviving on about two months' operating finances at a time, and more than once came within 48 hours of shutting its doors permanently.

The society had a relevancy problem, much like Child Find Alberta, Canada's first and, until it shuttered last year, oldest missing children organization. The Internet's ability to track lost children was better than its own. On the surface, the need for such organizations had been supplanted by social media's ability to spread the faces and names of the missing through friends, loved ones and strangers faster. On the other hand, the rallying support fades as time progresses, and though police never stop investigating, it's impossible to sustain that initial focus. And that's where the MCSC comes in.

In addition to services such as family and peer support, the society's strength is its team of investigators who never stop interviewing, chasing tips and working with law enforcement. Indeed, as testament to its success, the society's office walls are decorated

with pictures of reunited families — one of which was taken 18 years after the case opened. To keep that momentum in a new digital age, however, building awareness of missing children cases needed rethinking.

During one of her first staff meetings, Pick asked her colleagues how they got the mes-

sage out. They pointed to a bookshelf in the corner of the boardroom stuffed with posters. The society had relied on them to gather tips since 1986, after the still unsolved abduction of six-year-old Tania Murrell in Edmonton shocked the nation, and inspired Rhonda Morgan to found the organization. (Morgan led the society until she resigned and Pick stepped in.) Though the new director would never dismiss the value of posters to show community support for the families of missing children, she doubted it was the best use of limited resources.

A month later, Pick met with representatives from Marketwired. The media company distributes 300,000 paid stories annually to thousands of news outlets on behalf of its clients. The MCSC has used the service, but only on occasions such as anniversaries. "As soon as they explained their reach, I said, 'Oh. I don't know about using your service for events, but would you like to help me save the life of a child?'" recalls Pick. "I said, 'Give me access to your network. Let me push alerts out on our cases.'"

This was the start of the MCSC's transformation into a media and technology organization. In 2013, when police gave it a picture and description of the missing 14-year-old Calgary teen and her alleged abductor, the society was able to target hundreds of content producers — news editors, broadcasters, bloggers and other social media "influencers" — in southern Alberta and southern British Columbia at once.

**'GEOGRAPHY IS CRITICAL.  
It's me getting that information to  
him, on that street corner right  
there, while that car is driving by.'**

This use of Marketwired's services now meant that the society could also become an Amber Alert rebroadcaster, like any newsroom. But Pick saw an opportunity to cast a wider net.

The threshold for issuing Amber Alerts is high. First created in the U.S. after a high-profile child abduction and murder in 1996, each regional Amber Alert program has different criteria, but the emergency broadcasts are typically only activated in "stranger danger" kidnappings, which according to the MCSC make up less than 0.1 per cent of missing child reports. Unless it's a life-threatening scenario, Amber Alerts are not activated for parental abductions or runaways.

But, thought Pick, if the organization had its own alert program, it could use many of the same distribution tools to help solve missing children cases that didn't meet the Amber Alert criteria. So, first working with the Calgary Police, and now several Canadian police jurisdictions, it created Child Search Alert, a program to do just that — and it too was used to enlist the help of traditional and new media to track down the 14-year-old Calgary runaway.

**THESE NEW PROGRAMS** were just the beginning. Partnering with Grey Advertising Canada, Pick's team soon also conjured a way to solicit the assistance of the general public online: by asking people to donate their social media accounts and authorize the society to push missing child reports to them in times of need — much as they did with Marketwired.

"It was the right ask," says Pick. "If you asked, 'Will you donate your social media feed so government and law enforcement could post directly on it?' they'd say no. But if we say, 'Will you let us know where you are? Would you let us push a notification at one in the morning, if there was a missing child in your community, to help bring a child home?' people say yes."

Launched in 2012, the program, known as the World's Most Valuable Project "search party," asks regular people to give the MCSC access to their Facebook, Twitter and Foursquare accounts. By specifying their area by province or territory online, they allow the society to target specific regions with its missing child reports — only Alberta and British Columbia to trace the Calgary girl's whereabouts, for instance, which still translated to more than a million pairs of eyes, says Pick. "That

The Calgary-based Missing Children Society of Canada partnered with Strut Creative, a strategic communications agency, to develop its CodeSearch app (RIGHT), which notifies individuals of a missing child near their location, then provides updates via a news feed as police deliver more tips.

had never been done anywhere in the world." Today, the search party's social networks reach a tenth of Canadians.

There are few cases, however, when the whole country needs canvassing. Plus, you run the risk of desensitizing people to missing persons reports if they're overexposed to them. To Pick, the more targeted the society's outreach the better. And she knew that inside the smartphones that many people carry today are global positioning systems that could give her organization precision as fine as sticking a tack in a map. So the society collaborated with Strut Creative, a Calgary-based strategic communications agency, to design CodeSearch, a content-rich app that notifies individuals of a missing child near their location, then provides updates via a news feed as police deliver more tips: a licence plate number, a vehicle description, suspected whereabouts. But where the World's Most Valuable Project social media alerts cast a broad and ephemeral net, disappearing further into the user's feed with each new and unrelated post they share, CodeSearch's current 15,000 users can be fed updates as needed.

The app's home screen is populated with all the active cases the MCSC is tracking, too. Some go as far back as 1979. If there's a tip that a person related to any one of them might be, say, in Battleford, Sask., or on Pizza Corner in Halifax, then all CodeSearch users in that area can be notified immediately. "I can push a notification to just one person, or we can push to a community, a city or province," explains Pick.

At the moment, CodeSearch users are employees of corporate sponsors, such as WestJet airlines, and law enforcement, who can use the app to go a step further in their work by requesting specific assistance from corporate sponsors on a case-by-case basis. The eventual goal is to make CodeSearch publicly available, but in the meantime the MCSC is using it to sustain its new tech services by asking participating companies to make financial donations.

Insp. O'Brien is proud to be part of the first agency in the world using technology this way. "It's responsive in a way I've never seen before," he says. "I don't want to take away from email and websites and posters, because they all have a purpose depending on the file, but, frankly, there's nothing better in this age of technology than to put real-time, geographically specific information in the hands of people who are in the area of a missing kid."



**THE CHANCES OF RECOVERING** a missing child dwindle with each passing hour. According to a Canadian study of murdered abductees, 91 per cent were dead within the first 24 hours of going missing, 74 per cent within the first three, and 44 per cent in under an hour. So although social media outreach often takes added effort and comes with complications related to protecting victims' identities once they're found, it's a welcome tool for detectives.

"We have more sources," says Ted Davis, a former police officer who joined the MCSC's investigation staff 18 years ago. "We can get awareness out to people in a matter of seconds rather than hours, or days, or weeks. In 1997, we had to rely on media or posters. I don't remember the last time we had a poster drawn up for a missing child."

While the direct impacts of social media and consumer technology on finding missing children are hard to quantify, according to the society's U.S. counterpart, the National Center for Missing and Exploited Children, recovery rates have improved by 3.5 per cent in the past decade to 97.5 per cent. And about two decades before that? Only six in 10 children investigated by the U.S. centre came home.

Those were the days of milk carton outreach, when virtually half of all dairies in America, and many in Canada too, packed their products with the pictures, names and descriptions of the vanished. They appeared on pizza boxes, grocery bags and mail too, but it was milk containers that entered the public consciousness and became a cultural trope. People still ask Pick if her organization's responsible for putting children on cartons. Actually, despite how powerful the images were, they were ineffective, serving only to give children nightmares, according to some pediatricians, and the concept was phased out in the late 1980s.

Davis credits the Internet for the sharp decline of missing child and youth reports, down almost 20 per cent from 50,000 five years ago. "It's harder and harder in this world for a person to hide because of social media."

The geo-location functions of smart devices will only enhance the public's ability to help find missing persons. GPS tracking devices are already used by some parents, probation officers and caretakers of people with cognitive disorders such as autism and Alzheimer's. Project Lifesaver International, a 16-year-old Virginia-based search-and-rescue organization that equips "at-risk" individuals with electronic wristbands, has rescued 3,000

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Omar Mouallem (@omar\_aok) is a National Magazine Award winner whose writing has appeared in *Wired* and *The Walrus*. Mouallem wrote about Ross Thurston, the 2014 3M Environmental Innovation Award winner, in Canadian Geographic's April 2015 issue.

clients, averaging 30 minutes per client. However, company spokesperson Elizabeth Kappes says geo-locating isn't perfect, and they rely more on radio-transmitters to find clients. "I am sure we all can relate to using a GPS while travelling and hitting a 'dead zone.' This is still the case with GPS locators."

But used together, O'Brien says the society's search programs rob abductors of the two things most important to them. "You're not going to have time, you're not going to have anonymity." He adds, "You don't know if when you're on the bus, or the train, or in the airport, or in your car at the intersection — the people around you are going to have this real-time information on their phones."

**THAT'S WHAT WAS GOING** through the mind of the 31-year-old man who lured the teenage Calgary girl from home. According to post-arrest interviews, the pair's efforts to fly under the radar were foiled by people who had recognized them from traditional and new media. Even those who said nothing seemed to be looking on with suspicion and vague familiarity. He became paranoid, fearing that even a cab driver was an undercover officer.

"They couldn't go anywhere, they couldn't talk to anyone," says O'Brien. "That forced him to come back to Calgary, where

he thought his friends were and where he felt safer. What he didn't know was his friends didn't approve of him abusing a 14-year-old." Police finally got the tip they needed to make an arrest and safely return the girl home about 10 days after activating the society's search programs.

Last October, the suspect was charged with three criminal offences, including sexual interference with a child and sexual assault. The case is still before the courts (his name has been withheld here to protect the victim's identity).

In April 2014, the society's search programs received official endorsement from the Canadian Association of Chiefs of Police, who encouraged all the country's police forces to work with the society and embrace its tools. Since then, Facebook Canada has also started sending Amber Alerts, the highest-level notices, directly to the news feeds of users in suspected search areas. The society's programs are expected to spread beyond Canada too, since Pick attended an invite-only conference at the European Parliament in Brussels last October to share her organization's innovative practices with state representatives.

Meanwhile, at the Missing Children Society's headquarters, the financial books are looking better. The bookshelf of posters, however, hasn't budged, despite not having new additions in years. Says Pick, "We've left it there as a reminder of where we started."



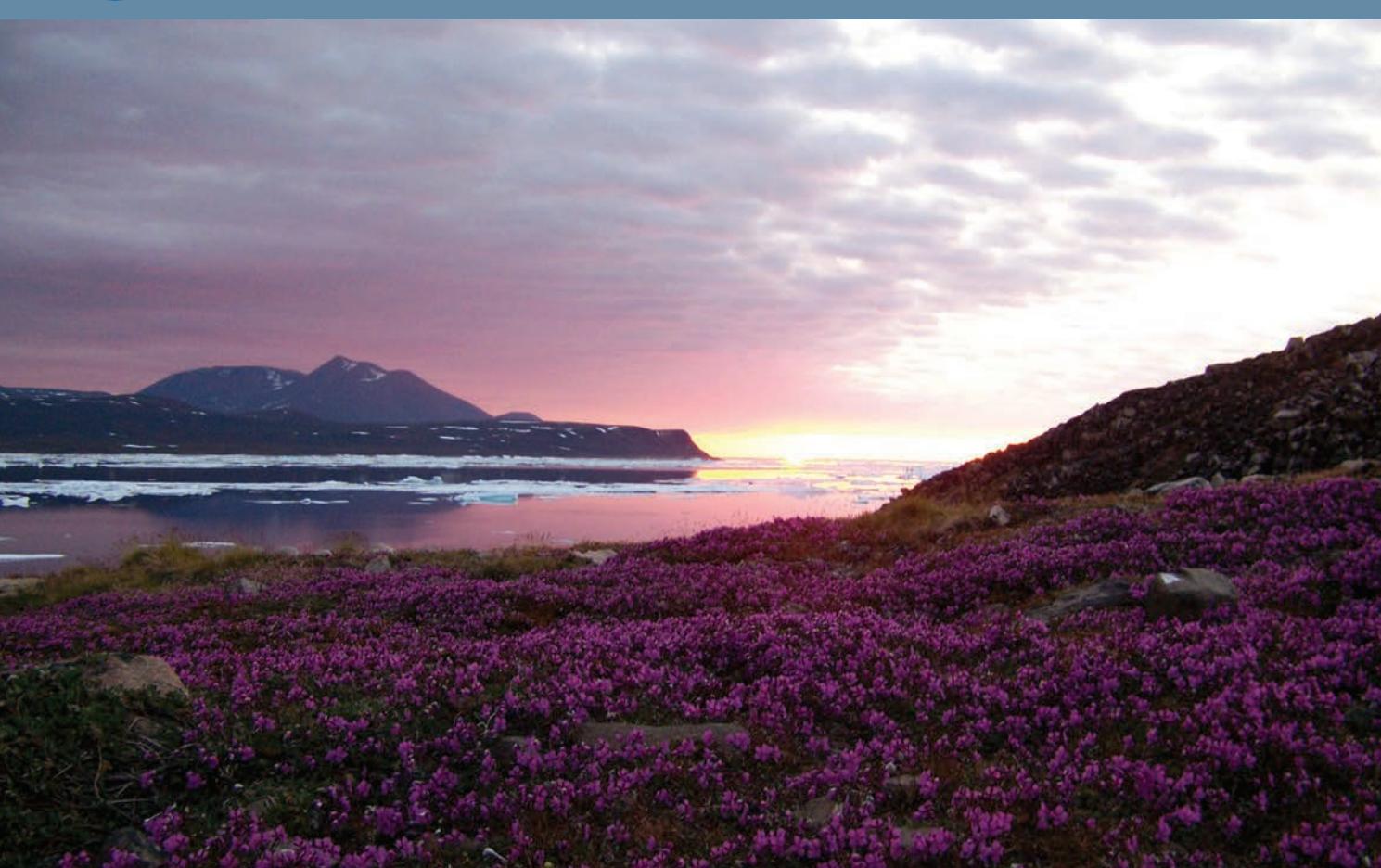
Get a glimpse of what Omar Mouallem learned while researching and writing this story by reading his tweets at [mag.cangeo.ca/ja15/missing](http://mag.cangeo.ca/ja15/missing).



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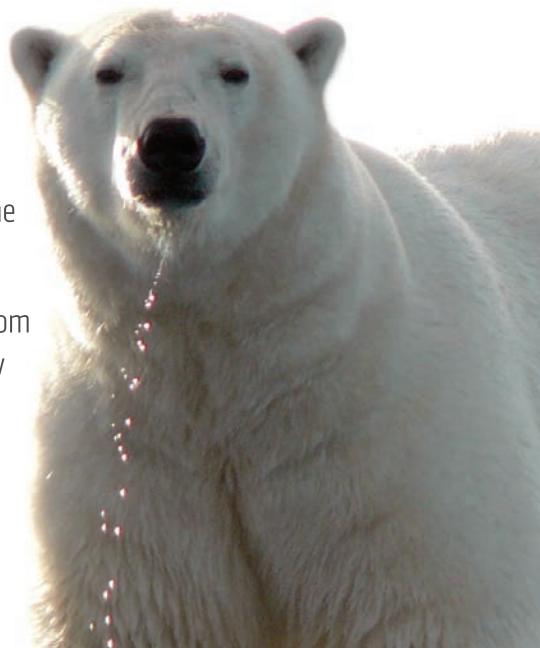
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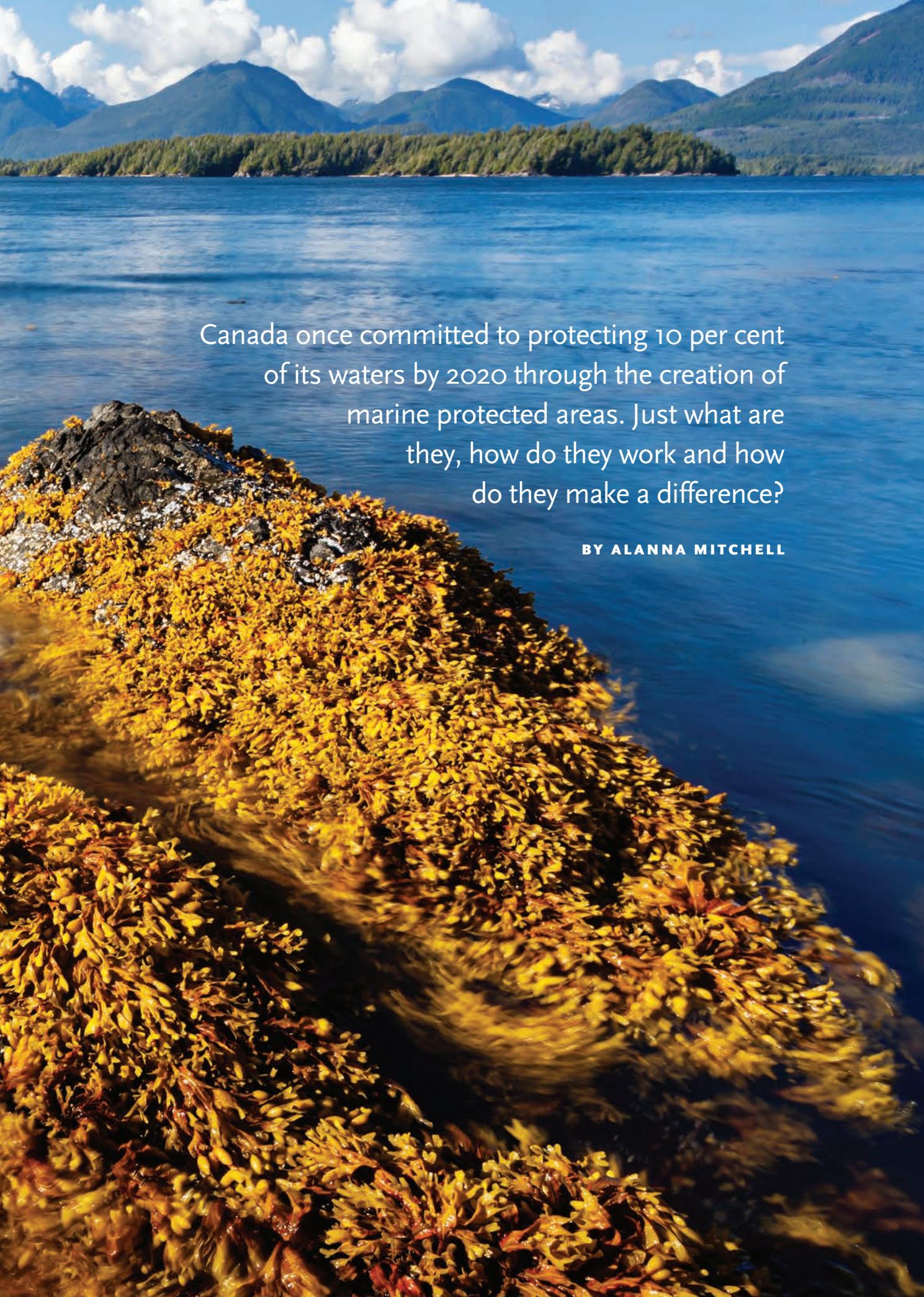
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# UNDER PRESSURE

Kelp sways in the tidal current around Dodd Island, one of the Broken Group Islands, in Vancouver Island's Barkley Sound.



Canada once committed to protecting 10 per cent of its waters by 2020 through the creation of marine protected areas. Just what are they, how do they work and how do they make a difference?

BY ALANNA MITCHELL

**I**t was the sea slugs deep off the cold coast of British Columbia that got Isabelle Côté so exhilarated. Côté, a professor of marine ecology at Simon Fraser University, loved diving among the vibrant coral reefs in the tropical waters in the Caribbean. But once she discovered what lives under the water off Canada's West Coast in the middle of the winter, she found a new passion. Gorgeous, huge sea slugs. Masses of them. Kelp groves so vast it was like being in an underwater rainforest. Sea stars a metre across with dozens of arms.

"There is nowhere better to dive," she says. "It's breathtaking."

She wishes she could take the whole House of Commons to dive there to see Canada's underwater riches. That's because Côté is one of the world's experts on marine protected areas, and while Canada has pledged to establish more of these areas to protect life under the water and even has an official strategy to make that happen, so far, it hasn't made much progress.

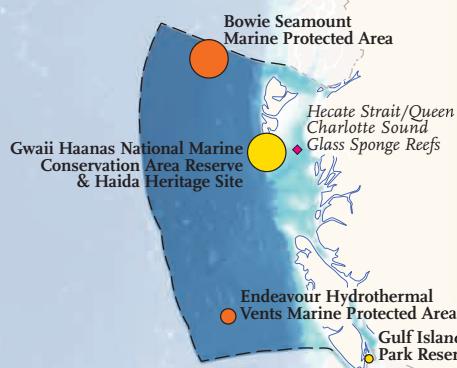
"In Canada, it's a slow, slow process," says Paul Snelgrove, a professor of ocean science at Memorial University in St. John's and the director of the Canadian Healthy Oceans Network, which is funded by the Natural Sciences and Engineering Research Council of Canada and Fisheries and Oceans Canada. "We are underperforming."

Canada's ocean real estate that is under strict protection (no-take areas) is less than a tenth of a per cent, says Côté, and that means Canada lags far behind other countries with similar wealth and oceanfront. Australia, the poster child for a large country protecting its coral reefs, has earmarked about a third of its waters as protected.

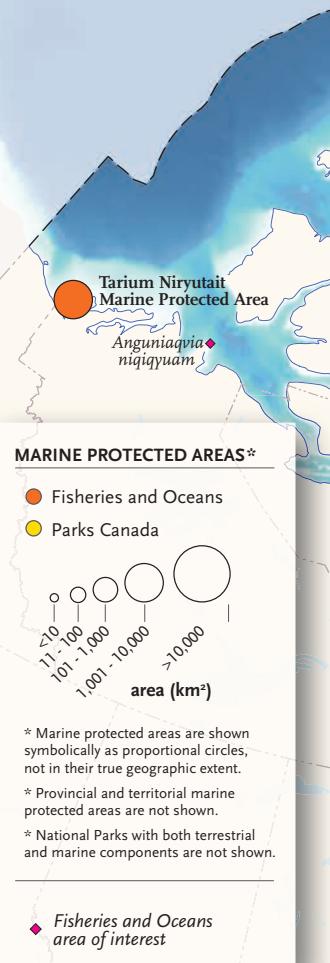
One measure of the consequences of that lack of protection is that marine creatures have begun showing up on Canada's endangered species list, including many whales, the northern abalone of the Pacific, the Pacific populations of the basking shark, the Atlantic salmon of the inner Bay of Fundy and the white shark of the Atlantic, notes Côté.

Canada's performance stands in sharp contrast to its pledge to protect 10 per cent of its oceans by 2020. It made that commitment in 1992, becoming the first industrialized country to sign the Convention on Biological Diversity. Today, Fisheries and Oceans Canada says it has no specific target for a national network of marine protected areas. But the department also says it is busy identifying future protected areas and laying the foundation for a network of them, a process it says is time-consuming because it relies so heavily on consultation. It says the lengthy process ensures that once the area is established, it will be properly maintained.

**PART OF THE HOLDUP** is the complex Canadian system of decision-making when it comes to the marine world, explains Natalie Ban, an assistant professor in the School of Environmental Studies at the University of Victoria and another expert in marine protected areas. The federal government has jurisdiction over what happens in the water — including fishing — while the province determines the fate of the seabed in inland seas. First Nations and Inuit are also part of the process.

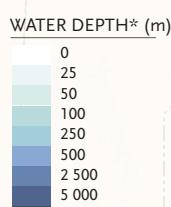


All three groups — and often local government, too — need to be involved for an effective marine protected area to be established. So, for example, this past April, the B.C. government and 18 First Nations published a blueprint for how to use and protect the waters of the north Pacific coast, a program known as a marine planning partnership. A list of the precise steps needed



MANY SCIENTISTS SAY  
what they consider to be an effective  
reserve rests in the definition of a  
marine protected area, which can be  
nearly as wide as the ocean itself.

## CANADA'S NATIONAL MARINE PROTECTED AREAS



\* Colours apply only to Canadian waters.

Lake Superior National Marine Conservation Area

Fathom Five National Marine Park

Saguenay-St. Lawrence Marine Park

Musquash Estuary Marine Protected Area

Gilbert Bay Marine Protected Area

Eastport Marine Protected Areas

American Bank

Shediac Valley

St. Lawrence East

Basin Head Marine Protected Area

The Gully Marine Protected Area

St. Ann's Bank

Laurentian Channel



Marine protected areas can help safeguard creatures such as purple sea stars, which can be found in locations both remote and urban, including on a West Vancouver beach (OPPOSITE), and the Steller's sea lions that call Gwaii Haanas National Park home (BELOW).



to implement those plans is expected sometime late this summer or fall. But the federal government did not take part in drafting the plans, and that means the plan cannot enforce changes to fishing rules even though First Nations and the province want it to, says Ban.

Even more confusingly, provinces and territories can establish marine preserves or marine portions of land parks, some of which offer fishing bans if they control boat traffic, says Côté, pointing to Porteau Cove Provincial Park in British Columbia. In addition, three separate federal departments or agencies can establish the preserves: Fisheries and Oceans Canada, Parks Canada and Environment Canada. In the federal realm, each preserve is called by a different name.

Fisheries and Oceans calls them marine protected areas and has designated eight, with another eight proposed. One of the most spectacular of these is The Gully, a deep underwater canyon 200 kilometres off the coast of Nova Scotia, teeming with rare and, likely, some unidentified ocean life. At the heart of its immense depths,

endangered northern bottlenose whales — with their comical bulging foreheads — dive for food. Fifteen other species of whales and dolphins swim leisurely through its waters. Cold-water corals throng its slopes. Three different zones of management control

## THE GOAL IS SUPPORTING species, increasing the number of creatures, their diversity and their size.

human activity in the area, with the aim of making sure the animals and plants that live there are undisturbed.

Parks Canada calls the preserves national marine conservation areas and has established four, two of which are in the Great Lakes rather than the ocean. The most famous is Gwaii Haanas, off the coast of British Columbia. Known as the Galapagos of the North, it is renowned for its thriving populations of humpback and grey whales, which can often be glimpsed breeching the water's surface, and another 18 species of whales and dolphins. Tens of thousands of salmon, hefty blonde-haired

Steller's sea lions, charismatic tufted pufins, limpets and thousands of other creatures live in its waters and lands, which form an innovative integrated land-and-sea park.

Environment Canada has the mandate to create marine national wildlife areas, but has not yet done so.

To make matters even more complex, the federal government can also control activities in marine portions of land parks and other terrestrial preserves. While many of these offer no restrictions on human activity in their marine components, some do. Pacific Rim National Park Reserve, for example, bans mining and oil and gas exploration in the 221 square kilometres that are marine, and also bans fin fishing in about a third of that area around the Broken Group Islands.

Nevertheless, Fisheries and Oceans reports that Canada had 809 marine preserves of all kinds as of June 2011, covering one per cent of its oceans and Great Lakes. (By contrast, the federal government says it has protected 10.4 per cent of the nation's lands.)

Still, many scientists say what they consider to be an effective reserve rests in the definition of a marine protected area, which can be nearly as wide and broad as the ocean itself.

"Part of the difficulty with marine protected areas is that they are badly defined. They mean different things to different people," says Sean Brillant, a marine ecologist in Halifax who manages the national marine conservation program for the Canadian Wildlife Federation.

Even the authoritative International Union for Conservation of Nature has six categories of marine protected areas, each requiring a different level of protection, ranging from areas where human activity is limited to those open to sustainable uses, including some fishing.

It leads to bewilderment among members of the public and sometimes skepticism. What is a marine protected area, what is it for, and how effective is it?



**TO SOME**, including many scientists, a marine protected area is aimed at safeguarding, by law, a rare ocean species or living space by limiting some activities within its boundaries, and then enforcing that law. The goal is to make the living space capable of supporting the species, thereby increasing the number of creatures within it, their diversity and also their size.

While that may sound abstract, in practice, these days it is about fishing. Species on land are mainly endangered because their habitat has been destroyed or damaged by human activity. For example, the rich ecosystem of North America's grasslands prairie, with its thousands of native creatures, has been largely turned over by the plow. That's not the case in the ocean; there, species are under pressure because so many of them are killed. Protecting them means banning fishing, says Simon Fraser University's Côté.

That's just one of five keys for a successful marine protected area, she says. These criteria have been developed over decades as scientists have studied the efficacy of the areas. Along with a fishing ban, the rules of the area need to be enforced, the area needs to be established for at least a decade, it must be larger than 100 square kilometres, and it has to be isolated.

## SUCCESSFUL MARINE RESERVES function as nurseries, seeding neighbouring unprotected areas of the ocean with new life and increasing the numbers of commercially important fish.

"The fewer of those characteristics there are, the less well the protected area functions," says Côté.

If all or most of those five characteristics are present, studies show that life in the area usually becomes bigger, stronger, more productive and more diverse. Species

The crew of a research vessel looks on as two grey whales surface off the coast of Vancouver Island (ABOVE). Underwater plants, such as kelp (OPPOSITE), also stand to be preserved in marine protected areas.

that had disappeared come back, including the big predators that keep an ecosystem healthy. And the successful marine reserve

functions as a nursery, seeding neighbouring unprotected areas of the ocean with new life and increasing the numbers of commercially important fish. That's true for tropical waters as well as colder areas, according to the research.

But in Canada, the vast majority of the ocean areas dubbed protected allow commercial activity — including seismic testing, fishing and bottom-trawling — putting all economic goals ahead of conservation ones, says the Canadian Wildlife Federation's Brillant.

"It's cowboy country: anything goes," he says. "It's almost absurd. Marine protected areas can be a bit of a smokescreen."

For example, a study by the Living Oceans Society and the World Wildlife Fund found that in 2011, 148 of 197

Alanna Mitchell is an award-winning journalist and author who often writes about marine issues. Her bestselling book *Sea Sick: The Global Ocean in Crisis* is now a play.



## MARINE PROTECTED AREAS



Clockwise from LEFT: an opalescent nudibranch — a.k.a. a sea slug — clings to a mass of Taylor's Colonial Tunicates, a type of marine invertebrate; a tufted puffin; a humpback whale; and black rockfish.



Canadian marine protected areas in the Pacific Ocean (a vast number of which are provincial) had no approved management plan. The report said that federal and provincial auditors-general have noted a lack of systematic monitoring of the areas. And while the federal government controls fishing, it has not assigned staff to enforce fishery closures or other rules in many provincial protected areas, the study found. That means the marine parks are there on paper, but don't necessarily have an influence on the creatures that live there.

And while marine protected areas with the five key characteristics Côté says are essential do, in general, meet their objectives, sometimes it's hard for scientists to measure the effectiveness of a specific protected area. Ocean creatures move around, and a lot of ocean life is undocumented to begin with, says Memorial University's Snelgrove. Scientists can

often measure the sizes of animals and plants in a protected area and chronicle their growth, but they can't necessarily prove that creatures from a protected area helped populate the ocean nearby.

Still, he and other marine scientists say that even if it's not clear precisely what each area does, each offers at least some protection where none was before. "They're the only mechanism I can think of to protect against unknowns," Snelgrove says, adding that when they help protect ocean life, they can become extraordinarily popular among fishermen and local communities.

He points to Eastport, a Fisheries and Oceans marine protected area off the coast of Newfoundland, set up in 2005 after lobster fishermen noticed their catches were dwindling. Lobster fishing in parts of the area is banned. And today, the neighbouring waters boast healthy



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populations of lobster, the lobster fishery is robust again, and fishermen are keenly interested in helping enforce the ban because they can see its effects.

But Snelgrove and other scientists say overfishing is just one of the mounting threats to ocean life, and that marine protected areas are going to be needed as an insurance policy against future problems. As carbon dioxide concentrations increase in the atmosphere, ocean water is getting warmer and more acidic, phenomena Snelgrove calls a “freight train.” Establishing marine protected areas could reduce the stresses on marine creatures, possibly helping ocean ecosystems build resilience against the changing conditions to come.

Steve Fletcher, head of the marine programme at the United Nations Environment Programme who's based at the World Marine Conservation Monitoring Centre in Cambridge, England, says that in the United Kingdom the philosophy behind establishing marine protected areas has evolved to take into account wider societal benefits.

Among them: recreation, cultural needs, carbon storage and other services the ecosystem provides. Marine restoration has become a key value, and networks of protected areas — rather than isolated marine parks — have been shown to increase resilience to the threats of high carbon dioxide concentrations in the atmosphere.

Not only that, but rather than protecting a single feature or species, the new genera-

Discussions about what a marine protected area should be and how it should function involve factors such as how Canada's fisheries, including herring fishermen in Newfoundland (ABOVE), operate.

society chose a few areas where fishing is permitted? Could Canada's \$3.9-billion fishery still thrive? So she and a co-worker ran a study looking at doing just that off the

coast of B.C. They found that small reductions in fishing catches, strategically designed, could leave vast areas of the ocean untouched.

“Wouldn't it be cool to rewind the tape and just decide to do things differently?” asks Côté, who calls the study one of the most “thought-provoking” she has read. “We could open areas as we need them instead of closing them as a desperate measure.”

---

 Check out an interactive map of Canada's federally protected marine preserves and read author Alanna Mitchell's personal reflections on the state of our oceans at [mag.cangeo.ca/ja15/mpa](http://mag.cangeo.ca/ja15/mpa).

## FISHING IS JUST ONE OF THE mounting threats to ocean life. Marine protected areas are going to be needed.

tion of marine protected areas is meant to preserve the system that supports the health of an area. And rather than looking just at the threats of today, European scientists are considering evaluating the effects of establishing pre-emptive marine protected areas to figure out where life might need to be protected in the future.

Ban, from the University of Victoria, can't help dreaming of a whole different system. What if, instead of closing small areas to fishing as an antidote to crisis,

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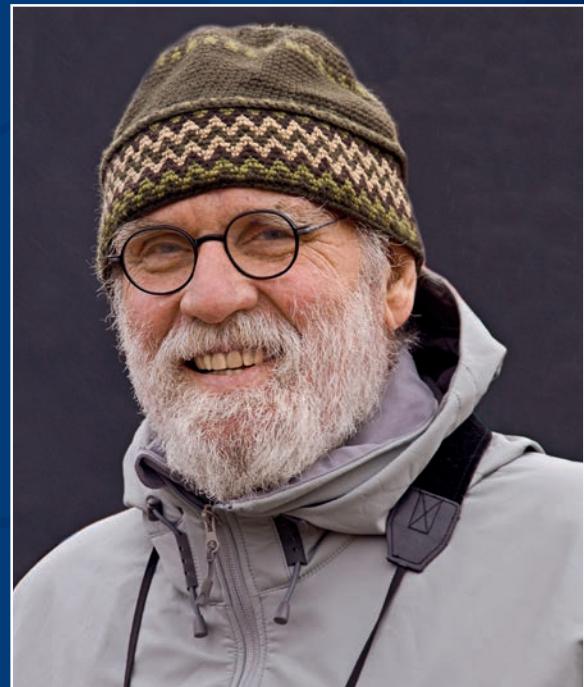
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## The National Bird Project

This essay is the latest in a series in support of specific species for *Canadian Geographic's* National Bird Project — a campaign to have Canada recognize an official national avian emblem. Vote and submit your own essay at [nationalbird.cangeo.ca](http://nationalbird.cangeo.ca).



# Snowy owl

## Fierce, beautiful and tough

By Candace Savage

THERE IS ONLY ONE BIRD that speaks to our relationship with the 9,984,670 square kilometres of sea-to-sea-to-sea that we call Canada. Not for us a lily-livered migrant that flies south at the first hint of frost. So forget the loon and our eponymous goose: we're looking for tougher stuff. And you can strike off the other candidates, too, whatever their merits may be. Not one of them can match the snowy owl for pairing cold-weather competence with heart-stopping beauty. If you've ever tried to look glamorous in a balaclava, you'll know that isn't easy.

Just as Canada is the largest country on the continent, so the *uppik* — to honour the bird with its Inuktitut name — is the largest of North American owls by weight. As with raptors in general, female snowies are bigger than males; a really large female, cradled in your arms, would have about the same heft as a typical newborn infant, though the fierce yellow eyes staring back at you would no doubt be disconcerting. And just as we Canadians serenade our land as "the true North

strong and free," so snowy owls could, if they were so inclined, brag about their stature as a circumpolar species. Their nesting grounds span the High Arctic world from Scandinavia to Siberia and from Alaska clear across to Greenland. Yet despite this encircling distribution, snowy owls are specifically and vitally connected to the coastlines and islands of the Canadian North, which provide sustenance for at least half of the global population at some time every year.

Like most Canadians, I only get to see snowy owls in winters when, for reasons of their own, they grace us with their presence "down south." Big, bold and unmistakable, they connect us with the grandeur and mystery of this land we dare to call our own.

---

Candace Savage ([candacesavage.ca](http://candacesavage.ca)) lives and writes in Saskatoon. The 10th-anniversary edition of her book *Crows: Encounters With the Wise Guys of the Avian World* came out in the spring.

---



Conservationists from the Canadian Museum of History restored the canoe (ABOVE) right down to its birchbark bumpers (OPPOSITE TOP) in 2007.



Despite being restored  
nearly a decade ago,  
one of the nation's oldest  
birchbark canoes can't  
be seen by the public.

The sad and  
frustrating tale of

# Grandfather canoe

BY JAMES RAFFAN

T

IN A BACK HALLWAY near the shipping dock of the Beaverbrook Art Gallery in Fredericton sits a crate containing one of Canada's true canoe treasures. Built somewhere in New Brunswick during the 1820s, the 6.46-metre vessel was taken to Ireland during the same decade by a British soldier. There, in the damp Irish air, it quietly aged for a century and a half, first in a private castle and then at the National University of Ireland in Galway. In 2007, the university sent the canoe back to Canada to have it restored, and that's when the trouble began — discord that has resulted in one of the world's oldest birchbark canoes being boxed up for five years, out of sight, out of mind and out of public view.

How did it come to this?



"WHAT WE DO KNOW," explains Stephen Augustine, who was the curator of eastern Maritimes ethnology at the Museum of Civilization (now History) in Gatineau, Que., in 2007 when the canoe arrived there to be restored, "is that based on the research by Kathryn Moore [an Irish academic who got curious about the Canadian canoe's origins] the canoe was likely given to Stepney St. George, a British officer stationed in Fredericton, possibly by Howard Douglas, the then lieutenant governor of New Brunswick, for his role in helping to resettle survivors of the catastrophic 1825 Miramichi fire." It's believed that St.

George took the souvenir home to his estate in Ireland and, when he died, the canoe was passed on to NUI in Galway. "But where the canoe was actually built, where it came from in New Brunswick and under what circumstances it was acquired by the lieutenant governor can only be determined by further research," says Augustine, "and we may never know the answer."

Augustine notes that the canoe boasts the shape of those constructed by the Maliseet of New Brunswick, but says there



are other characteristics that make him think it might have been more of a ceremonial canoe, made for and/or with the help or influence of Europeans mixed in with indigenous builders. Clues include its unusual length, its thicker-than-usual ribs, the use of square brass nails, evidence of green paint on the gunwales and thwarts, the lack of detail in the headboard and the presence of four diamond-shaped birchbark bumpers hanging from the gunwales, decorated with an English rose, a Scottish thistle, an Irish shamrock and a Maliseet fiddlehead.

"There was a lumber company in the Tobique River area at that time," he says, "that contracted the making of a couple of dozen canoes like this, and maybe this is one of them. But I really have no hard evidence to say that it came from the Maliseet people from the [area of the modern-day] St. Mary's First Nation." Other birchbark canoe experts, such as Rick Nash from Dorset, Ont.,

concur: all signs point to it being an example of a Maliseet canoe of indeterminate origin.

We may never know  
the answers to where the canoe  
was actually built, where it came  
from in New Brunswick.



THAT VERDICT does not sit well with Kim and Wayne Brooks and Chief Candice Paul of St. Mary's First Nation. The Brookses have been

involved in a renaissance of bark canoe building traditions in the community on the Saint John River since 1999, and they took particular interest in this canoe when they saw stories of its return to Canada and subsequent restoration at the museum in Gatineau. Through Maliseet historian Andrea Bear Nicholas, the people of St. Mary's First Nation argued that the museum, in accepting the loan of the canoe from the university in Ireland, had taken a proprietary interest in an artifact that oral history passed





Stephen Augustine (ABOVE, left) and Paul Lauzon unwrap the 6.46-metre canoe (BELOW), which came back from Ireland complete with a wood plate (OPPOSITE TOP), at the Canadian Museum of History.

down through the generations said rightfully belonged to them. With that perspective publicly articulated, the museum temporarily suspended its conservation work.

The work resumed when the parties agreed that the best thing for the canoe was to complete its restoration. When it was finished, the museum began looking for ways to address the issues raised by the Maliseet of St. Mary's. Looking back, Augustine, now principal at Unama'ki College at Cape Breton University, says "When people were saying we had appropriated this canoe from the First Nation, the Maliseets, this was a departure from the good relationships the museum had built with many other First Nations." And so the museum quickly sought a resolution.

With the restoration complete (for which the museum won an award for outstanding achievement in conservation from the Canadian Museums Association), the canoe was shipped to the New Brunswick Museum in Saint John in 2008 for public exhibit. By now, the Brookses and other Maliseet of St. Mary's First Nation had taken a proprietary interest of their own in the canoe and were calling it "Grandfather Akwiten." In a welcoming ceremony in Saint John, Wayne used a cedar switch and water from the Wolastoq — as the Saint John River is known in the Maliseet language. While an elder told a story about the canoe, something else happened. The canoe's conservator had used delicate conservation-grade paper made from Japanese mulberry bark and water-soluble glue made of fish bones under the ribs and planking inside the canoe to repair splits in the bark. Water from the blessing dissolved the glue, reversing some of the hard-won conservation measures to restore the canoe and necessitating further restoration work to repair the damage.



AS AN ACT of creative stewardship and appreciation for this iconic canoe, the Brookses took advantage of a relationship they had forged in 1999 with master canoe builder Steve Cayard from Wellington, Maine. With an \$18,000 grant from the Aboriginal People's Collaborative Exchange, sponsored by the Canada Council, they built a full-size recreation of the original canoe.

## GRANDFATHER CANOE



Clockwise from ABOVE: Wayne Brooks (in blue) works on a recreation of the original canoe; a handmade knife used in the construction of the new vessel; another view of Grandfather Canoe, which remains in storage at the Beaverbrook Art Gallery in Fredericton.

The result of that building project, which happened in the Brookses' garage on Maliseet Drive in St. Mary's First Nation in the summer of 2009, was a gorgeous contemporary echo of the original canoe. They called the recreation "Grandmother," and amid great fanfare on the Wolastoq the following summer, Wayne, wearing an ingeniously crafted top hat made of birch-bark, said: "We built this canoe because we have a passion and love for our culture and the teachings that are passed down. We want the general public to know that we're still here today, and we ain't going anywhere."

With sons Cody, Desmond and Patrick, and with the support of Chief Paul and the St. Mary's First Nation, Kim and Wayne set up the Wolastokwiyk Nawicowok: the Sacred Land Trust, a charitable organization to support their cultural renewal work with canoes and other traditional practices. Through this group they hope to one day

**By now, the Brookses and other Maliseet of St. Mary's First Nation had taken a proprietary interest of their own in the canoe and were calling it 'Grandfather Akwiten.'**

build a cultural centre that will meet the standards of storage and care necessary to accept custodianship for "Grandfather Akwiten." But that, unfortunately, is still a long way off.

After its stint at the New Brunswick Museum in Saint John, the old canoe went to an aboriginal art exhibit at the Beaverbrook

Art Gallery in Fredericton in 2009. The following year, both the Grandfather and Grandmother canoes were exhibited together at the Beaverbrook, after which the recreation went back to the Brookses' garage and the original was crated and set in the shipping dock at the gallery for safekeeping. It has been there ever since.

"The problem is that we have lost track of who owns this canoe," says Terry Graff, Beaverbrook's CEO and chief curator. "The canoe is safe in our institution where it will stay until other arrangements can be made — we want to help and ensure its safety. But space here is at a premium. The canoe is taking up storage area that could be used for other exhibits."

When the restored canoe was exhibited in Ottawa, Saint John and Fredericton between 2007 and 2009, various visitors from Ireland came to see it. Prompted by appeals from Chief Paul, the

*James Raffan is the director of development at the Canadian Canoe Museum in Peterborough, Ont., and the author of Circling the Midnight Sun: Culture and Change in the Invisible Arctic.*

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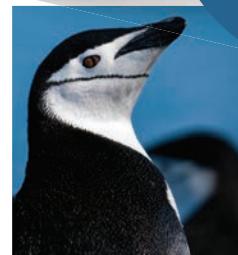
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ABOVE, left to right: Wayne Brooks, Graydon Nicholas (the then-lieutenant-governor of New Brunswick), Chief Candice Paul and Patrick Brooks in the replica canoe on the Saint John River in 2009.

Brookses and others to repatriate the canoe to the St. Mary's First Nation, one of those visitors, Michael D. Higgins, a representative of the Irish parliament (who later became Ireland's president) and others from the NUI in Galway have stated publicly that, in principle, they would like to see the canoe returned to the Maliseet.

"Unfortunately," says Kathryn Moore, the academic who first started digging into the canoe's history soon after she was hired at NUI in Galway in 1999, "it was not within their power to grant that repatriation." In order to travel, the canoe was registered with the National Museum of Ireland in Dublin, so it's a protected

In order to travel, the canoe was registered with the National Museum of Ireland, so it's a protected artifact of the Irish nation.

artifact of the Irish nation. "When I set up the original agreement with the Canadian Museum of Civilization," continues Moore, "I had to get permission from the Irish government and, because of the national cultural designation, I had to secure an export permit from the European Union." If the canoe is to be repatriated, she adds, there is a process for doing that starting with the National Museum of Ireland, after which an independent body would be set up to investigate. Until then, the canoe is still technically on loan to the museum.

"As far as I know, all they said they wanted was proper accommodations, a controlled environment, for Grandfather Akwiten," says Kim Brooks. "We don't have those kinds of facilities in any of our communities. And it's about time we started to change that. It's about time our children had access to their own history. Our history is in museums and everywhere else, often packed away in some storage room."

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Read about the Canadian Canoe Museum's summer exhibition on paddling and romance at [mag.cangeo.ca/ja15/canoe](http://mag.cangeo.ca/ja15/canoe).

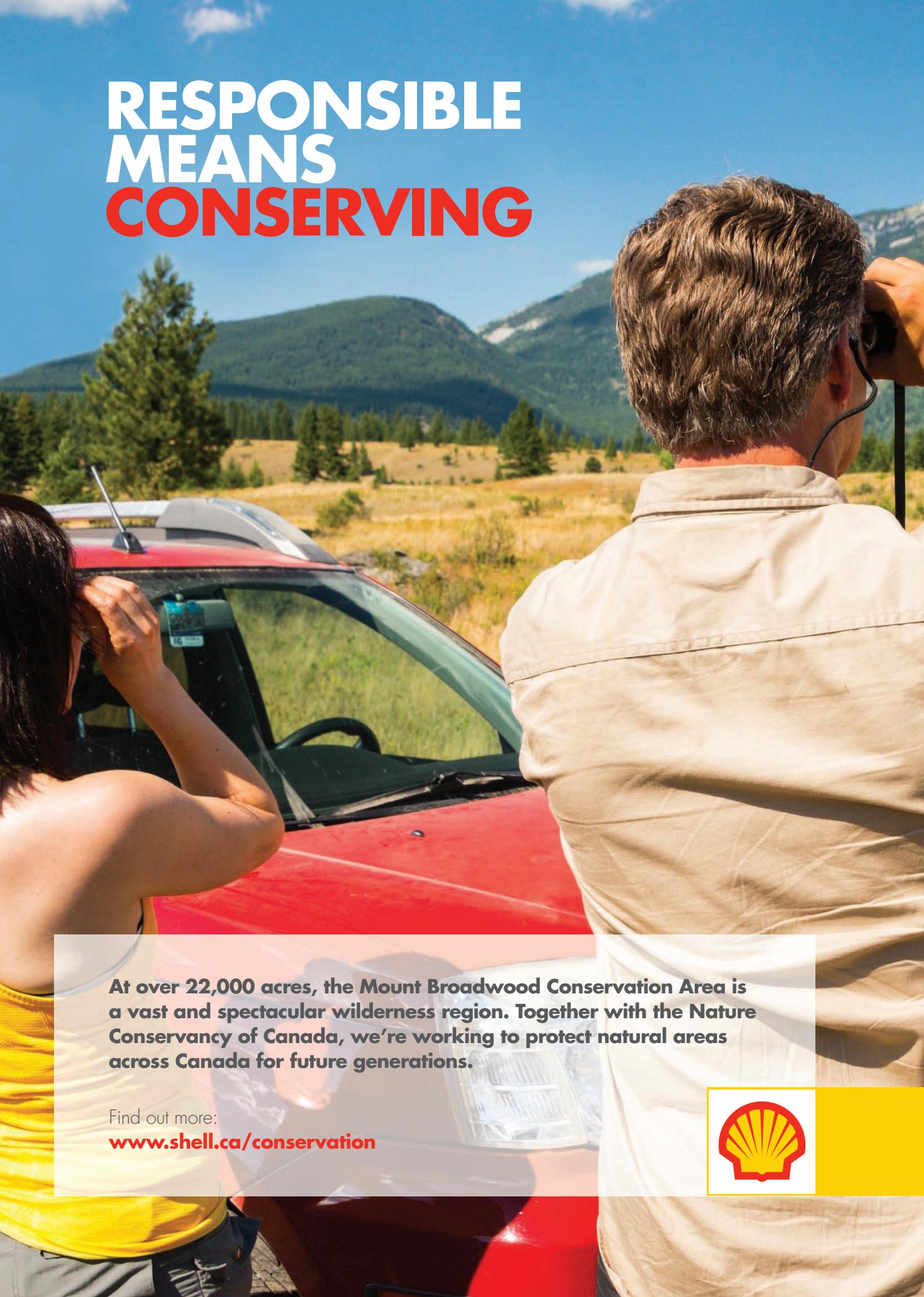
## Canoe conservation

The trouble with birchbark canoes, at least from a conservation perspective, is that they were originally built as disposable transportation devices — you could always build another one. And if you're a critter from the forest floor, they're good to eat. That's why the first step the restoration team at what is now the Museum of History took in their work on the "Grandfather" canoe in 2007 was to freeze it to kill any mould or parasites that might be lingering in its cracks and crevices. From there, they worked methodically to clean the many surfaces of the boat, occasionally injecting ethanol with polyvinyl butyral into holes and rotted areas to clean and stabilize the wood. The canoe was then taken apart to repair broken pieces — cracked bark, for instance, was fixed with conservation-grade paper made from Japanese mulberry bark and water-soluble glue made of fish bones — and painstakingly put back together again. (Because of building details revealed by the degradation of artifacts, some very old birchbark canoes are simply stabilized to preserve all clues of their making rather than being restored.) The entire process is time-consuming and delicate, but an important part of maintaining canoe history.



The Enys canoe dates to the late 1700s and was partially restored before being returned to Canada from England in 2012.

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## TRENDING

The buzz from CanGeo's social media sites

In the June 2015 issue, *Canadian Geographic* named 100 of Canada's top modern-day explorers with the help of Fellows of The Royal Canadian Geographical Society. Here's a selection of feedback the list received on social media. For more information, visit [canadiangeographic.ca/canadian-explorers](http://canadiangeographic.ca/canadian-explorers).

Is "explorer" an extinct vocation these days? Not at all. I used to think I'd been born too late, that I'd missed the golden era of exploration, but that's impossible on a planet that grows more vast and mysterious the more we learn about it — and ourselves. What a delight to be included in this list of trailblazers.

—Kate Harris

Congrats to three of our own researchers on this list! Stewart Peck, Natalie Rybczynski and Kathleen Conlan!

—@cu\_research (Carleton Research)

Epic. Good friend & colleague @TornadoGreg named one of "Canada's Top 100 Explorers" by @CanGeo. #CMTTornadoHunters

—@ForbesRicky

Congrats @adamkreek @markuspukonen — two of Canada's greatest explorers! Thanks for helping @CWF\_FCF save our oceans.

—@HeatherRobison

I made the list! Jumping for joy :-) @CanGeo named 100 Canada's #TopExplorers

—@taloeffler

Thank you @CanGeo for the unexpected shout-out. Humbling and inspiring group to find myself included amidst.

—@bruce\_kirkby



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- The deadline is September 7, 2015.
- The correct answer will appear in the October 2015 issue.

\* Five winners will be randomly selected from all correct responses.

*Canadian Geographic* and the Canadian Heritage Information Network have partnered to showcase important artifacts from Canadian history and geography. Each object comes from one of the museums in CHIN's national network.

### LAST ISSUE'S OBJECT: Narwhal skull

Two tusks protrude from this narwhal skull, an uncommon occurrence in the Arctic whale species. The narwhal's spiralled tusk — which for centuries gave rise to stories about unicorns and inspired Inuit legends of magic and power — is actually an elongated tooth that pierces the male's lip, growing to about 2½ metres. Scientists now believe the appendage evolved as a sexually selected ornament for males or as a sensory organ. Life is rapidly changing for narwhals in a warming Arctic. Occasionally predated by polar bears, they now have to worry about another apex predator making its way through the melting ice: the killer whale.



With files from Parks Canada. Learn more about the natural and cultural history of Ukkusiksak National Park by visiting [pc.gc.ca](http://pc.gc.ca).



Explore more stories from Canada's past through [cangeo.ca/whatsthis](http://cangeo.ca/whatsthis).

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# WHERE'S THIS?

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1. Nicknamed the “Tea Caddy Castle” and rented by a prominent Canadian politician in the 1840s.



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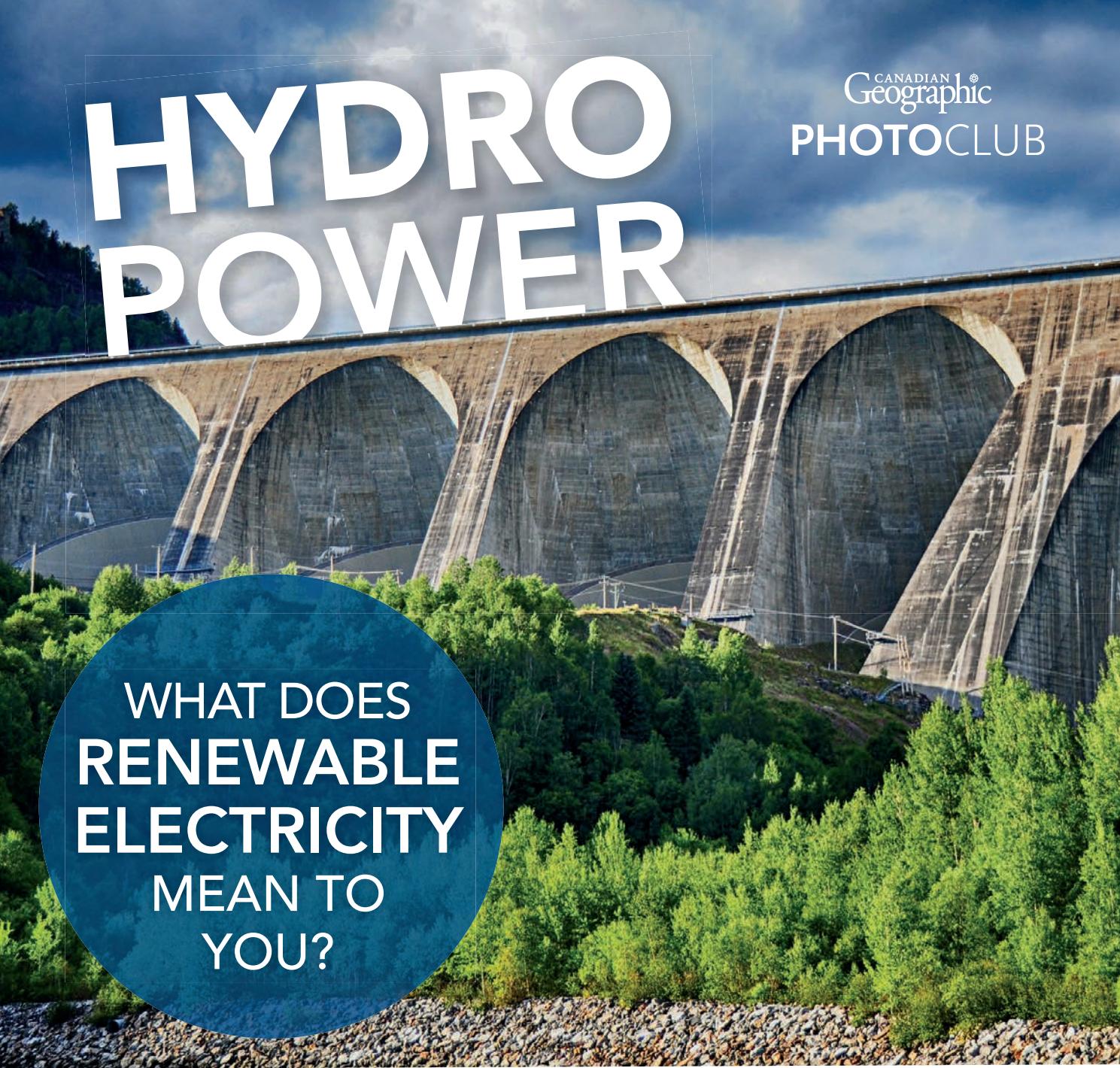


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# YOUR SOCIETY



NEWS FROM THE ROYAL CANADIAN GEOGRAPHICAL SOCIETY



## CALGARY STUDENT WINS CANADIAN GEOGRAPHIC CHALLENGE

**C**anada's 2015 geography champion was crowned on May 4. Anzo Nguyen, a Grade 10 student from Calgary, won the Canadian Geographic Challenge, a nationwide competition that saw students test their geographic knowledge of Canada and the world. Twenty finalists gathered in Ottawa for the National Championship, which was attended by *Jeopardy!* host Alex Trebek.

The reception hall at the Canadian Museum of Nature was packed for the finals, but the audience watched silently as the five remaining contestants answered questions on everything from community demographics to remote sensing to roadside attractions.

As the eighth and final round came to a close, Nguyen decided to answer the last question ("What is the longest river in Europe?") with a joke. Instead of writing down the correct answer, "Volga River," the Henry Wise Wood High School student jotted down, "Hey Canada, I won!" Second-place winner Aaron Abraham also hailed from Calgary, while Malhaar Moharir of Toronto took third place.

"It's very important to be curious about life and to want to learn," Trebek said after presenting Nguyen with the \$5,000 cheque for first place. "It's my honour to



The finalists of the Canadian Geographic Challenge pose with Alex Trebek (LEFT). Anzo Nguyen (far right) won the competition, answering the final question with a bit of comedic flair (ABOVE).

be at occasions like this, and it touches me greatly." After the event, Trebek was awarded the RCGS's Lawrence J. Burpee Medal in recognition of his outstanding contributions to the Society's mission of making Canada better known and to the general advancement of geography.

"The Canadian Geographic Challenge is now in its 20th year and has helped countless students get a window on the world through geography," said John Geiger, CEO of The Royal Canadian Geographical Society. "Geography can be your guide, your compass, your inspiration."

—Sabrina Doyle



## EREBUS MEDAL

The crew from Canadian Coast Guard icebreaker *Sir Wilfrid Laurier* (LEFT) received The Royal Canadian Geographical Society's Erebus Medal in a ceremony in Sidney, B.C., in March. The medal, a special one-time honour, has gone to representatives from all organizations that participated in the 2014 Victoria Strait Expedition.

In April, RCGS CEO John Geiger also presented the medal to Leona Aglukkaq, minister of the environment, citing her part in the organization and execution of the expedition.

—Carys Mills



## THE ROYAL CANADIAN GEOGRAPHICAL SOCIETY

Founded in 1929, the Society is a non-profit educational organization. Its object is to advance geographical knowledge and, in particular, to stimulate awareness of the significance of geography in Canada's development, well-being and culture.

Primary fields of interest include our people, resources, environment, heritage and the evolution of our country. In short, the aim is to make Canada better known to Canadians and to the world. *Canadian Geographic*, the Society's magazine, is dedicated to reporting on all aspects of Canada's geography — physical, biological, historical, cultural and economic — and on major issues of concern to Canada in which geographical dimensions play a significant role.

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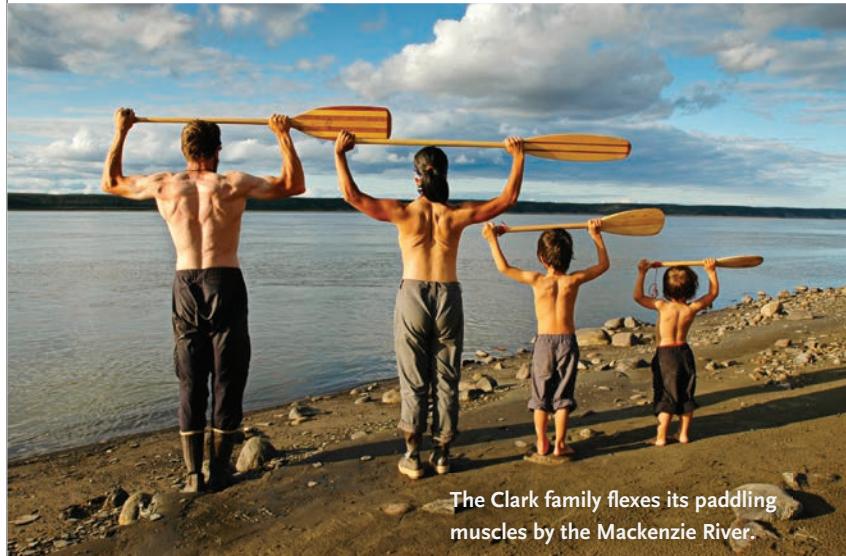
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YOUR SOCIETY | EXPEDITIONS & FELLOWS

## 2015 RCGS EXPEDITIONS



The Clark family flexes its paddling muscles by the Mackenzie River.

**F**ive Royal Canadian Geographical Society-funded expeditions will cross much of the country by foot and paddle this year. These explorers are testing themselves on little-known stretches of tundra, tracing nation-linking waterways, reaching the end of the world's longest trail and showcasing and preserving a First Nation's heritage.

**Les chemins de l'or bleu** Six paddlers will canoe and camp along rivers and lakes linking Montreal and Inuvik, N.W.T., a distance of 7,000 kilometres. From late April to October 2015, their journey will follow traditional First Nations routes, as well as the course of several of the early European explorers.

**Paddling Home** With their five-year-old son, Mali, in tow, Benoit Gendreau-Berthiaume and Magali Moffatt will canoe 5,000 kilometres between Edmonton and Montreal from early May to late August 2015, educating the public about waterways, watersheds and ecosystems along the way.

**Together to the Tundra** The Clark family — Dan, Alice, eight-year-old Koby and six-year-old Ava Fei — will paddle a 1,050-kilometre circuit from the boreal

forest around Yellowknife, into the tundra and through the proposed Thaidene Nene National Park in an effort to better understand the tundra biome's richness and diversity.

**Tahltan Leadership Expedition** Last year, this eight-person team, which included members of the Tahltan First Nation, completed a 12-day hike over northern British Columbia's Spectrum Mountain range and Mount Edziza to physically connect with the land. The group then completed a documentary, *Colours of Edziza*, and is now promoting the film.

**The Great Hike** Dana Meise's Great Hike was the 2014 RCGS Expedition of the Year, and now he's back to complete the final leg of his eight-year journey to trek the entirety of the Trans Canada Trail. Starting July 1, Meise will travel 1,700 kilometres from Whitehorse to Inuvik, N.W.T., reaching a grand total of almost 22,000 kilometres and touching the last of Canada's three oceans.

—Nick Walker and Michela Rosano



For more on the 2015 RCGS expeditions, go to [rcgs.org/programs/expeditions](http://rcgs.org/programs/expeditions).

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Gavin Fitch, an RCGS vice-president, approaches Bow Summit during a back-country skiing trip in Banff National Park.

### On what he's doing for the RCGS

I'm very supportive of the vision to make the Society truly national, and I want to help raise its profile in Western Canada. I don't want people to see it as a once-a-year deal, where you come to the annual meeting and dinner, as great as those events are. The West is a natural growth area for the Society, and I want us to have more functions and events out here, so people can see the Society as part of their day-to-day lives when they look at their calendar.

—Harry Wilson

### COMPASS ROSE CLUB



#### WHY I DONATE

My father was raised in an orphanage, I grew up living over a corner store in Kingston, and with some hard work and good luck I now have funds I can contribute. The RCGS is top of my list because Canadian geography is so interesting and the void of understanding is so great. Do you know that if you flew from Toronto to Resolute, Nunavut, then turned around and went the same distance south from Toronto, you would be in Venezuela? Canada is really big. I am dedicated to doing anything I can to get the word out about Canadian geography.

Allen B. Clarke  
Toronto

## FEATURED FELLOW: GAVIN FITCH

**G**avin Fitch, 53, is a Calgary-based lawyer and one of The Royal Canadian Geographical Society's two vice-presidents. He talks about being a longtime fan of *Canadian Geographic*, taking an epic family road trip and raising the Society's profile in Western Canada.

### On his relationship with *Canadian Geographic* and the RCGS

I've been a subscriber since my 20s. I was drawn to it because I'm one of those map geeks. On my office wall, I've got a great 1875 map that shows part of what was then called the North West Territory, which included everything west of Ontario except for Manitoba, which at the time was a little box on the 49th parallel. So when I became a Fellow in 2009, I was honoured. I then joined the board of governors in 2010, and became a vice-president in 2011. It's all been great, and I enjoy working with the Society very much.

### On the stories that appeal to him most

Exploration and adventure is something I've always loved, so I'm interested in tales of explorers and adventurers. I think they appeal to the enduring kid in me.

### On who spurred his interest in exploration and adventure

My parents. In the late 1970s, they trekked into Everest base camp and climbed Mount Kenya, Mount Kilimanjaro and Mount Aconcagua, the highest mountain in the Western Hemisphere. When I was 11, we went on one of those epic driving holidays no one seems to do any more. We drove from Edmonton to Prince Rupert, B.C., got on the ferry and went up the Inside Passage to Skagway, Alaska, hiked the Chilkoot Trail for four days, then picked up the car, which my dad had put on the train, drove to Whitehorse, Kluane National Park, Dawson and, finally, finished by rafting down the Nahanni River for 10 days.

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# next issue

OCTOBER 2015



Canadian Geographic tests  
your geography smarts



This October, *Canadian Geographic* puts your knowledge of the Arctic, from vistas in Nunavut's Auyittuq National Park (TOP) to icebergs in Baffin Bay (ABOVE), to the test.

What is the official latitude of the Arctic Circle? Is it a) 60°00' N, b) 66°33' N, c) 70°66' N or d) 78°00' N? Every Canadian should know the answer, right? (Yes, it is "b.") If you've been a reader of *Canadian Geographic* for the last few years, you should *definitely* know. That question was among 60 posed in "The ultimate Canadian geography quiz" in our October 2013 issue. That fun test received plenty of positive feedback, so we presented another edition of the quiz in our October 2014 issue, which was dedicated to space in conjunction with the 25th anniversary of the Canadian Space Agency. It was likewise well received, as are the quizzes we regularly present on our website ([mag.cangeo.ca/geoquiz](http://mag.cangeo.ca/geoquiz)).

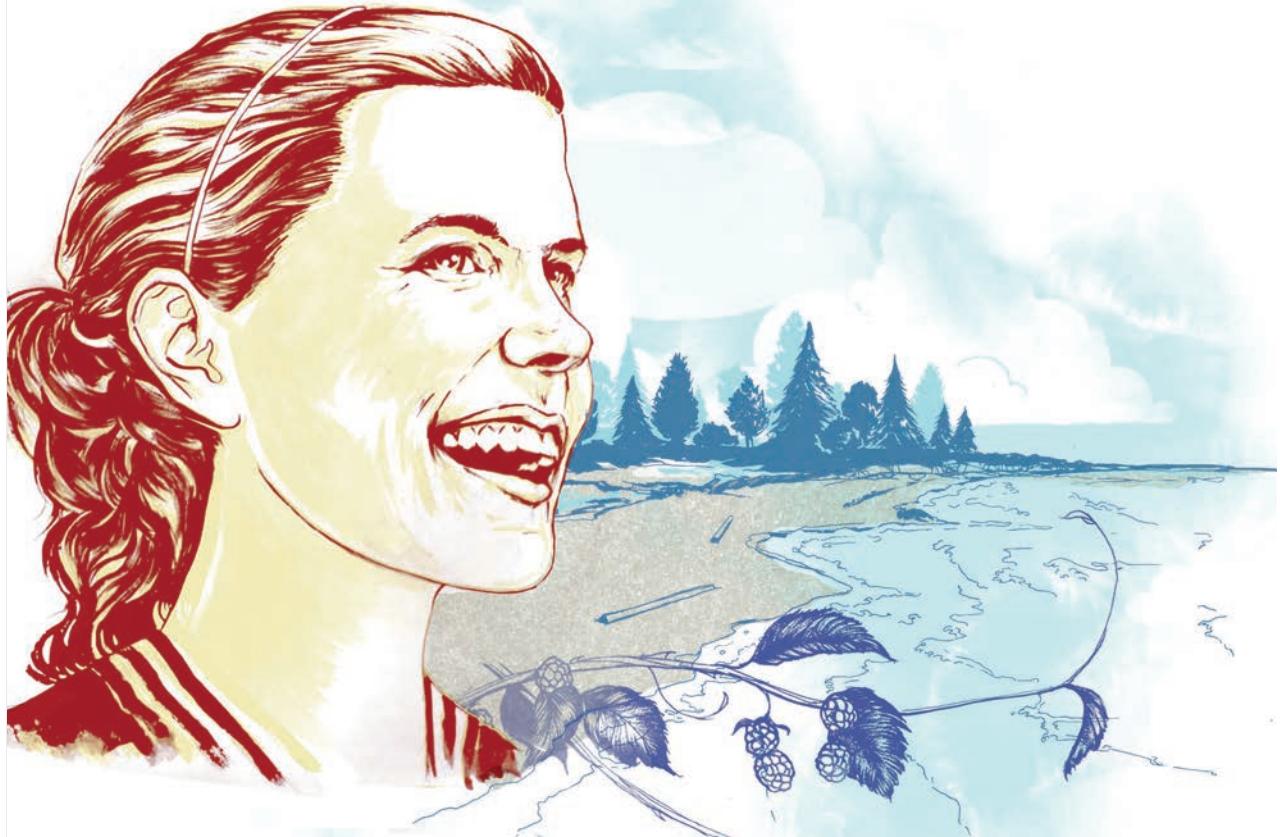
In October 2015, *Canadian Geographic* will present yet another ultimate geography quiz. This time, it will be dedicated to Canada's Arctic, one of the favourite topics of our readers. So, best brush up on your Far North knowledge, because we've once again set out to seriously test your geo IQ. Here's a teaser to get you ready: name the northernmost point of continental North America. Stay tuned for the answer.



Subscribe or renew today at [canadiangeographic.ca/subscribe](http://canadiangeographic.ca/subscribe) or by calling (800) 267-0824. The October 2015 issue hits newsstands Sept. 21.

# our country

REVEALING CANADA



## Christine Sinclair

The captain of the Canadian women's national soccer team loves nothing more than unwinding in Sechelt, B.C.

We have a family place in Sechelt, just up the coast from Vancouver. You have to take a ferry to get there, and it's only about an hour and a half from the city, yet it seems a thousand miles away. It's a small cedar cabin, just off the beach, on about two acres of land. If you step out the front door, you're on the deck, which overlooks the yard and some blackberry bushes, and then there's the ocean, right there. It's very wild, very quiet. I've been going since I was born, and some of my best childhood memories are from there. We grew up fishing off the coast, and I remember being in a little aluminum fishing boat when I was about 10 and seeing orcas swim by.

When I was young, we used to spend about a month at the cabin in the summers. Now, because of the way my soccer schedule is, I don't get summers off anymore, but as we've gotten older, my cousins and I have spent New Year's there and done a polar bear swim on New Year's Day. But whenever I go, it's the same. I walk through the door, smell the cedar and go into total vacation mode. I end up playing a lot of cards and walking along the beach. It's a pretty mellow time. There's no stress, no Internet, the cellphone service is terrible and the soccer ball stays on the shelf. It's awesome.

—As told to Harry Wilson



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