

# Punctuation's mark

AFTER A SERIES OF MASS DEATHS IN RECENT YEARS,  
CAN WE SAVE THE CRITICALLY ENDANGERED NORTH  
ATLANTIC RIGHT WHALE? WHAT WILL IT TAKE?

BY **ALANNA MITCHELL**  
WITH PHOTOGRAPHY BY **NICK HAWKINS**





The North Atlantic right whale known as Punctuation, mother of eight, grandmother of two, as seen with her calf in 2016.



**THE WHALE WAS SO BIG**, that it took until the middle of the night, and nine hours of manoeuvring, before the industrial excavator could drag her body from the ocean shallows onto the flat beach of Grand Étang, N.S., a rope tied to her tail.

By dawn, a team of wildlife pathologists and volunteers had gathered, in anger and shock, to begin the greasy, smelly, meticulous process of figuring out exactly how she died. Anger because this was a North Atlantic right whale, a species so critically endangered that as few as 200 adults may remain on Earth. Anger, too, because she was the second to die by that point in June 2019, the start of what was to be an extraordinarily grim summer of right whale deaths.

Shock because, by then, they all knew exactly which whale she was: Punctuation, a splendid female that scientists were counting on to help keep the species alive. One of the most productive females in modern decades, she had already given birth

to eight calves and was the grandmother of two more. Now just middle-aged, she could have mothered perhaps a dozen more. When she died, those potential calves died along with her.

There was also a personal sense of loss for many on the Nova Scotia beach that morning. They knew Punctuation, so named because of several small scars on her head that looked like dashes and commas. They had been watching her frolic along North America's eastern coast for 38 years, cataloguing her offspring, marvelling as she continued to survive despite being entangled five times in fishing gear and hit twice by ships. They were rooting for her.

"She was absolutely stunningly beautiful," says Tonya Wimmer, executive director of the Marine Animal Response Society in Halifax. "She was fat, she was muscular. She was absolutely healthy and strong. And it was impressed upon you that only a few days ago she was alive."

In fact, Punctuation's death — alongside her spate of near-misses in life and the fate of her progeny — has come to be seen as a devastating symbol of just how badly humanity has failed in its 85-year quest to protect the North Atlantic right whale from human assaults.

"It was humbling because the magnitude of what we've done couldn't have been made any plainer than having this massive, majestic creature laid bare for all to see on the beach," says Laura Bourque, a wildlife pathologist at the Atlantic Veterinary College at the University of Prince Edward Island, who led the examination of Punctuation's carcass that day.

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**THE NORTH ATLANTIC** right whale was the first large whale to be hunted commercially, the first to be protected internationally, and it will be the first to go extinct unless we prevent it. The Basques figured out how to slaughter the massive marine mammals for oil in the 12th century. Whalers from other nations followed, particularly European settlers to North America.

near the coast and floated after death, making them easy to catch and retrieve. To boot, by harpooning a calf, a whaler could be sure of bagging its fiercely protective mother.

In fact, their convenience to whalers is built into their scientific name: *Eubalaena glacialis*, which translates as “the good whale of the ice.” (The two other right whale species are the endangered *E. japonica* in the North Pacific and the recovering *E. australis* in the southern hemisphere.) Nobody

Punctuation’s remains (OPPOSITE PAGE) near Grand Étang, N.S. A right whale with callosities, unique to each individual, on its head surfaces for air (ABOVE).

and whalers considered them commercially extinct. By the late 1800s, as few as 50 remained, all in Canadian and U.S. waters.

The League of Nations, the forerunner to the United Nations, stepped in with a plan to protect them internationally in 1935 — a world first. But the whales, which give birth near Florida and migrate north toward Canada to forage during the summer, have been slow to recover. Perhaps it was because they were so diminished in numbers, so inbred, so particular about their food, so sensitive to noise in the ocean.

Until 1980, researchers feared they had gone extinct. But, by chance, some marine biologists spotted 25 in the Bay of Fundy that year, launching an impassioned cross-border scientific chase to figure out how to keep the species alive. Since then, the right whale has become one of the

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**PUNCTUATION**, SO NAMED BECAUSE OF SEVERAL SMALL SCARS ON HER HEAD THAT LOOKED LIKE **DASHES AND COMMAS**, HAD BEEN FROLICKING ALONG NORTH AMERICA’S EASTERN COAST FOR **38 YEARS**.

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The species was, in the eyes of whalers, the “right” whale to hunt, thus the name. Not only were the whales rotund from thick layers of lucrative blubber, but they also swam

has made accurate counts of how many *E. glacialis* individuals ended up as lamp fuel, but by 1750 they were so rare that they had vanished forever from the European side of the Atlantic



A team of pathologists and scientists conduct Punctuation's necropsy in 2019.

most intensively studied mammals in the world.

The North Atlantic Right Whale Consortium, established in 1986, has more than 200 members today, including scientists and conservationists, plus fishing, shipping and government representatives. Consortium meetings regularly draw more than 400 people, each of whom is on a mission to save the species. That's more than the current right whale population.

Over the years, they've discovered that each whale has a unique pattern of raised tissue on its head, known as callosities. Because the skin is often infected with light-coloured lice, the callosity appears white. It's the equivalent of a right whale fingerprint. As well, many of them, like Punctuation, have scars that help distinguish one animal from another.

That means, strange as it may seem, that each individual has its own

identification number and, sometimes, like Punctuation, a name as well. Photographs of the whales taken over time are housed in a catalogue at the Anderson Cabot Center for Ocean Life at Boston's New England Aquarium. The system allows researchers to tell not just who is who but also what each whale does and where it goes

when they become entangled in fishing gear or are struck by ships. So, in the early 2000s, scientists started working with governments, with the United Nations' International Maritime Organization and with industry

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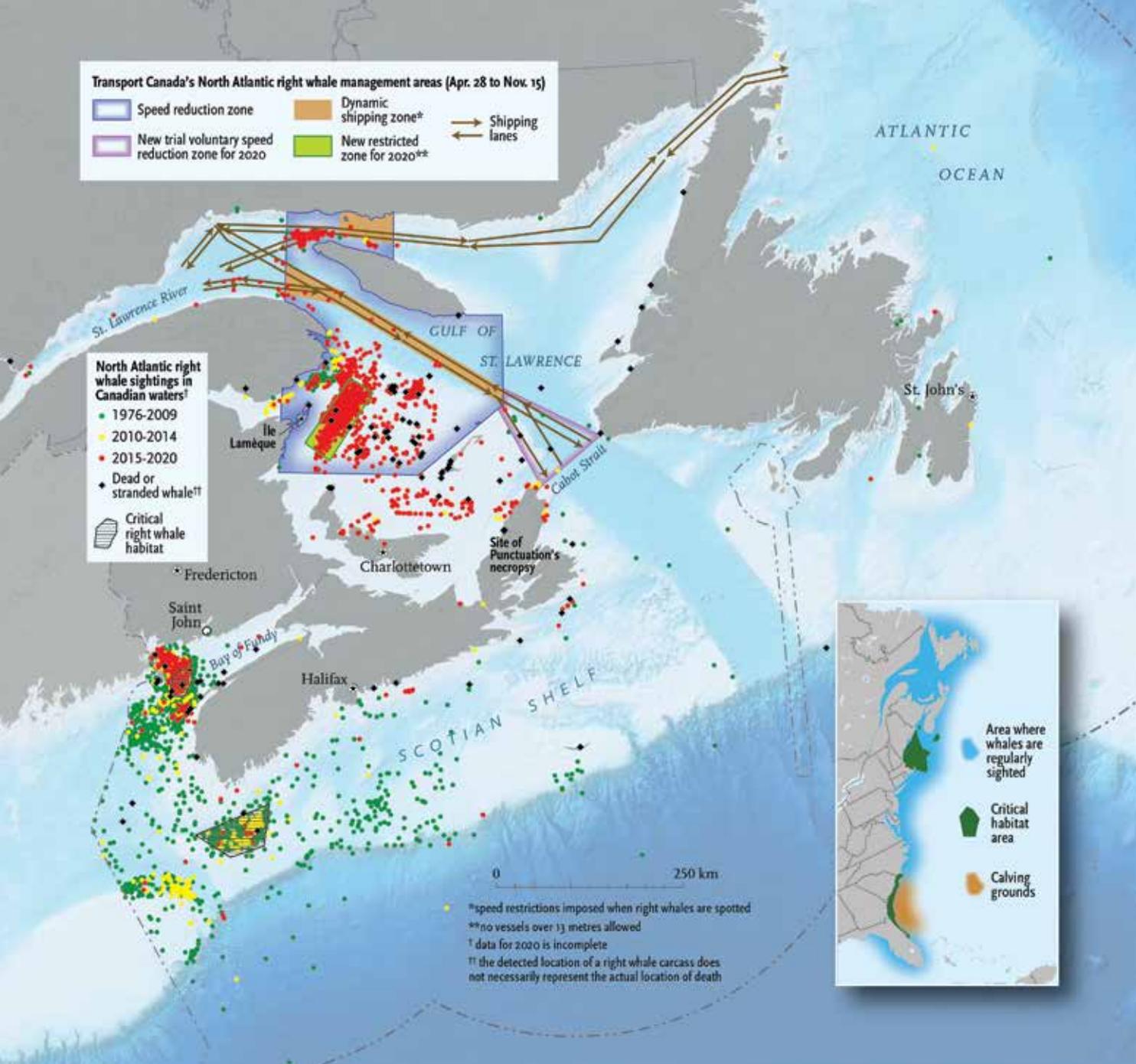
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over time. All of this is critical to gauging how the population is faring.

And while humans aren't killing right whales deliberately anymore, we are killing them inadvertently

to shift shipping lanes out of the whales' way and restrict the ships' speeds. The moves cut the risk of being hit by a ship in the Bay of Fundy by about 80 per cent.



“You feel like you’re clawing your way back,” says Moira Brown, senior scientist at the Canadian Whale Institute in New Brunswick, who has been tracking the right whales for four decades. “It’s an endangered species and you’re saving it, one less dead whale at a time.”

Then came 2010. That’s when the whales began reacting to human-caused changes in the ocean. As we overload the atmosphere with greenhouse gases from burning fossil fuels — the replacement for whale oil — we are heating the ocean and changing its structure and chemistry.

In turn, that alters where copepods — the grain-sized, cold-loving crustaceans that right whales need to feast on to build up their blubber and reproduce — can live.

So, to the bafflement of marine biologists, many of the whales decamped from their main summer feeding grounds in the Bay of Fundy and Scotian Shelf and followed their prey into the cooler, deep-basin waters of the Gulf of St. Lawrence. By 2015, scientists caught up with them.

But two problems had already collided. For one thing, a big habitat shift like that leads to fewer births as the

animals exert energy sorting out their new living space, a perilous situation for such an endangered species. For another, the gulf contains a lot of snow-crab fishing gear and high-traffic shipping lanes.

“We don’t know all the answers, especially in a new habitat,” Brown says. “We have no ability to predict. And with this habitat shift, it may be that the whales are also learning about the habitat along with us.”

The fallout was disastrous. In 2017, just five calves were born — a steep drop from the dozens of calves seen in the best years. In 2018, it was zero.



During the three feeding seasons leading up to the end of 2019, 10 right whales were seriously injured, either from entanglement in fishing gear or from ship strikes. Thirty more were found dead — 21 of them in Canadian waters — including Punctuation. That’s despite the Canadian government closing large parts of the whales’ feeding ground to fishing last year and mandating slower speeds for ships.

A treacherous new habitat. Few births. High deaths. It’s a perfect storm of risk for an endangered species.

The fate of Punctuation’s offspring underscores how grave things are. Of her eight children, five are dead or

And it’s unfolding on Canada’s turf. “This is a make or break point we’re at,” says Sean Brilliant, senior conservation biologist of marine programs at the Canadian Wildlife Federation.



**WHEN A NORTH ATLANTIC** right whale dies, scientists want the body. A necropsy, the animal equivalent of an autopsy, tells them how the whale died and may offer important clues about how to prevent similar deaths. But it also tells a story about what the animal went through to survive. It is messy, visceral and unforgettable.

ing into the wilderness. The extinction literature even has a name for this strangely quiet process: winking out.

Punctuation’s death, by contrast, required a team. A coast guard vessel towed her carcass to Grand Étang, where several dozen people had gathered, along with Bourque, the wildlife pathologist, to help do the necropsy. On the face of it, the cause of death seemed obvious.

Five days earlier, when a Transport Canada vessel had spotted her body floating north of Meat Cove, N.S., Punctuation had a vast slash across her black abdomen, the result of a ship strike. It was so deep that the coils of her intestines — mainly crimson with some tinged in gold — were spilling out into the sea. By the time she got to the beach, the intestines were gone, scavenged by other sea creatures. The five-metre-long gash remained — as much as three metres wide in places — exposing blubber, thick skeletal muscle, her kidneys, cervix and uterus.

But jumping to conclusions is not how a necropsy works. Instead, it is a systematic, extensive analysis, starting with measuring the carcass, including its circumference, and

TO GO SO INTIMATELY INSIDE ONE OF THE BIGGEST ANIMALS EVER TO HAVE LIVED IS TO GAIN **RARE INSIGHT** INTO HOW ITS **LIFE CONNECTS TO LIFE** ON THE PLANET AS A WHOLE.

presumed dead, and so are both her grandchildren. Her female line has been extinguished. Each of her surviving three sons has been entangled multiple times.

It is the opposite of what happens with some of the other looming extinctions humans are tracking. In those cases, species simply become more difficult to find, finally vanish-



making a minute examination of the skin, explains Bourque. The pathologists have to be on their toes, taking notes at the outset of anything that might turn out later to be important. It was possible, Bourque says, that the ship strike happened shortly after Punctuation had died from something else entirely, such as disease or infection. The team had to begin without bias.

The task was daunting. Punctuation was the biggest right whale anyone had ever seen. She weighed in at about 50 tonnes and, even resting on her side, towered over everyone on the beach. Bourque and her fellow wildlife pathologist Pierre-Yves Daoust, an emeritus professor at the University of Prince Edward Island, put on boots, gloves and hip-waders and got to work, braving what Bourque calls the “characteristic smell” of rotting whale. (“It’s very penetrative,” she says.)

Seen up close, Punctuation’s inky skin was a roadmap of white scars from her many interactions with sharp blades and her long-term entanglement in fishing ropes. There were multiple old propeller scars on her left side, mottled scarring on her

left lip, her tail, both flippers and her right side.

Many of the earlier injuries had been so deep that the white scar tissue (devoid of the black pigment of the skin) ran fully 10 centimetres from the top of the thick skin layer right down to the blubber layer.

“It was an impressive array of traumatic hits,” says Bourque.

And a testament to the remarkable ability of right whales to heal from dreadful injuries. But it was also evidence of just how much energy Punctuation had needed over time to recover from her interactions with the paraphernalia humans use to be at sea.

Once they began dissecting her body with long-bladed knives, the pathologists found that Punctuation had an unusually thick layer of blubber, a sign that she was healthy and well fed. They flensed the blubber from her body and sliced it into thick table-top-sized slabs in a macabre echo of what whalers once did to render oil from whale fat.

Then they examined her muscles and vital organs, which were relatively free from decomposition, before dismantling her skeleton,

Veterinarian Pierre-Yves Daoust (OPPOSITE PAGE) works on Punctuation’s necropsy, while another vet climbs up a ladder in the visceral mess of the dissection (ABOVE).

bone by bone, looking all the while for any trace of deadly abnormality. The last thing they did was get the excavator to flip her over so they could examine the side that had been resting on the sand.

To go so intimately inside one of the biggest animals ever to have lived on Earth is to gain rare insight. Not just into the creature’s flesh and cells and molecules, but also into how its life connects to life on the planet as a whole — past, present and future.

“All species have their own special ways of handling their life and the environment. And their adaptation is just amazing, from bats all the way to big whales like this,” says Daoust. “You have to understand how the animal works if you want to explain why at some point it did not work. We put a lot of little things together and see a big picture.”

In the case of whales, that means reading the mysteries of time and evolution. Millions of years ago, the

ancestors of whales walked on land. Long afterward, their descendants returned to the ocean, but they retained characteristics of other highly evolved mammals such as humans. The mother gives birth to a single child, nurses it and teaches it, keeping it nearby for a year. And whales manoeuvre through the marine world by moving their tails up and down, thanks to the mammalian spinal column that helped their forebears scamper through swamps. Fish, by contrast, move their tails from side to side.

There are layers of irony in this. That move back into the deep sea may be one reason any large whales have survived at all. Most large mammals vanished as ice sheets crawled across the land eating up habitat while human hunters sharpened their weapons. But the human reach caught up even with whales. While whaling bans have led to remarkable recoveries in some species such as the humpback, many others are in growing danger from new human threats, including warming oceans. More will be at risk in the future if we fail to rein in carbon emissions.

Daoust and Bourque found no infection or disease in Punctuation, or even any sign that her body had been in a long recovery from illness. In fact, she had been rudely healthy. That meant that the massive abdominal laceration had probably killed her after all. It was so big that it had to have come from what is known as a category 4 vessel, which is a cruise ship, large shipping vessel, tugboat or mega yacht.

The trauma would have been more than enough to kill her, says Daoust. The ship's curved blade eviscerated her, slicing through muscles and the abdominal wall, right into her abdominal cavity. So much blood would have rushed from all parts of her body to try to heal the injury that she likely went into vascular and maybe neurological shock. Her organs spilling out of

her body, she likely lost consciousness before she died.

Depending on whether the blade severed a large artery, that descent into death would have taken anywhere from moments to hours, says Daoust. And it would have been horrifically painful.

"It seems," says Bourque, "like it's a pretty huge waste."



### THE RESPONSIBILITY OF TRYING

to save a species so close to extinction is crushing — especially when the deaths are preventable. As 2020 began, right whale scientists from both Canada and the U.S. were feeling the pressure.

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IF WE SAVE THE NORTH ATLANTIC RIGHT WHALE, IT WILL BE BECAUSE WE KNOW IT HAS ITS OWN **INTRINSIC VALUE**, THE **RIGHTFUL HEIR** OF ITS EVOLUTIONARY LEGACY.

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Would there be another horror-show cluster of deaths, like in 2017 and 2019? Would it be a repeat of 2018 when no females gave birth? What new measures could be devised to protect the whales when such aggressive ones last year didn't work? And the biggest question of all: would the elusive whales continue to show up in the Gulf of St. Lawrence, or would they again find new feeding sites and stump efforts to study them?

Early in the year, researchers had a little good news. Ten calves were spotted. Not the bumper year they'd been hoping for, but not the bust of 2018, either.

They had intricate plans for weeks at sea on research expeditions in the gulf during July and August. On the itinerary: plankton surveys and oceanographic investigations. In addition, they would rely on regular government airplane surveys, an underwater glider fitted with sensors to listen for right whales, and acoustic buoys to detect right whale

sounds. All of these would feed data into an interactive map designed by Hansen Johnson, a PhD candidate in biological oceanography at Dalhousie University in Halifax. Scientists would be able to see where the whales were in real time.

But even the best laid plans collapse during a pandemic.

While government airplane surveys and underwater listening devices remained in place this year, all ship-based right whale expeditions to the gulf had to be cancelled once the border with the U.S. closed in March. The sole exception was a tiny boat operated by Canadian photographer Nick Hawkins, who recently received a National Geo-

graphic explorer grant to document the right whale. He is the only non-researcher with permission from Fisheries and Oceans Canada to approach the whales.

Hawkins lives in New Brunswick and, by chance, was there when the borders to that province closed. He put together what amounted to a small summer research station — complete with a specially stabilized camera and a drone for aerial filming — on Île Lamèque, perhaps half an hour's sail from where right whales are sometimes spotted.

Because he was to be the only one on the water, Hawkins and his wife, Andrea Tapia, volunteered to photograph and help identify individual right whales this year and to send the information to the catalogue at the New England Aquarium.

By June, researchers were jumpy. Some talked of having post-traumatic stress disorder from last year's dreadful season. Several said they hated to hear the phone ring or pick up emails for fear of hearing yet another dead

right whale needed to be necropsied, or a live one disentangled.

"I'm literally sitting here holding my breath," said Wimmer, of the Marine Animal Response Society, from her office in Halifax in mid-June.

A week later, on the one-year anniversary of Punctuation's necropsy, the first of this year's new crop of calves was found dead off the coast of New Jersey. It had survived awful propeller gashes on its head and chest after being hit by one ship, only to succumb after being struck a few weeks later by a second.

Another badly injured calf had already vanished from sight after a ship ran into it off the coast of Georgia, and so had an emaciated adult female, called Dragon, who was spotted off the coast of Massachusetts earlier in the season with a fishing buoy lodged in her mouth. They are presumed dead.

In July, the International Union for Conservation of Nature Red List, alarmed, moved the species from the category of "endangered" to "critically endangered." That's one step from "extinct in the wild." They are the closest to the edge of any big whale on Earth.



**IT'S HARD TO FIND SIGNS** of hope. But there are some. For one thing, as Brown says, local fishermen and ships' bridge crews and quartermasters alike are passionately interested in avoiding interactions with whales.

"Those are the guys saving the whales. And they don't get a lot of credit."

A move toward smaller-gauge ropes that whales can break free from more easily is under consideration. So is the idea of rope-less gear, including having some traps attached to inflatable balloons rather than buoy lines.

"Three years ago, people thought this was Star Trek," says Brilliant, from the Canadian Wildlife Federation, describing the leap in technology. "But in the last three years, with the imperative of this situation, the fishing community, let alone the scientific community, has really jumped on this."

Scientists and policy-makers are exploring more mechanisms to separate ships from whales, including

early warning systems and no-go zones that exclude ships altogether while the whales are there. The conservation group Oceana Canada is calling for mandatory speed restrictions in the Cabot Strait leading into the Gulf of St. Lawrence. Brilliant says it's time to consider a gulf-wide shipping restriction at certain times of the year.

"I think we need to get to the point where we start to look at some of the

Photographers Nick Hawkins and Andrea Tapia helped researchers document right whales in 2020 (TOP). The whale known as Harmony with her calf (BOTTOM).





ideas that are crazy,” he says. “We need to be crazy because the situation is becoming so critical.”

Whale biologists are brainstorming new ways to study the species so they can devise more ways to protect it. Among the ideas: taking the temperature of air coming out of the whales’ blowholes by drone-carried thermal cameras, measuring by high-resolution photographs, even whale-watching by satellite.

Perhaps most touchingly, a new generation of right whale researchers is eagerly stepping up, with passion to spare. Among them is Gina Lonati, who started her PhD in January at the University of New Brunswick in Fredericton under the supervision of oceanographer Kim Davies. Lonati heard about the threats to the species at a conference in Halifax in 2017.

“It was like a call to me,” she says. “As a marine mammal enthusiast and researcher, I felt what better way to dedicate my energy than to the right whale cause?”



**WHETHER THE NORTH ATLANTIC** right whale survives or not is, at this

point, in our hands. It is a philosophical question rather than a practical one. The right whale is no longer a commercial species, needing to be saved because humans rely on it for food or income. If we save it, it will be because we know it has its own intrinsic value, the rightful heir of its evolutionary legacy. If we save it, it will be a form of redemption for all the species we have let go extinct.

Two images remain. Metaphors, if you will.

The day after this year’s first calf was found dead, Hawkins was out on the water filming and taking photographs. The day was perfect. Light cloud cover. Little wind. A rarity in the Gulf of St. Lawrence.

To his joy, he spotted a mother, Harmony, and her chubby calf, one of the eight remaining from this year’s batch and the fourth mother-calf pair sighted in the gulf by that point. He sent up his drone to get some footage, keeping well back.

Harmony dived down to feed, leaving her calf at the surface. The calf looked over, curious. What was that thing floating on the water? It swam over to look — a baby, but still half again as long as the boat. It looked up at the hull from underneath, circling

A right whale dives near the southern coast of the Gaspé Peninsula.

around the boat, diving underneath it, then surfacing maybe three metres off the stern. In its element. Almost near enough to touch.

“At that moment, you just drop the cameras and appreciate the moment,” says Hawkins.

A year and a day earlier, Hawkins had been at the necropsy of Punctuation, taking his haunting photographs. He was there at the end, when Bourque and Daoust and the others had to clean themselves up. It was quite an ordeal. Bourque ended up sitting in the ocean, scrubbing her tools and gear with sand to get off the scent and viscera of the whale.

Punctuation was in pieces by then. The excavator went back to work later, digging her a huge grave in the dunes, back from the beach. It was the tidiest solution. She couldn’t be buried at sea because bits would end up washing back to land. Somehow, the fact that she couldn’t go back home in death was the most ignominious thing of all. 🌀



See more pictures of the North Atlantic right whales at [cangeo.ca/nd20/rightwhale](https://cangeo.ca/nd20/rightwhale).