Tiny Fish to Big Picture

Marine biologist Amanda Vincent is a renowned seahorse specialist. Her work on these minute creatures has led her to become one of the world's leading conservationists—and a global force for change

By Brian Banks Portaits by Taylor Roades

FOR CENTURIES, POETS AND ASTRONOMERS HAVE LED THE WAY IN capturing the essence of the big picture by training their eyes on the very small. The power in that perspective — at times symbolic, in other cases practical — has also enabled leaders in many spheres to galvanize people and to mobilize change.

To that pantheon, add Canadian marine biologist Amanda Vincent.

Vincent, a professor at the Institute for the Oceans and Fisheries at the University of British Columbia and the director and co-founder of Project Seahorse, an international coastal marine conservation organization, won the Indianapolis Prize in May. The $250,000 prize — awarded every other year since 2006 by the Indianapolis Zoological Society— is the largest and most prestigious award for animal conservation in the world.

Vincent is the award's first Canadian-based winner, the first marine scientist in an elite group of internationally renowned fellow recipients, and the first whose long list of achievements includes significant wins that play out globally rather than in specific terrestrial geographies.

Two early highlights in particular stand out. In 1996, Vincent was responsible for putting the first marine species on the International Union for Conservation of Nature's Red List of threatened species. Six years later, she led a team that persuaded the Convention on International Trade in Endangered Species of Wild Fauna and Flora — known as CITES — to begin regulating international trade in marine fishes.

"She tapped the wedge into the door that effectively unlocked the [CITES] treaty for the protection of a lot of marine organisms," says Nick Dulvy, Canada Research Chair in Marine Biodiversity and Conservation at Simon Fraser University.

"The mindset that was pushed by fisheries scientists at the time was that fish are a resource or a commodity, not wildlife; therefore, we should not be applying to conserve them under wildlife treaties," Dulvy explains. Vincent made the case "that these are wildlife and that they deserve the same kind of protection as elephants, pangolins and mountain gorillas."

In the years since, successive CITES listings, enforcement actions and trade bans for a range of marine species ranging from sharks and rays to eels and sea cucumbers have followed — actions that,

A young White's seahorse

in many cases, Vincent and her team have either led, provided research for or influenced in some way.

"She's an extremely good communicator. And you can see, when she speaks, complete conviction," says Jon Paul Rodriguez, nominator for Vincent's 2020 Indianapolis Prize application and Venezuelan-based chair of the IUCN Species Survival Commission, adding that Vincent "changed the tide in marine conservation."

In confronting the major threats to seahorses – habitat loss, overfishing, and Vincent has emerged as a leader in the movement for global conservation

There are no bigger stages on which a conservationist can operate. Yet what makes Vincent's story truly remarkable is that — as with poet William Blake seeing the world in a grain of sand — her focus and achievements all revolve around one diminutive, iconic creature: the seahorse.

Worldwide, there are 46 known species of seahorses. The largest, when stretched out, is 30 to 35 centimetres long; the smallest, less than two. Seahorses live in shallow temperate and tropical waters, sometimes hovering or drifting, more typically wrapping their tails on seagrass, sponges or coral to stay in place, their colours shifting with the surroundings to provide camouflage. They're found between 50 degrees north and 50 degrees south latitude, most either in the Indo-Pacific or West Atlantic. One species, the lined seahorse (*Hippocampus erectus*), has a range that includes Canadian waters, off Nova Scotia.

Seahorses, says Vincent, are "the coolest animal." Their anatomy, unlike any other fish species, includes a spiny crown, a horse-like head, a monkey-like tail, a kangaroo-like pouch and bony plates instead of scales. With fewer, smaller fins than most fish, they are built for maneuverability rather than speed, often spending their entire lives in the same small patches of ocean, sucking in tiny, live prey through their long, tubular snouts. When it comes time to reproduce, remarkably, it is the males that get pregnant, carry the eggs and give birth to live young.

As well as being cool, seahorses are in trouble, says Vincent. All 46 species are listed on the IUCN Red List. Of those, 14 are classed as "vulnerable" or worse. So little is still known about some of the others that 17 species are classed as "data deficient." The biggest threats: overfishing, exploitation through the illegal wildlife trade and habitat loss.

Lessons learned in confronting these challenges are what has enabled Vincent to turn her concern for seahorses into a fight for global conservation.

"Imagine the world as a cross-section of an onion, with seahorses in the centre," she explains. "Helping them starts with immediate threatened species work. But then the next layer is you can only do good things for seahorses if their communities' ecosystems are in good shape. Of course, that is only possible if the people who depend on them make wise decisions. And that is only possible if they have decent economic opportunity, law and order, and you can see those communities, regions and national governments ensuring good governance and respectful integration of human needs and wildlife. Eventually you end up at a global scale with global wildlife trade conventions or global environmental agreements, and at the outermost ring, you have the human behaviours of greed, altruism, self-denial and self-indulgence."

Her primary vehicle in these pursuits is Project Seahorse, which Vincent co-founded in 1996 with Heather Koldewey, a marine scientist with a PhD in genetics, based at the Zoological Society of London. Today, its capacities include threatened species research, protected areas creation, fisheries management, economic development, governance and citizen science (learn how you can contribute at iseahorse.org). Along the way, it has helped establish 35 marine protected areas (areas off-limits to fishing and other commercial activities) and trained more than 175 conservation professionals who now follow in Vincent's footsteps.

The more you unpack these achievements, the easier it is to see why the Indianapolis Prize jury chose Vincent. But while the award recognizes a lifetime body of work, she isn't anywhere near done. In fact, with the prestige and financial boost her victory provides, she is zeroing in on what stands to be her bigger challenge yet — a campaign to put an end to bottom trawling, an industrial fishing practice that not only wreaks havoc on seahorses but allows "literally hundreds of thousands of trawlers" around the world to devastate shallow seabeds, where a huge diversity of marine species live and breed.

Her motivation? "A complete sense of moral outrage."

For those who've never heard of bottom trawling, she paints a grim picture: "Choose a forested landscape that you adore, and imagine helicopters dropping razor wires with massive heavy chains and every destructive tool you can think of and raking the hillsides — far worse than clearcutting, because you're not just taking out the trees and all the understorey, but you're actually plowing into the soil itself. You're picking out every bird, bee and bear that sits in there. Then you're selling them for aquaculture feed or chicken feed at an income of a couple of pennies a kilogram.

"How on Earth would society tolerate that? It wouldn't, right? But that's exactly the story in the oceans. It needs to stop."

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VINCENT'S GLOBAL VIEW WAS FORGED EARLY. WHEN SHE WAS two, her parents sold everything and left Vancouver, spending the next seven years forging new careers in consulting and photography in Latin America. They then made their base in Ontario. Vincent did an undergraduate degree in zoology at what is now called Western University, then began studying seahorses in the field in 1986, en route to her PhD in zoology from the University of Cambridge in England.

Her research took her to the shallow estuaries on Australia's southeast coast, studying the White's seahorse (*Hippocampus whitei*) — today one of the world's most critically endangered seahorse species. "Unbeknownst to me, I turned out to be the first biologist to study seahorses underwater, which was a bit of a jaw-dropper," Vincent says. "That sort of led me to be committed to these creatures."

After completing that degree in 1990, Vincent held several visiting scientist and research fellow positions in Europe and the U.K. before becoming an assistant professor in biology at McGill University in 1996, the same year she and Koldewey formed Project Seahorse.

By then, Vincent was established as a leading marine scientist for her pioneering work on seahorse behaviour, growth and survival rates, ecology and male pregnancy — a trait seahorses share with other species in the Syngnathidae family, which includes pipefish, pipehorses and seadragons, more than 300 species in all. Her discoveries included the fact that many seahorse species form long-term monogamous pairs. "That was the first tranche of work, and I still continue with that, mostly through students, because I love working in the field," she says.

However, the exact moment when things "pivoted" for her as a person came a few years earlier.

"I was travelling through Berlin and saw an electronic billboard scrolling that said, and I translate literally: 'Seahorses are the most valuable exports from the Philippines to help men with weak tails.'"

At the time, Vincent had been commissioned to write an article for *National Geographic* on seahorse ecology. "I said to them, 'I'd really like to follow this hint.' So, they offered to fund me in exchange for at least a couple of paragraphs in the story."

With that, Vincent made plans to travel around the Philippines with a Filipina biologist. It was adventurous detective work for a couple of female scientists. They carried little more than day packs. Wherever they stopped at night, they would start the next day.

"We travelled through very dodgy areas and met some very unusual and slightly worrying people," says Vincent. "But out of that, we drew this story of a big trade in seahorses. That so sparked my interest that I started tracking it through many other countries and revealed this enormous trade — tens of millions of animals moving among 80 countries every year. And finding that was super important, because that then led us to try to understand what was happening to wild populations. And what was happening is that they were plummeting."

exploitation through illegal wildlife trade – Amanda

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Vincent's detective work revealed a devastating, illicit seahorse trade among 80 countries

IN 1996, NEWLY ESTABLISHED PROJECT Seahorse published Vincent's comprehensive report on global seahorse fisheries and trade. Its findings also directly led to the first IUCN Red List marine species listings — for seahorses — as noted above.

Vincent says pulling back the curtain on trade in seahorses was probably a bigger deal than the IUCN Red List achievement. She found they were widely used in traditional Chinese medicine, sold as curios and exploited for the aquarium and pet industries.

Every year bottom trawlers scour an ocean area nearly twice the size of Canada. "We are still at the 'waking up the world' part," says Vincent

"It was needle-in-the-haystack stuff. You're looking for anything that somebody might know about the trade. Of course, people in commerce knew about it, but they didn't have any understanding of the animals or their wild populations or of their threats. They were simple commodities. And the interesting thing was trying to bring together the threads of them being commodities with the threads of them being wildlife."

The process of bringing together those threads marked the start of the approach to science and conservation that has come to define Vincent's work and that of Project Seahorse.

"My training was as a scientist. When I realized seahorses faced significant problems, [my instinct] was to immediately plunge into research." But the group she was collaborating with in the Philippines at the time, the Haribon Foundation, the country's oldest conservation NGO, had a different approach that soon won her over.

"Whenever they have a biologist looking at a protected area, they have a social-worker community organizer talking to the local people, figuring out what they know, what do they advocate, what they encourage, what they would accept. And likewise, wherever they're trying to work out a plan with the communities through the community organizer, they also have scientists trying to make sure the plan actually has some value from an ecological point of view."

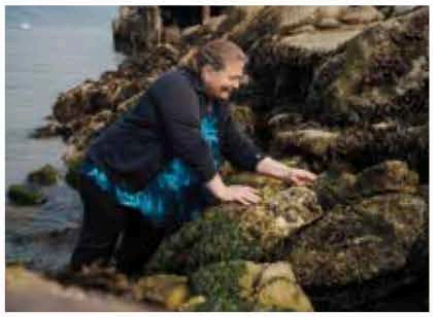
About the same time, while trying to help local subsistence fishers in one community reduce the pressure their seahorse catches exerted on wild populations, Vincent found her ideas getting little pickup because they were incompatible with local practices. The lesson, she says, was clear: "The enthusiasm of an outsider gets you pretty much nowhere unless it represents the will of the people who have to actually do the work."

Looking at Project Seahorse's track record today, Sarah Foster, the organization's program manager, who began working with Vincent as a research assistant about 20 years ago after completing a master's degree at McGill, says those same formative influences still apply.

"We're very pragmatic," says Foster. "We try to find solutions with the communities of place and practice that they will affect. We recognize that solutions for the oceans have to work for the people that depend on them as much as they work for the oceans."

On bigger international policy concerns, Vincent likens her approach to ancient sailors crossing the oceans. "You have to tack right, tack left, tack port, tack starboard to take advantage of the winds. And it is pretty much the same in conservation. Just accept that this stuff is a long game. The crises are imminent, the solutions won't be immediate, but when you least expect it, you'll trigger a really notable transition."

Not that Vincent doesn't supply plenty of her own power. Over the years, to better deal with people in the regions where she's operating, Vincent, who already spoke French, learned both Tagalog and Mandarin.



"We are very pragmatic... Solutions for the oceans have to work for the people that depend on them"

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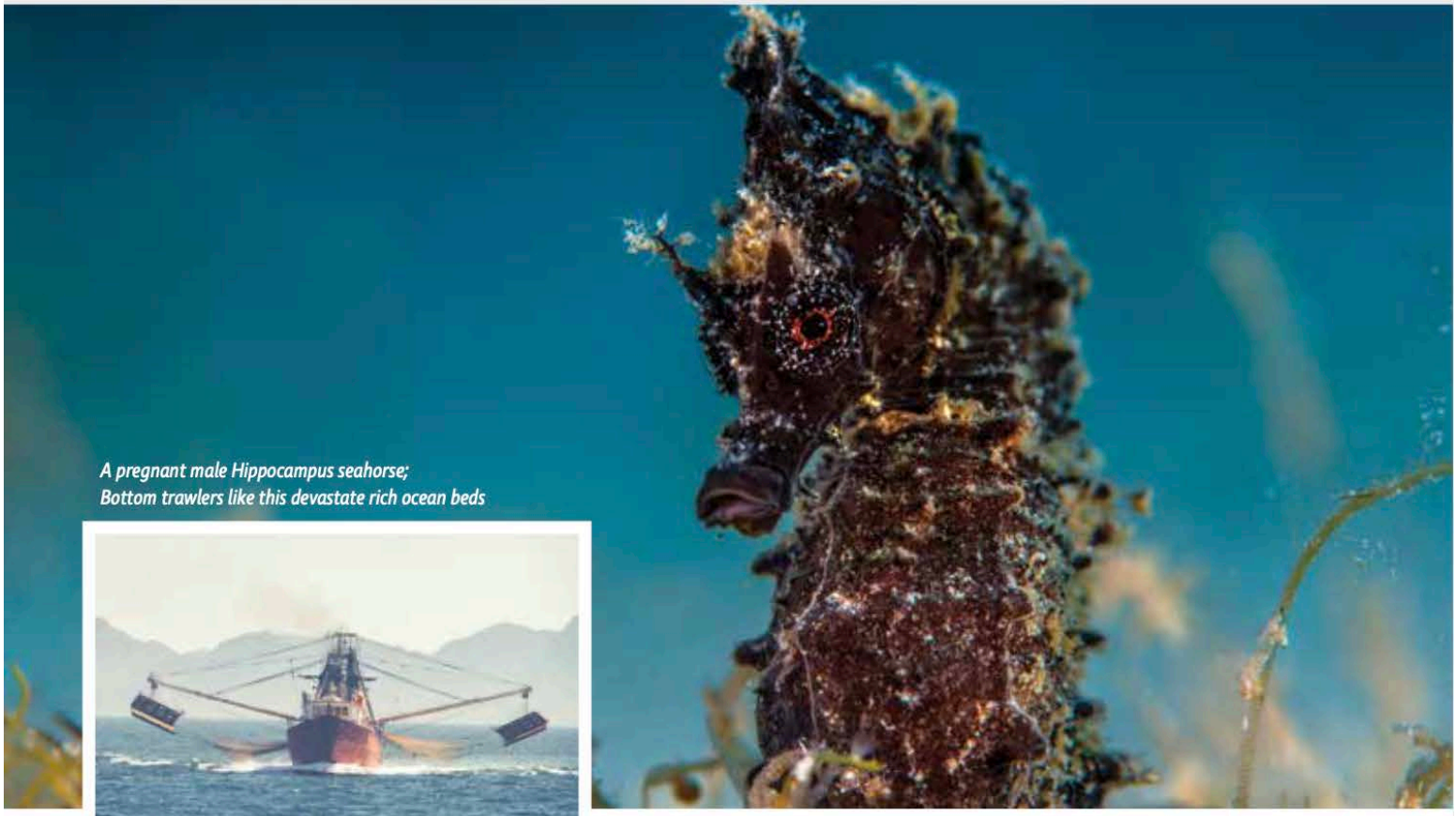

A pregnant male Hippocampus seahorse; Bottom trawlers like this devastate rich ocean beds

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IT WAS ONLY AFTER PUTTING IN A HUGE AMOUNT OF EFFORT TO regulate and limit trade in seahorses in the late 1990s and early 2000s that Vincent started to devote more of her focus to destructive fishing practices. One reason was the obvious habitat damage. The other was a realization that seahorses were still being harvested by these fisheries regardless of restrictions on market demand.

"While it's nice to regulate export trade in seahorses, if they're caught by bottom trawlers, then regulating the trade isn't really going to affect how they're caught or how many are caught," she says. "The trade might look smaller, but the damage to wild populations hasn't been reduced a whit."

Foster recalls one pivotal moment in 2004 when she and Vincent were at a CITES meeting in Mexico. By this time, Vincent had moved from McGill to a position at UBC as Canada Research Chair in Marine Conservation, bringing Foster and Project Seahorse's Canadian office along with her.

"We were sitting on the beach having a margarita, talking about how it is mostly trawler fisheries catching seahorses," Foster says. "When we asked ourselves, 'What do we know about the impact of trawl fisheries on small fish?' we realized no one had ever looked at it. At that point, I looked at her and I said, 'Well, I think I found the focus of my PhD.'"

Foster went on to complete that degree — a study of the impact of Mexican shrimp trawlers in the Gulf of California — in 2010 and subsequently joined the UBC faculty as a research associate. Her fieldwork included living and working aboard two different industrial trawlers.

"It was me and nine Mexican fishermen out at sea for weeks at a time," she recalls. "Probably one of the most eye-opening experiences was when we landed our catch and the net opened and what fell out was a whole bunch of rays that were already dead because they'd actually just been discarded by the boat in front of us. It got to the point where so many boats had been fishing so long that we were just catching other people's discards."

Foster describes the experience as "really grim." Her early days on ship were especially difficult. "It was just so emotional. Basically, the nets would go down, come up and then just dump the contents of the ocean like a broken puzzle at my feet."

In time, she befriended the crew and her Spanish "got really good, really fast." She says the men knew what they were doing wasn't sustainable. "None of them wanted their kids to take on this job. None of them felt that these fisheries were going to continue for much longer because they were causing such huge problems."

Today, despite the scale of the issue — every year trawlers scour a seabed area nearly twice the size of Canada — and the urgency of overall decline in global ocean fisheries, public knowledge about bottom trawling remains limited. "We're still very much at the 'waking up the world to the problem' part," says Foster.

Of late, Vincent has been working to develop a united front among her colleagues at the IUCN, where she chairs not only the IUCN Species Survival Commission's seahorse, pipefish and seadragon group but also its marine conservation committee. Last year, at a meeting of the full Species Survival Commission membership — about 300 experts in biodiversity in all areas, from fungi to blue whales — she gave a short presentation on the subject and was surprised to discover how few members of even that audience understood the issue. "Most people had never heard of it, even though they were leaders in species conservation for other taxa," says Vincent.

But there are hopeful threads to pull on, too — even in India and China, countries that operate the largest bottom trawling fleets in the world. For example, Vincent says that on a recent, pre-pandemic tour of government agencies and fisher cooperatives in India, every representative she asked about their bottom trawl fishery had the same response: it has to stop. China, likewise, has an official policy of phasing out bottom trawling. "So, to them, it's not like we're saying anything new. The problem is these policies, these views, are in no way implemented."

One major obstacle is concern for losing the jobs for the fishers who work on the boats. It's an area that Project Seahorse is now studying. According to Vincent, "it's looking like in a vast majority of cases — at least in China, India, Thailand — they're not people with a maritime history, with a heritage of fishing. They're people who have come to act as hired labour on the boats. They could just as easily be working in a widget factory or building roads. I'm not wishing to dismiss the crew; I want to be clear about that. But what I'm saying is that the policy question ... is not in its own particular category of fishers being only suited for that occupation."

Another critical leverage point is the fact that government fuel subsidies are the only thing keeping many of these boats operating. And right now, member countries of the World Trade Organization are trying to hammer out a deal to curtail so-called "perverse subsidies" before a year-end deadline.

"I am not aware of a trawl fishery that would be profitable if it wasn't getting shored up by public money," says Foster. "So while they're not specifically talking about trawl fishing in these WTO meetings, an agreement would absolutely contribute. The fact that the conversation is happening is really hopeful for me."

Vincent, meanwhile, is putting together a plan that draws on all of her accumulated contacts, diplomatic expertise, mettle and determination. "The tack we're going to take is to try to bring together disparate sectors to find a common voice."

Her list includes human rights NGOs that have already documented extensive use of slavery and indentured labour in the industry, enforcement specialists with expertise in eye-in-the-sky technology and vehicle monitoring, aquaculture and agriculture industry reps who will need alternative sources of feed if the trawl fisheries close, experts in fisheries and ecosystem restoration, and so on.

"Let's bring together all the sectors and look for the intersection of our concerns and find a voice that can be represented in the full range of issues on which this bears," says Vincent. "The challenge is to engage the political will."

ONE FRIDAY MORNING LAST MAY, VINCENT GOT A CALL AT home from Karen Burns, executive vice-president of the Indianapolis Zoological Society and executive director of the Indianapolis Prize. "I was in a meeting. I said, 'sorry, I can't talk right now,' and I hung up on her," Vincent says. "She called back later, and I said, 'Look, it's one of those days, I'll get back to you.'" Then Vincent promptly forgot. Eventually, Burns called back and said, "Amanda, I can't get through the weekend without talking to you."

"I thought she was calling because they needed more information," says Vincent. "I had no idea they'd actually reached a decision. After Karen told me, I couldn't stop warbling, 'This is wonderful, this is amazing!' I don't think I believed it."

In July, Vincent was thinking more about how to put her winning to best use. "It's a remarkable honour. And it comes with many benefits. One of them is the imprimatur of approval. It suggests we know what we're doing. And that's enormously valuable when you're approaching policy-makers or donors or collaborators. And it gave my team an enormous boost of excitement and enthusiasm because they know they're in the right place doing the work."

Like a first responder to a fire, says one colleague, Vincent "runs straight toward the biggest challenges in a fearless manner. She leads the charge that draws all of us in"

It also came at an important time for her personally. "I'm a single mother by choice with an 11-year-old son and a 14-year-old daughter. And it's a slog at times, to be perfectly honest. The fact that this came when I was really run down with all the COVID nonsense, kids at home, no schooling and all the rest, it was very uplifting."

On the Indianapolis Prize website, there is a video about the award narrated by the legendary natural historian, David Attenborough. Of the winners, most recently Vincent, he says: "Conservation isn't a job. It's a life commitment."

While that line sums up her achievements, Nick Dulvy, Vincent's longtime marine conservation colleague, does a much better job summing up the essence of her character.

"When something happens, like a car crash or a fire or an attack, while the public runs away, the first responders run to that event. Amanda's like that with conservation. She runs straight towards the biggest challenges in a pretty fearless manner. She leads the charge that draws all of us in. She'll say, 'This is the problem.' And she'll figure out a path to solve it."