After the Fact | Scientists at Work: The Wonder of Blue Whales

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TRANSCRIPT

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Dan LeDuc, host: What is the largest animal on the planet? Many of you probably already know the answer to this fun fact: the blue whale. But did you know it's the biggest animal on Earth in our known history—even bigger than dinosaurs?

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Dan LeDuc: Welcome to "After the Fact." For The Pew Charitable Trusts, I'm Dan LeDuc. In this latest episode in our Scientists at Work series, we're turning our attention to a big subject: the blue whale. And since they can be longer than 100 feet—100 is our data point for this episode—that's a big subject indeed. Sri Lankan marine biologist Asha de Vos, who is also a Pew marine fellow, is passionate about these unique mammals.

Over the past several decades, Asha has ventured into the waters of the northern Indian Ocean to study blue whales. By learning about their migratory patterns, mating habits, and other behaviors, she's helping the world better understand the vital role of blue whales in the ocean ecosystem. She's even founded an organization called Oceanswell to support research and protection of this species of which little is known, and upon which the ocean depends.

Dan LeDuc: Tell us about blue whales.

Asha de Vos, marine biologist, ocean educator, and Pew marine fellow: Well, blue whales are the largest animal that's ever roamed the planet.

Dan LeDuc: Bigger than dinosaurs?

Asha de Vos: Bigger by mass than any dinosaur that we've ever had roaming this planet. Right? And I think that's something for people to remember, because I think—you think about it, it's such a privilege to live on this planet today side by side with the giant—the giant of our—historically, the biggest animal that ever lived. Right? And I think it's a pretty special thing to hold on to and just celebrate, and remember that we have a responsibility.

Dan LeDuc: Yes. But help us conceptualize size. What are we talking—compare it to something that we know.

Asha de Vos: So a blue whale can grow as large as a basketball court. They're pretty long. The tongue is as heavy as an African elephant. So if you can think of an African elephant, and you think about trying to carry that, it's not fun, I'm sure.

Dan LeDuc: You do not want a whale to lick you.

Asha de Vos: No! Right. Right—slapped out of the way. They weigh about as much as 40 African elephants. So these are really huge animals. But I think the most fun fact about them is that their throats—their esophagus is so small that they could choke on a loaf of bread.

Dan LeDuc: Really?

Asha de Vos: They have to eat lots of small things all the time. And that's the thing, they're designed to eat—if you Google it, Wikipedia tells you that they feed on krill. In Sri Lanka, we break all these stereotypes, so our blue whales feed on shrimp, which there is a difference—and it has implications. So these are these tiny things that are probably the size of your little finger, and to think that this animal has grown to this immense size by feeding on something that small.

But it makes sense because these are things that don't swim actively away from the whale when the whale's approaching it, which is great, because you're not wasting energy chasing down your food.

Dan LeDuc: Yeah. Yeah. So they are magnificent. They're mythical. *Moby Dick*, right? It's part of our history and culture and literature. But that's not why you work with them.

Asha de Vos: No, no. And I think that's a really important thing that I want everyone to know is, yes, I totally think these animals are majestic, and beautiful, and charismatic, and there's just so much mystery around them. But to care for them and to protect them for just that reason is not good enough, because I think we have to remember that they are actually what we call ecosystem engineers. Their survival is so integral to the proper functioning of the entire ecosystem, right? So my fun fact is I love whale poop. They dive to the depths, into these areas where it's dark. But there are all these—there's food, but there's nutrients that you don't get in the surface waters, so things like iron and nitrogen. We all need a certain amount of nutrients in our diet, right? So do they.

And so they'll dive to these areas. They'll take these massive gulp fulls, they'll swallow them. Then they'll come up to the surface to breathe. And as they do so, they release these gigantic fecal plumes, right? And so as they do so, they're releasing all these nutrients into these surface waters. So it's fertilizer for the surface communities.

And on the surface of our oceans, we get tiny, microscopic plants called plankton, which are the base of every single food web. So they, like all plants, need fertilizer to grow, right? And so they—I always say they feed on sunshine. And including these nutrients in their diet when it's available, that means they can grow and proliferate. And then they photosynthesize and release oxygen into the environment.

Dan LeDuc: Let's talk more about them. In addition to their usual—what bears do in the woods and whales do in the ocean—their bodies themselves, when they pass on, become also a part of the ecosystem.

Asha de Vos: Absolutely.

Dan LeDuc: How does that work?

Asha de Vos: Yeah, so you think about it. A dead carcass is obviously a feast for so many animals, right? And so at the surface, there are lots of sharks and birds that will come and feast on this dead whale. And as it descends to the depths. And in those areas, you don't have sunlight penetrating, so you don't have these typical processes of plants that photosynthesize and produce whatever is necessary to run a food web. And in those deep, dark places, there's limited food.

So there are animals that live in these areas that basically just—they have evolved to survive without daily meals, and so it's a feast for these species that are down there, and I think there's a big dependency for these carcasses. So that's part of that cycle of life, right? The dead whale is important. It's important it stays in the water so it can sink to these places where there wouldn't be food otherwise.

Dan LeDuc: And what are the numbers we're talking about in terms of whale population and the decline?

Asha de Vos: Yeah, so I always found that a really interesting question. We say that there are probably about 10,000 blue whales left in the world. We say that that's a very small fraction of what was there, maybe—we've probably declined our populations of whales between 70 percent to 90 percent during the whaling period. So that's a lot of animals to take out of the oceans.

Dan LeDuc: Mm-hmm.

Asha de Vos: I also want to draw attention to the fact that when we say that, by giving a blanket number to blue whales in general, but in the ocean, there's about five different populations of blue whales, right? And each population, they may or may not be genetically distinct, but they may have a different acoustic dialect in these different places. They feed on different things. They're very adapted to live in that specific area.

So while there are 10,000 blue whales, if you wiped out the population, say, out of Sri Lanka, we're losing a very important, very different group of whales. These subspecies are very specifically adapted to a particular area in very many ways. And we have to protect all these subspecies, so we have to focus and study these different groups independently, and come up with conservation solutions that work in that area, rather than a blanket conservation solution for all blue whales across the world. There's only been one documented blue whale birth, and that was actually in Sri Lanka. A female had washed ashore, and then they'd tried to pull her out. This is some time ago, maybe even

in the ’40s. And then she’d given birth and then gone off. But that’s the only documented pregnancy or birth that we’ve ever had, right?

Dan LeDuc: Wow.

Asha de Vos: It’s like this amazing, mysterious—

Dan LeDuc: So there’s a lot more to know?

Asha de Vos: So much more. The ocean is such an incredible place because of all its magical secrets.

Dan LeDuc: Yeah. So the cool thing about Sri Lanka, right, is that so many of the whales are close to the coastline. It makes it easier to study them.

Asha de Vos: Typically, they do these long-range migrations to cool places, feed, and then they come to warm places to breed and calve. Now, the big thing that I found was that actually, the blue whales that I work with around Sri Lanka, they’re not doing these long-range migrations. So my Eureka moment was actually when I saw an aggregation of blue whales and a floating pile of whale poop, because I was like, well, this is warm and tropical. It’s five degrees above the equator. And if they’re pooping, that means they’re feeding somewhere close.

But so that showed us that these blue whales are actually—not actually leaving warm waters at any point in their lives, which is, I think, a very exciting thing. Really mirrors my life and my comfort zone as well, right? So I think it’s a match made in heaven.

Dan LeDuc: So you study the species, but these creatures are amazing. Do you get to know them individually at all when you’re out there?

Asha de Vos: Yeah, so it’s—so we use—I mean, yeah, we spend time on the water. We do see individuals. There are still a lot of individuals I don’t know, but there is this one particular whale that’s a special story. And we use this really simple technique called photo identification, which is, we just get out there with our cameras. We take pictures of particular parts of the whale’s body and look for permanent markings. So they can be scars. They can be patterns that we can—and we use these. They have to be long-term, permanent marks that we can use and reuse to identify the animals over and over again.

And I think it’s a great technique, because anyone can do it. If you’re a whale watcher, and you go out and you see a whale, and you take these pictures, they’re really handy for scientists. So I think whoever’s listening, if you ever go out whale watching and you take pictures of whales, ask the people on the boat if there’s any way you can send these photographs to scientists who might need them to identify these animals.

Dan LeDuc: This is crowdsourcing whales?

Asha de Vos: Absolutely. And it's such a—it's so important, because you can tell so many things from this data, everything from how big is the population. Right? This is a very simple technique to do it. It's a very safe way to do it. It takes time, so that's why we need more and more people submitting their photographs.

But this particular special individual, I was on a documentary shoot off the northeast coast of Sri Lanka, and I happened to take photographs of these whales that day. And then I looked at this one tail fluke—so that's just the tail of the animal—and I was like, wow, so beautiful. And it had these particular markings. And then I thought, I'm sure I've seen this individual before.

So I went back into the literature. And lo and behold, there was that whale. Right? And it's these markings, and you can see how long-term they are, because when I saw the whale, it was 27 years later. Right?

So we don't know what that whale had done in the intervening years. We don't know—because where we saw it was just 10 kilometers away from where it was seen 27 years earlier, which is not so—we don't know. It could have hung around there all that time, or it could have packed its bags and gone on a big journey and come back. Right?

But this kind of information, one thing is we can tell the demographic information about age and stuff like that. But then also the other important thing is if we start to see individuals coming back to the same areas, we start to realize that these are priority areas for conservation, because there's a reason they're coming back. They're dependent on the area. Then we can focus our conservation efforts on areas. So a simple tool can give us so much important information in science.

Dan LeDuc: And this—you get to know these as individuals. Do you name them?

Asha de Vos: Yeah, that's the fun part. This whale's called Whalentine.

Dan LeDuc: I like that.

Asha de Vos: I like that you like it.

Dan LeDuc: Does the blue whale that you study have a distinctive sound?

Asha de Vos: Yeah. So I think when we think of whales, everybody thinks about humpback whale song. And humpback whale song is pretty incredible. It's very complicated, and there's a lot of singing. And it evolves every year, and it's very complex. But blue whales have what we call a stable call. So if you record it—if I recorded it in 1983, and I recorded a blue whale again in the same area 20, 30 years later, it's pretty much the same call. So we don't see much change, which is interesting. Blue whale calls, I always think they're like these low rumbling jet engines.

[Whale sound]

They're so low frequency. So if I dropped an underwater microphone, or a hydrophone, in the water, and I tried to listen, I wouldn't be able to hear it, because it's outside our hearing range. So we have to put on our computers, speed it up so we can put it into the hearing range of a human. And then it's like this really deep rumble, right? And it's to me, when I listen to it, I can feel it in my chest. It's like a vibration. It's a really powerful sound, and it's like nothing you have ever heard. So yes it's like a jet engine, but you really have to hear it yourself.

Dan LeDuc: But if you're out there, you couldn't unless you had all this equipment to do it.

Asha de Vos: Exactly.

Dan LeDuc: We had this wonderful "Save the Whales" period. A lot of progress was made. But where do things stand now? I mean, the blue whales that you study are not safe.

Asha de Vos: No, and that's the thing. So if you look at a map of shipping routes around the world, the south coast of Sri Lanka is one of the busiest highways in the world, of course, because everything from Singapore to Dubai goes through that area. Those are two of the biggest ports in the world. Sri Lanka is in a very strategic position as a result in terms of shipping.

And historically, we have been. We've had sailors come through all the time. We were part of these very important routes. Right? But I mean, it's great to be in a strategic position, but then there are implications of that. So since the '70s, global shipping has doubled. But around places like Sri Lanka, it's quadrupled—

Dan LeDuc: Wow.

Asha de Vos: —because—yeah. Because trade is changing, right?

Dan LeDuc: Right.

Asha de Vos: And so we're seeing that impact. And it's just a numbers game. When you have more whales—you have whales and more boats, at some point, you're going to have more collisions. Right? And so that's one of the big things I've been working on, is how do we resolve this problem? But that doesn't mean we have to only be part of that problem. We can also be part of the solution. And so we have been working towards coming up with recommendations for the government so that we can try to reduce this ship collision problem. And we have recommendations. I mean, one of the main things is 90 percent of that traffic is actually not stopping in Sri Lanka. So they're just bypassing our coastline, and so just if we ask them to move 20 kilometers offshore, which is a tiny amount, then we can actually reduce that risk of lethal ship strike by 80 percent.

Dan LeDuc: Tell us more about Oceanswell. What does it do?

Asha de Vos: Yeah, so Oceanswell is a marine conservation—in fact, Sri Lanka's first marine conservation research and education organization. And we focus on doing the research that has conservation impact. So we work on the blue whales, looking at the ships track problem. We're at the advocacy stage for that. We work with—the other problem is whale watching has—it's grown, but it's a little out of control. So we're trying to figure out how do we create a more sustainable whale watching industry, not just for the whales but also for the livelihoods that depend on it.

So we do research like that that's really impactful, that can drive change on the ground. And we actually go to the government. We do outreach. So we do everything around pushing the message and also trying to get the government to change policy at the highest level.

I'm all about influencing the world.

Dan LeDuc: We've moved beyond the ocean, we're talking the globe right now, huh?

Asha de Vos: Oh, absolutely. I just think the ocean is this magical space, and there's so much amazing imagery, right? But people know more about what's happening in outer space than we do about our oceans. And it's most of our doorstep, not everybody's, but it's accessible. Right? And so I mean, it's frustrated me for a long time, and I've been talking to people about why and stuff, and there are loads of reasons. But the point is we need to start creating an ocean-conscious public.

Dan LeDuc: What is it like being out on the water, on the Indian Ocean?

Asha de Vos: I mean, to me, it's just the most spectacular experience. First of all, you get to get away from everything, but you're still working, so it's OK. And so let me describe the first time I saw blue whales. I was on this whale research vessel, and we were off the north—we were off the southeast coast of Sri Lanka. And it was this spectacular day. It was this beautiful, flat, calm day, just like—it was like being on a pond.

But it was this amazing day. And at that time, the whale research vessel I was working on, we were tracking sperm whales acoustically. So we had a hydrophone in the water. We were collecting the sounds, listening, and then trying to figure out where the whales are, because we had to do work with them. Right? And so the pilot house of the vessel, we had the whale sounds on, basically, loudspeaker. So all day, all night, we were listening to sperm whales. And sperm whales—

Dan LeDuc: You were jamming to the whales?

Asha de Vos: It was amazing, right? Because they have a very characteristic call. They have a click sound, so it's like *[imitates whale sound]*. That's literally what it sounds like. So you imagine all these whales making this sound at once, and it's just surrounding you. Right? So I can hear this sound emanating through the floor of the vessel from where I'm standing. I'm looking out on this flat ocean, looking for these whales, thinking,

wow, they're out here somewhere. I know they're here, and I want to be this first person to see them.

And I'm straining into the sun. My shift is coming to an end. I'm getting really frustrated, because I want to be the one. You can't even blink, because you're so worried you'll miss that thing. Right? Because it's a vast space, and if you do blink, sometimes you miss some incredible—you know, this moment. And so it is about being alert.

And I mean, the ocean has taught me so many things as a result. I've learned to become a lot more patient. I've learned to expect the unexpected, because there are things that have happened that I would never have predicted at the start of the day. And I also think that just learning that we are a tiny, tiny, tiny, tiny drop in an incredibly large space. And we are actually pretty insignificant. And it gives you a sense of perspective. I'm just excited to see the change that's happening on the ground and the impact that's possible with one big, audacious dream.

Dan LeDuc: Mm-hmm. Asha, thanks so much. Good luck with the dreams.

Asha de Vos: Thank you.

[Transition music]

Dan LeDuc: To learn more about Asha's important work with blue whales and see some photos, visit pewtrusts.org/afterthefact. And as always, if you liked what you heard here please give us a review on Stitcher, Apple Podcasts, Spotify, Pandora, or wherever you listen. Thanks for joining us.

[(Female voice over music) "After the Fact" is produced by The Pew Charitable Trusts.]