After the Fact | Ocean, People, Planet: Part 1–The State of Our Ocean, With Callum Roberts

Originally published Feb. 8, 2022

Total runtime: 00:22:00

TRANSCRIPT

[Pensive music opens episode. Callum Roberts' soundbite fades in.]

Callum Roberts, marine biologist, science communicator, and Pew marine fellow: We like to think of the world as a blue planet, and 71% of it is blue, the rest is land. But when you think about what is made up of water on this planet, the ocean occupies far more of the living space than the land does if you take into account the third dimension of depth.

[The sound of ocean waves rises toward the end of the audio, with a brief pause on the ocean noise of waves along the shore, fading back into Callum's soundbite.]

When we see the ocean, we should be thinking about it taking up 97% of the volume of living space on planet Earth. That means that the ocean is profoundly important in all of our lives, even if we don't appreciate it.

[Pensive music fades.]

Dan LeDuc, host: Welcome back to "After the Fact" from The Pew Charitable Trusts. I'm Dan LeDuc, and in this season—"Ocean, People, Planet"—we'll be talking about the future of the ocean. It's so big, so vast, that you might think it invincible.

But think again.

Over time, we've overfished the ocean. We've dumped plastic trash now found in the bellies of fish far from land. And we've warmed the climate—making waves and storms more powerful and changing the very chemistry of the ocean so that its acidic waters are now bleaching white the rainbow colors of some of our most spectacular reefs.

[Upbeat orchestral music fades in.]

Scientists have some practical, workable answers for how to slow these changes. They start with preserving 30% of the ocean—scientists say we should also preserve 30% of our lands, and we've made more progress there—all by the year 2030, less than a decade from now. That 30% is our data point for this episode.

[Music fades out.]

Today and in the coming episodes, we'll talk about the ocean and its challenges and the solutions to those challenges with some of the world's leading experts. We'll speak with members of Indigenous communities who have cared for the ocean for generations. And we'll take you to places where you'll hear the splash of water and about the impact of the ocean on people's daily lives.

We start with Callum Roberts, who you heard from at the top of this episode. He is a marine biologist and science communicator who's been a Pew marine fellow, written acclaimed books about the ocean, and was scientific adviser for the BBC's series "Blue Planet II." He has spent much of his life literally in the ocean, diving and studying waters and the fish who live there up close.

Dan LeDuc: Well, Callum Roberts, welcome. Thank you so much for joining us. You have been studying the ocean for most of your professional life. What was it about the sea that enticed you and attracted you and made it your life's work?

Callum Roberts: It's the constant fascination. I think occasionally you see in movies and in questionnaire surveys that "marine biologist" comes up there as one of the coolest jobs to do. And I have to say, it's true, because there's so much excitement in being a marine scientist. There's the thrill of discovery, there's the fact that still vast areas of the ocean are unknown and unexplored, and we are just scratching at the surface still. Even as we look to outer space, we can see all of that amazing cosmos. Underwater is being neglected. For me, marine life is endlessly fascinating. The ocean just keeps me coming back.

Dan LeDuc: You have written an essay for us here at Pew. And I loved your perspective, in which you talk about the ocean as a river almost. Could you tell us a little bit more about your thoughts on that?

Callum Roberts: The biggest river of all in the world is not one that flows across the continent; it is the current that wraps itself around the planet. And it flows at the surface. But deep down, there's a current which draws another loop all the way across the deep seabed.

In a couple of places in the Atlantic Ocean—at the poles, the North and South Pole—you see the downward leg of that current pouring from the surface to the deep ocean. And it does so because the water gets more dense.

The amount of water that's pouring down into the deep sea in the North Atlantic is equivalent to 20,000 Niagara Falls. So this is a really huge planetary force. And that ocean river takes down, into the deep sea, oxygen. It makes life possible in the deep. It ventilates the deep all across the planet.

It also takes down carbon. So, from the atmosphere, we're trapping carbon, where it can be locked away and therefore slow the rate of climate change. So these oceanographic processes are really important to shaping the world that we live in, and I think the connections are really underappreciated and misunderstood.

Dan LeDuc: Tell us what the state of the ocean is today.

Callum Roberts: For most people, the sea is just that strip of blue that you see at the coast. It goes out to the horizon; and then, beyond that, you don't think about it. The ocean, from the perspective that I've had of it over the years, has changed a great deal.

And I think there's a couple of fallacies that have stayed with us over time; they've been very durable. The first is that the ocean is so big that we can take anything out of it that we like with no comeback; there will always be plenty more. And the second thing is that we can throw anything into it that we don't want, and it will disappear forever. Neither of those things is true, as we are finding to our cost. Human influence has grown to a truly planetary scale, and it's big enough now that even something as vast as the ocean is going to be affected by us.

What is happening has differed over time. Going back 1,000 or 10,000 years, even, the main impact that we had on the sea was taking things out of it. And it was a hunting of seabirds, of whales, of seals. They were full, big-bodied animals full of valuable resources like oil. And so, catching these animals became big business. In fact, arguably the world's first global industry was whaling.

During the 19th century, fishing really rose in prominence. Fisheries became more mechanized; we added steam power to boats. By the 1940s, we were introducing monofilament to replace natural fibers in nets. We then started using electronic devices to find fish, like sonar, and then complex seafloor mapping systems.

We've moved from fishing pieces of the ecosystem to fishing the whole ecosystem, and we've simplified it in the course of doing so. And that simplification means that what we're now focused on are the rats and cockroaches of the sea, animals that are small-bodied, that live fast, reproduce prolifically at young ages. They're the ones that can keep up with this incredible rate of exploitation that we're throwing at them. The bigger animals that live their

lives more sedately, those can't keep up. And we've eliminated them mostly from the places that they formerly were abundant.

Dan LeDuc: What's an example of the recent impact of overfishing?

Callum Roberts: I would say pretty much any fish that you look at has been exploited in recent times. Things like cod, we were causing their collapse in the 1970s and '80s and '90s. The Canadian government ignored warning signs from some scientists that the cod were in trouble. How could the cod be in trouble? They've been there for hundreds of years. There's always been plenty of cod in the sea.

And sure enough, there weren't any anymore. By 1994, the Canadian government had to put a moratorium on cod fishing, a moratorium that has not been removed as of yet.

Why haven't they come back since we've stopped fishing them directly? Well, the answer to that is because we're fishing for other things using finer mesh nets.

Northern prawns are the big catch now in Eastern Canada. And why are northern prawns abundant and doing well? Because there aren't any cod around to eat them. Any juvenile cod around are going to be caught among the prawns, so the cod can't recover.

Dan LeDuc: How have governments worked to remedy this?

Callum Roberts: In the United States, it was made illegal to ignore scientific advice. In Europe, better management was introduced. Not good enough still, but better. And so, things have gradually improved, but for many other countries, much of the developing world, fisheries are now at their nadir, their lowest point; we've just seen more and more destructive fishing methods being introduced to catch fewer and fewer fish.

And it's reached the point where across large areas of Southeast Asia, we're catching fish not to sell as individuals on a fishmonger's stand but to render down into fish meal and oil that we can then feed to fish that are grown in ponds. So we're eating up the wild ecosystem to sustain farmed fish, and this is not sustainable in the long term. You cannot destroy the natural capital of the planet and expect it to end well.

So fishing is its own worst enemy in a way, because the more you fish and the better you are at it, the fewer fish there are. And so, regulators have to step in and intervene between the technologically advanced and sophisticated fishing industry and the fish that now have no place to hide.

Dan LeDuc: Beyond overfishing, what are other threats facing the ocean?

Callum Roberts: What came hard on the heels of exploitation was pollution, and people were aware of the problems of pollution back in the ’60s and ’70s, really. That pollution has been joined by the other kind of global form of pollution now, which is climate change from greenhouse gas emissions. It stresses organisms directly. It increases the power of the sea, the height of the waves, the number of storms. It influences the nutrient cycles in the ocean. Pretty much anything you look at is affected by that warming.

Added to that, though, we have a chemical change, and that’s caused by the same greenhouse gas, carbon dioxide, dissolving in the ocean, and that’s making it less alkaline than it used to be in a process called ocean acidification.

Dan LeDuc: The actual chemistry of the ocean as we look at it is different now than it was a generation or two ago.

Callum Roberts: When you dissolve carbon dioxide in the ocean, it’s like when you dissolve it in a fizzy drink. It makes it more acidic; it gives the fizzy drink its tang. It’s changing the ocean in much the same way. But when you add carbon dioxide to seawater, that makes it harder for animals to build their skeletons and shells. They can’t get enough of the raw materials.

We’re seeing already instances where corals and shells are becoming more fragile because there’s not as dense a skeleton or a structure that has been built up by the organisms that live in them, and it’s predicted that if we carry on emitting greenhouse gases in the way that we have been, it will mean that the range of the ocean in which you can build coral reefs, for example, will shrink dramatically.

When I dived on the Great Barrier Reef back in the 1980s, the average sort of coral cover was around 50%, 60%. And it was amazing.

[Sound of a diver jumping into the ocean.]

In some places, you couldn’t see the bottom because of the coral.

But now, that coral has been in retreat for a long time. It’s had some savage impacts from global bleaching events, which happen when you get these huge pools of hot water that sit over the reef for extended periods of time. And that’s caused huge changes. And the biggest change is that, now, 20% coral cover is considered to be pretty good; 10% is what you see in many places.

Now that’s a big problem, because we’re losing many of the species that make up one of the most rich shallow-water marine systems on the planet. Low-lying coral nations of the world, those islands are now set to disappear as sea levels rise.

If coral reefs were alive and vigorous and healthy, it might be that they could grow upward as fast as the sea level rose and they would continue to sustain islands in these remote atoll nations. But they're not. They're struggling. And so then the net result is that those islands are likely to wash away.

Dan LeDuc: And that, of course, is the most vivid answer to, "Why should those of us on the shoreline care?" I mean, as rude as that question might sound, it's sort of like, "Well, the world is changing. What's the impact on me?" And it seems if you're in an island nation or living on a seacoast, the effects are going to be pretty obvious pretty soon.

Callum Roberts: In the Western Pacific, island nations there, like Tuvalu, have experienced sea level rise of something like a half-inch per year in the last couple of decades, which is extraordinary. For the last 7,000 years, sea levels have been more or less constant, and we've grown used to that constancy, that reliability of the ocean.

But now, it's no longer there. In most places, sea levels are rising at the rate of a few millimeters a year; but in the Western Pacific, due to the local oceanography, they're rising much faster.

Dan LeDuc: Another phrase we're increasingly hearing is "blue carbon." What is blue carbon?

Callum Roberts: Blue carbon is, really simply defined, it's carbon which is in the ocean. And carbon, as we know, is a key part of the global climate change problem. The addition of carbon dioxide into the atmosphere is causing the world to warm.

The ocean's carbon stores have not been well studied or well appreciated until recently. It's only about 15 years ago that the word blue carbon came into existence. And that was in the context of coastal wetland habitats like mangroves and salt marshes and seagrass beds. And we discovered that, just like swamps on land, they store a lot of carbon in the root systems underneath. And so they were coined as blue carbon habitats.

But that's not the only place where you find a lot of carbon in the sea. And one thing that I'm now doing is leading up a team of scientists to study the amount of carbon that is locked away in continental shelf habitats. So just offshore, the continental shelves are areas that go up to about 600 feet deep. And those shelves have thick sediments on them. Within that mud, there is a lot of carbon. We don't know exactly how much. We don't know where it is. We don't know how vulnerable it is to human disturbance. We suspect that activities like bottom trawling and dredging, where nets and dredges are dragged along the seabed,

are releasing some of that carbon back into the ocean and potentially into the atmosphere as well.

Bottom trawling and dredging destroys the animals that are busily transferring this carbon from the water to the sediment. Marine life is incredibly important. Those animals are filter feeding—they're extracting carbon from the water, they're burying it in the mud. Without those animals, the ability of the seabed to take up carbon may well be impaired.

The reason that I'm so interested in the seabed like this is because it covers 38 times more of the ocean than these wetland habitats that fringe the edge of the coastline. And so, potentially, this could be a game-changer in efforts to slow the rate of growth of climate change at a global scale.

Dan LeDuc: You are not just sounding an alarm here but offering—you and the rest of the scientific community—ideas of how to make things better. One of the things we're hearing more and more about is this notion of "30 by 30." Could you explain what that is and how it could work?

Callum Roberts: For more than a century, we've been trying to protect nature from us. We've been creating protected areas such as in the Serengeti in Africa; and in the ocean latterly, we've been establishing protected areas.

But that hasn't slowed the rate of biodiversity loss. In fact, the rate of losses increased, and our model is wrong and our targets are too unambitious.

The science that we've done, which was funded in part by The Pew Charitable Trusts, says that we need to be protecting at least 30% of the planet's surface by the year 2030. And probably quite a lot more if we're going to keep the Earth habitable and promote human well-being long into the future.

Dan LeDuc: These needed protections you're describing to reach 30% of the ocean by 2030—they are really about the need for more marine-protected areas. How big must they be, and what kind of constraints or restrictions make them effective?

Callum Roberts: I think how big they need to be depends on where you are and what your opportunities are like. There's a truism in ocean conservation that a marine protected area won't work unless it has the support of the people who live in and around it. And that's absolutely right. Indigenous peoples, in particular, have a great knowledge and understanding of the environment that can help us to live in greater harmony with the world. We need to preserve their cultures, and rights, and the resources that they depend on. And I think the best way to do that is through getting a good balance between people and nature.

What we've learned from protected areas is that by protecting an area of sea from exploitation and harm, the populations inside it build up. The animals there live longer, they grow larger. Big animals produce far more offspring than small animals do. And those benefits spill over from the protected areas into the surrounding seas, where they can contribute to replenishing the stocks that people who fish depend on.

We're a long way ahead of where we were when I started my career, and I began to study marine protected areas in the 1990s. And so, even though progress is perhaps not fast enough, progress is being made. It's a work of generations for us to put in place the framework and the tools needed to safeguard our planet.

Dan LeDuc: There's plenty of Pew Research Center polling showing that sort of the Gen Z, Millennial generations are far more engaged with climate change and worries about climate change. Any advice for younger generations?

Callum Roberts: I think you can say it in a sentence: Action is the antidote to despair. And I don't despair about the way the world is going to be in the future because there are many, many ways that you can contribute to making it a better world and to seeing the kind of actions that you would like others to take today being the ones that you are driving through tomorrow.

I devoted the past 30 years of my life to training people to manage the planet better, and it's a source of enormous comfort to me that many of them are now in positions where they are working actively to make the world a better place. That's the best legacy I think you can have.

[Pensive music fades in.]

Dan LeDuc: In the Arctic, climate change is melting ice and changing the lives of the Inuit people there. Sheila Watt Cloutier is a Nobel Peace Prize-nominated advocate for her Indigenous community. She tells us in our next episode we all will experience those changes too.

Sheila Watt-Cloutier: The glaciers of the Arctic are the cooling system for the rest of the planet. And so, as that starts to melt and starts to go, it creates all kinds of other havoc. What's happening in the Arctic doesn't stay in the Arctic. It is impacting everywhere else around the world.

For The Pew Charitable Trusts, I'm Dan LeDuc, and this is "After the Fact."

[Music fades out.]