

The Climate-Health Connection: Nature's Role in Protecting People

BILL FRIST: I think back that when I opened the chest of a patient and look at a diseased lung—a scarred lung, a darkened, you know, damaged, blotched lung—I was always focused on the procedure before me, but I was also beginning to think about what had come before that very moment: the air that the patient had breathed; the pollution that had been around that patient over their lifetime; the exposure, sometimes over decades, that had shaped that disease to lung, long before that time in the operating room.

And that's what brought me to this whole field of planetary health to the environment: how we interact with that environment; the health of the soil; the water that we drink; and the air that we breathe; and the climates all around us. All of it became alive to me as I looked into that chest and the disease that's there. Let's go upstream. Let's look at the root causes. Let's look at planetary health.

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KRIS SARRI: You're listening to *Nature is the Solution*, a podcast from The Nature Conservancy. It's a show about how nature can solve some of our biggest challenges. Because doom isn't the whole story. I'm Kris Sarri, state director for The Nature Conservancy in Massachusetts.

For today's episode, we explore the connection between the environment and human health. After all, people aren't separate from the environment—we're part of it. The air we breathe, the water around us, the climate and the landscape we live in all shape our wellbeing in ways both obvious and invisible.

And it's a connection Senator Bill Frist came to see up close—standing in the operating room, looking at the lungs of his patients and realizing how years of environmental exposure could shape the disease in front of him.

BILL FRIST: I see every day how the world around us that we interact with—the natural world—and how people interact with that natural world actually undergirds our individual health.

KRIS SARRI: Senator Frist's career unfolded in a few distinct chapters. He began as a heart and lung transplant surgeon, working on the front lines of medicine. He then moved into public service, representing Tennessee in the United States Senate, eventually serving as senate majority leader, where health policy became a central part of his work.

Today, his focus has widened even further. As chair of The Nature Conservancy's Global Board, Senator Frist is a leading voice for the idea that protecting nature is inseparable from protecting human health.

BILL FRIST: Medicine taught me to ask what is causing the illness in the first place; policy taught me to think it's scale, going global to scale; and conservation taught me that the system supporting life and our healthy forests and wetlands and oceans and grasslands and biodiversity are not sort of out on the edge, are not peripheral to human well-being—of the individual, of their families—but they're really foundational to it.

KRIS SARRI: It feels fitting that we're ending our podcast season here because in many ways, this conversation brings the whole narrative into focus. All season long, we've been talking about solutions to biodiversity and climate challenges. Underneath all of it is something even more fundamental: health. The health of us individually, and the health of our planet.

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At The Nature Conservancy, our mission is to protect nature for the benefit of people and the planet. And nowhere is that connection clearer than in our health—because when nature thrives, people do too.

BILL FRIST: Really unhealthy environments contribute to as much of—and this is from the literature—nearly 25% of deaths across the globe. And that's a staggering number, but it does tell us that protecting nature is not separate from protecting people. That what we do in our environment and how we interact with that is no different than how we preserve and protect the well-being of individual people. So it comes down to the nature, and the world around us is one of the smartest and most practical and, probably, most overlooked ways we have to reduce disease and improve well-being and to strengthen our communities.

KRIS SARRI: Planetary health—that's the way Senator Frist described this growing field at the top of the show. It's a term that captures a powerful idea: the health of people and communities depend on the health of the climate and nature around us. The

Nature Conservancy recognized the importance of this connection and brought on its first planetary health scientist, Dr. Catherine Machalaba, and I wanted to bring her into this conversation.

Her work sits at the intersection of ecology, public health and policy, helping translate what's happening in nature into what it means for human well-being. From emerging diseases to the ways healthy ecosystems can protect and sustain communities.

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CATHERINE MACHALABA: We often say, “health in all policies.” You know, every policy is a health policy at the end of the day, and I think that's really very true when we think about environmental policy and the impact it can have on our health. It's often very invisible—that impact when things are going well—when we have a healthy environment, we're getting the benefits. We sometimes don't think about that and say, gosh, we have to keep investing in this or even really scale it up to continue those benefits, but it's vitally important.

And I think that upstream opportunity of where we usually think about health or medicine—the water we drink; the food that we eat; the air that we breathe—it's those many services that ecosystems provide when they're healthy. And it's the role of salamanders and frogs in mosquito control; and then that, of course, helps regulate disease. It's the reduction in stress levels, it's, you know, being in nature to be able to be healthy and enjoy life. Nature shows up for us every day, and I think that value that we can gain from it is really an opportunity to say, “gosh, how do we improve this?”—this health system that's, you know, in our backyards or our preserves—and invest in it and make sure that those functions and services are there for the current generation and into the future too.

KRIS SARRI: I think it's always interesting that sometimes, you know, people want clean air, they want clean water; we sometimes think about those as infrastructure that you put into place to have it, versus understanding that the natural systems actually create it. I always—I'm a big fan of the ocean—and I always like to tell people, 50% of our oxygen comes from these little critters in the ocean that produce it.

BILL FRIST: I think by taking these examples, it makes it real to people, 'cause we talk about planetary health and just the very nature of it, people say, you know, “what do you mean it's so big?” And it really brings it back, and when we talk about things like restoring marshes or reducing erosion, it sounds like initially we're only talking about

habitat, but when you take this lens of health and well-being, we're also talking about protection.

Protection from flooding; protection from contaminated water; protection from displacement and the mental health anxiety and the stress that comes from that. We're talking about mold and fungi, which cause disease. We're talking about this long tail of disruption; if you have a major storm with increasing storm patterns and changing storm patterns.

KRIS SARRI: And, Senator Fris, I also think those healthy marshes are so critical to seafood production. It's amazing how much nature provides: it's providing that flood protection; it's providing mental health because you love these beautiful salt marshes; and then it's actually providing us with really healthy food.

BILL FRIST: That connectivity and this sort of flow throughout society, a lot of times when I'm speaking on this when it's on the coast, like in Massachusetts, it's a little bit easier because people know how important fishery is in fish. But across America, indeed, across the planet, remember this is planetary health. We've got 6 billion people who really do get a major part of their diet from fish. So what happens in these waters is absolutely critical to all people all across the world coming in—and that's the planetary component—which translates down to the food an individual eats, and the food that individual eats determines whether or not health or disease occurs in their life.

KRIS SARRI: So when we frame environmental decisions as health decisions, how does that help us bring in new partners or new perspectives into the conversation?

BILL FRIST: What it does, it brings everyone to the table, and sometimes environmentalism can be siloed; it has its own language, its own history, its own scientists. Clearly, from the political world, people become very tribal, unfortunately, when they talk about things like climate change, but you want to keep people at the table.

You want to bring people to the table, and every one of us—every one of us—care about health: our health, our partner's health, the health of our children, the health of our grandchildren. We want our families healthy. We want our children healthy. We want our communities to be places where people can come and thrive and live fulfilling lives.

CATHERINE MACHALABA: And the cost of inaction, I mean, it's extremely high. There was a recent paper published by a colleague at The Nature Conservancy that

found that rising temperatures are making daily life unlivable. So this study found that 35% of the global population now lives in areas where heat severely limits safe activity.

I think we can remember the very hot days, and actually how it doesn't even cool down at night sometimes, and you can't get a good night's sleep. But what that means is that, you know, people are gonna have challenges gardening, doing construction work, playing tennis, doing the things that we love—or our employment, you know, agricultural workers are in that hot sun—and really what that means for health. And so more hours, more days, and that trade-off of if we, sort of, get to that point where it's unlivable, you know, what are we missing today? And I think that's where nature can play such a critical role, so certainly in stemming future greenhouse gas emissions—the mitigation potential—but also in providing cooling and shade to adapt to high temperatures.

And I think if you're living in a city, you really feel that heat island, the urban heat effect, and it just gets so hot, and if you have some trees around, you really feel that cooling. So it's as something sometimes just as simple as saying, gosh, we're gonna green up the community and do our part to be contributing to reducing climate change, but also getting those immediate benefits so you can be outside and really enjoy safely.

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KRIS SARRI: I want to pause our conversation with Senator Frist and Catherine Machalaba to highlight something important: earlier, we mentioned that nearly 25% of deaths worldwide are linked to environmental factors like air pollution, contaminated water and climate change, but those impacts aren't shared equally.

A 2019 study published in the Proceedings of the National Academy of Sciences found that white, non-Hispanic Americans experience what researchers call a “pollution advantage,” meaning they are exposed to about 17% less air pollution than the population average. Meanwhile, Black and Hispanic Americans experience what the study calls a “pollution burden,” with roughly 56% and 63% more exposure. And the disparities can be even more stark for people who are already vulnerable. For someone living without reliable shelter, colder winter days and hotter summer ones aren't just uncomfortable, they're something you feel on your skin every single day.

GARGI COOPER: Most of us think, oh, summertime is coming; I'm gonna get my tan; I'm gonna get out to the beach; I'm gonna be able to kind of, you know, feel better in the sun. And a lot of our folks who don't have adequate sun protection—they don't have

adequate sunblock, right?—that costs money. We see burns, we see significant sunburns, skin burns, blistering and heat exhaustion.

KRIS SARRI: Gargi Cooper is the medical director for the Recuperative Care Program at the Lynn Community Health Center, in Lynn, Massachusetts. The Health Center provides medical care to housing insecure adults. Gargi's program hands out water bottles, cooling towels, sun hats and ice. Things you wouldn't typically find in a health care clinic, but this is what medicine looks like when the environment is one of the patient's primary health risks. From that vantage point, she sees something most of us don't: the human impact of a changing climate.

GARGI COOPER: I can say that every patient that we serve is impacted by the environment or their environment in some way. I think anyone living outside and watching their trajectory of health decline so much because of the elements is really hard. And we know that the average life expectancy of someone experiencing homelessness is declined basically because of environmental factors, because they don't have a roof over their head and because the elements are literally impacting their physical body in a different way.

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KRIS SARRI: Gargi sees more than despair. She also sees what happens when communities invest in solutions. When people are given a safe place to rest, recover and be cared for, the body responds. Healing begins.

GARGI COOPER: One of the unique things about the respite is that we get to witness healing here because people come in and they stay with us for months, which is pretty an amazing part of my job.

But we would see folks with some severe, almost like your skin is like leathery 'cause you're so in the elements, or in the sun. It's—and like, to see that's actually a very clear physical change, right? As people are healing, you could see their skin improve, their hydration improve, their meals improve, their weight improve...

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KRIS SARRI: Lynn, where the health center is based, is a diverse city of more than 100,000 people from around the world. It lies along a beautiful stretch of coastline on the North Shore. And that very shore is another place where the relationship between the environment and health shows up.

CARDELIZ PAEZ: It has a terrible odor [laughs] and so it kind of smells sometimes like rotten eggs or what have you...

KRIS SARRI: That's Lynn City Councilor Cardeliz Paez, describing conditions along the city's coastline, where something as simple as going for a swim can come with real health risks like infection. This is because of high bacteria levels coming from contaminated storm water runoff.

CARDELIZ PAEZ: From just living here, a lot of people, whenever you say like, “oh, I'm going to the beach”, and you say like, “oh, I'm gonna go swim”, they're like, “are you insane?” There's just already, because it's been an issue for a very long time, that it's just a cultural concept that you don't go swimming in that water,

KRIS SARRI: As troubling as that is, this is another example where the right investments can make a real difference. The city has begun investing in ways to clean up the water and make the coastline safer for people.

CARDELIZ PAEZ: In collaboration with Lynn and Swampscott, there was a UV pilot program in which they're using ultraviolet lights technology to clear some of that wastewater so that it's easier for people to go swim.

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KRIS SARRI: The UV technology is used inside the pipes to disinfect the stormwater before it gets to the beach. Listening to stories like that, you start to see how closely these issues are tied together. Health, environment, community—they're not separate challenges to solve one at a time, they're part of the same system.

And that's something we've been circling all season. When we talk about restoring coastlines, improving rivers or reconnecting wildlife habitat, we're also talking about safer communities, cleaner water and healthier lives. In other words, caring for nature isn't just about protecting landscapes. It's about shaping the conditions that allow people to live well. Senator Frist had a great example of another solution found in nature.

BILL FRIST: As a heart transplant surgeon and a lung transplant surgeon, I am able to do lung transplants today. They weren't done when I first started. I have—right now, the longest living lung transplant in the world is a patient of mine that I'd transplanted 36 years ago.

She would not be alive today if it weren't for the fact that two Norwegian scientists—back about 10 years before I did that transplant—were out exploring and they came across a particular fungus in the ground that they dug up, took back to the laboratory, and it had the specific medicinal properties that allowed me, 10 years later, to do what's called a bronchial anastomosis.

But healing of two parts of the donor lung and the recipient bronchus, putting those together, that drug allowed that, which never had been done in history. And now thousands of lung transplants have been done because of that one medicinal element that came from nature—directly from the soil.

KRIS SARRI: Something that is so unique about what The Nature Conservancy is something, Senator Fris, you mentioned: it's the ability to scale. So we've been talking about nature is the solution; we've been talking a lot about, throughout this podcast, about what's taking place in Massachusetts, but we need to scale all of this because it's planetary health.

That is something I think is so unique about The Nature Conservancy: the ability to say, we touch down locally, but we can act globally, and we can really go to those places where we can have the greatest impact.

BILL FRIST: There are a thousand scientists that are there. No other conservation group in the world has that many scientists that are working. So what we've added with the Planetary and Human Health Initiative is having those scientists look at everything that they do through a filter of how it impacts human beings today: the intimacy, their health, their well-being. No other organization can do that.

And so what The Nature Conservancy can uniquely do is say, okay, in Quito—and I've forgotten how many people live in Quito, but millions of people—20, 30 years ago, the water was not clean there. The sanitation, not good there, and it would be the number one cause of death. More kids under the age of five would die of waterborne disease than anything else. And so starting about 20 years ago, The Nature Conservancy working locally and with partners, bought—began to buy—the headwaters up in the Andes mountains, and then, by buying the headwaters, cleaning up the headwaters, all of a sudden clean water would flow down into Quito, and now about 50% we partnered with people of the population have clean water.

And we did that by partnering with local farmers; people who lived there for generations, coming in, working with their land; helping fence out their cattle; paying

them appropriately. And all of a sudden people started living longer in Quito, and that's a big water project that was then repeated in another area of the world.

And today we have 44 projects at that massive scale that are bringing clean water to, now, millions of people, but it really started with that local fencing, cattle-out riparian border, that model. And we do it by partnering with organizations around the world. And this is just the kind of example of non-government organizations working with government organizations with some innovation, working with local people and partners can accomplish.

KRIS SARRI: So we've been spending a lot of time talking about how the healthcare sector, or public health, needs to integrate nature. I think it's also fair to ask, how do we need to do a better job when we're thinking about nature based solutions to integrate health into those systems?

CATHERINE MACHALABA: There are so many great examples that we're seeing that, really, we can learn about the how of how health benefits are happening. I wanna highlight one great example: we were talking about salt marshes before, what's happening along the coast in Long Island's Accabonac Harbor, which is a 250-acre preserve in East Hampton. It is very popular for recreation. It has biodiversity value. You have some people fishing out there, and like many marsh areas along the East coast, the marsh was degraded. About a hundred years ago, you know, you think about the farmland, what happened in that area? You know, you lost a lot of those ecosystem services, you lost the natural water flows, you know, the floodplains.

And so there's a lot that happens when you lose that; you sort of lose that natural balance of that ecological protection and regulation of different species. So mosquitoes; I know a lot of folks are concerned about West Nile virus. We have the summer coming up, equine encephalitis, you know, we're concerned about these more and more. And I think there's a great example from this harbor—this Accabonac Harbor marsh—where there was a collaboration formed between Suffolk County Vector Control, East Hampton and the Nature Conservancy, and there's a big problem with spraying—insecticide spraying—sort of mass spraying of this harbor out of concern about West Nile virus. And it was noisy, it was costly, you had the helicopters overhead. You know, you were wanting to go out there and enjoy—this is a recreational area, it's a quiet area—and you're having these loud helicopters in the summer, and there was a lot of concern about the pollution from that spraying too.

So there was a great partnership started and it's really been three components that have been core to reducing the spraying and reducing the risk: so the first was looking at

marsh restoration, so doing a holistic view, you know, how do we improve the ecological functions here? So this was a restoration effort, to really reduce the stagnant water, help the water to be really flowing so you don't get that mosquito breeding. So that was the core part, the restoration.

Then, also citizen science efforts. So volunteers walking the marsh weekly during the mosquito season to monitor the pools and report if they're seeing any larval areas. And then really doing a risk-based spraying. So if you're seeing those pools, if you're seeing the larvae, then targeting your insecticide there, as needed. This has had a profound effect in terms of reducing that cost, in terms of reducing those non-target effects of the insecticide use. So if you think 10 years ago, to 2016, there was about 2,000 acres treated with pesticides, so weekly spraying of the marsh. Last year, only a hundred acres, and only spraying twice in that whole summer.

So really, when we're thinking about how nature can be part of these solutions; working with public health agencies; working with environmental agencies; working with towns that really want to figure out some long-term solutions that are cheaper, that are safer for people and ecosystems. So I think there's thousands of examples out there like this that we're learning from, and I think that's only something an organization like The Nature Conservancy can really do at scale to advocate for, gosh, these are public health solutions.

BILL FRIST: I think one that really comes to mind, that speaks to me, that nature is medicine. Again, I got my doctor's hat on, but it's just, that's the perspective that I look at so much of this, and one of my favorite examples is urban greening. It's such a clear reminder that nature can produce measurable, measurable health benefits. A great example is the Greenheart Louisville Project, and that's a collaboration among the University of Louisville, The Nature Conservancy, and our partners and local communities.

And what makes that project so compelling is that it addresses a multiple number of inequities at once. It improves access to green space, it helps reduce the air pollution, it provides shade and cooling in neighborhoods that need it most. Five years into the program, we're seeing real clinical measurable effects from this exposure to nature. There was a notable decrease, statistically significant, in a measure in the blood that we all get taken when we go to the doctor called C-reactive protein, and it's a marker for chronic inflammation that causes heart disease and causes stroke and causes cancer. But that C-reactive protein, a marker of inflammation, fell and it was like 15% less in those neighborhoods that had the trees, itself. So as a physician, that gets my attention because it tells us that nature is not just pleasant and it's not just beautiful—which

again, I love—but it's protective; it can lower risk; it can improve health in ways that we can actually measure.

KRIS SARRI: I love that example. When I first heard that coming to The Nature Conservancy, I was so proud to be part of this organization that had made that connection and was looking at it as an actual kind of clinical drug to help people. It's an incredible story.

BILL FRIST: You know, people ask a lot—or they ask me a lot, as I travel around as a physician and as someone who spends a lot of time in conservation issues—what they can do. And I always carry a card with me that has 10 things you can do right now and an immediate, and then that's good 'cause I have a good answer to it. And like a good former politician, it's always good to have an answer like that, but I think the one thing that all of us can do—and it's probably the thing that our Chief Scientist Catherine Hayhoe always, always says—the one thing that everybody can do is just talk about it, do what we're doing now. Have a conversation about things like tough issues. Some of 'em, biodiversity loss, climate change, which people tend to be almost paralyzed to talk about, in part, 'cause of our political situation. That the language and the framing of what we're talking about just got so polarized, so tribal, that people don't even want to talk about it.

If you just have a conversation, you know, how are these hotter days affecting your kids? When they can't go outside to recess, how is it affecting their acting out, or ability to learn, or to think if it's one degree hotter? Are they learning as much? How does it affect you in the way that you feel? Not necessarily just having a heat stroke and going to the hospital, but affect your everyday life? And approach it that way and keep people at the table talking about it.

There is no question, from a scientific standpoint, that the planetary health, the health of the environment around us, shapes—doesn't control totally, 'cause there's genetics involved, there are other things—but shapes our health and well-being and there's no question about that. And just have the conversation that way.

And when you do that, you'll see that an element of hope springs up because people say, “Oh yeah, I sort of get it. There are things that I can do and become a part of a mission that's much bigger than myself.” And that's what I find. So if there's one thing that I would encourage, and it's what this program in this series has done, it is basically put things on the table to stimulate conversation in a gentle and a dignified and a careful and in a friendly way. And if we can do that, I remain absolutely optimistic and

confident that we'll be able to address all of these issues that are big, challenging, new—and many of them, human-created—problems that we have today.

KRIS SARRI: Hope and optimism. That's exactly where we should land. As we come to the end of this season, it's worth pausing for a simple, but important, idea: this podcast exists because solutions exist. Around the world, The Nature Conservancy is developing and testing ways to protect ecosystems while supporting the people who depend on them. Their work spans forests, coastlines, farms and cities—but it's part of a much larger movement. People are now restoring wetlands, protecting fisheries, rethinking agriculture, and designing communities that work with nature rather than against it. Taken together, these efforts point to something powerful: the future isn't just a story of risk, it's also a story of possibility.

So before we close out the season, I wanted to return to a question we've asked throughout this podcast: In the face of so many complex challenges, why should we be hopeful about the future? I asked this to Senator Frist and Catherine.

BILL FRIST: I'm very hopeful, and I'm very optimistic. The American people understand today—if you look at survey after survey after survey—of increasingly, people recognize the importance of addressing fundamental issues that are around us, and that is the type of food that we are eating and putting into our body, and the regenerative agriculture behind that. They're looking at that. That our clean water does matter to their impact and to their health, and water and sanitation. That the soil under their feet, and the quality of that soil, gets reflected in the food that they eat. So survey after survey has come in that the American people are ready for the sorts of changes that we're asking for, and it's simply not big changes. It is protecting nature and recognizing that nature around us has a huge impact on the individual health.

CATHERINE MACHALABA: And there's so many solutions. I mean, I think that's really, knowledge is power in terms of there's so much that can be done on all different scales. And so it's not something that we sort of have to wait and see. We can really get started and, you know, imagine where we can be in 10 years in terms of nature and health connections. And this is happening to some extent already. You know, nature prescribing, getting people out in nature, making nature more accessible so that more people can enjoy it and really not have those barriers to accessing nature. But I think that opportunity to really, embrace this and say, gosh, you know, let's try this out on a large scale. And I think that the co-benefits too, are so important that, gosh, why wouldn't we want to solve multiple problems together? And so really a lot of the solutions are at hand to get started and to really scale up.

And also I love the distinction about hope and optimism. You know, I think hopefulness is waiting for some, you know, it'll get done. I think someone will do it. And optimism, that's something I've seen from so many colleagues and partners of The Nature Conservancy of, gosh, let's do our best to get it done together and hopefully a lot of folks will join us too.

KRIS SARRI: I like that. Thank you. Senator Fris, Catherine, thank you so much for joining us today for this final podcast, of *Nature is the Solution*. It was wonderful talking to you both.

BILL FRIST: Thank you. It's been a pleasure.

CATHERINE MACHALABA: I thank you so much.

KRIS SARRI: Thank you so much for listening to *Nature is the Solution*.

This is our final episode of the season, so I want to take a moment to express my gratitude to everyone who joined us along the way: our guests who shared their expertise and stories, and all of you who spent time with us thinking about these challenges and the solutions within reach.

Over the course of this season, we've explored coastlines, landscapes, climate and the communities working to care for them. And if there's one thread running through all of it, it's this: when we invest in nature, we're also investing in people. So let's keep working on the solutions together.

Thank you for listening to *Nature is the Solution*. I'm Kris Sarri.