Suzanne Simard: "Speaking for the Trees, Calling for Change"

Season 2, Episode 2

***Small Planet Heroes* Podcast**

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***This transcript has been lightly abridged for optimum coherence and flow.**

Kai: Hi. I'm Kai Chan. I'm a professor and Canada Research Chair at the Institute for Resources, Environment and Sustainability at the University of British Columbia, and founder and lead of CoSphere, a Community of Small Planet Heroes and a student-focused think tank. And I'm here with Nancy Kang for the first time, one of our brilliant co-hosts for Season Two. Nancy, can you introduce yourself to folks?

Nancy: Hi, I'm Nancy Kang. I'm Canada Research Chair in Transnational Feminisms and Gender-Based Violence at the University of Manitoba, and Muriel Gold Professor at the Institute for Gender, Sexuality, and Feminist studies at McGill University.

Kai: Wonderful. And you are here with me in the studio today so that we can have a conversation with somebody really special.

Nancy: Absolutely!

Kai: Yeah, somebody who has actually, relatively recently, this very year, been named as one of Time's Most 100 Most Influential People.

Nancy: Dr. Suzanne Simard is a professor of forestry ecology at the University of British Columbia, and she's also a very renowned author of the 2021 New York Times bestseller, *Finding the Mother Tree.*

Kai: Yeah, her office is actually just a stone's throw from here, if you–if you can throw uphill–not far at all. And her work has been centered in several pieces that almost anybody that would be listening would have heard of, like James Cameron's *Avatar*, where the Tree of Souls was inspired partly by her work. That's amazing! I love that tree.

Nancy: Yeah, absolutely. And as well, Dr. Simard's TED talks have been seen over 10 million times. She's not only performed for the TED Youth Forum, but also for various other TED platforms. And could you tell us, Kai, about her central idea?

Kai: Yeah, I love this idea, you know, and I didn't realize how early Dr. Simard was involved in this research until much more recently. After having been colleagues with her at UBC for already more than a decade, Dr. Suzanne Simard's work shows how connected things are in forests below ground in particular; that trees are not only in communication with mycorrhizal fungi, but also with other trees; and not only between individuals that may, in some cases, be genetically connected, but also between individuals that are much less related; and between species–sometimes in predictable ways–between Douglas Fir and aspen, I believe, or birch?

Nancy: Cedar?

Kai: I don't know, she's gonna tell us!

Nancy: Dr. Simard will also be telling us about her seminal theory of Mother Trees, which really underscores the nurturing role that these large trees inhabit. She's also very well known for not only her humility, but also her capacity to speak to a broad range of thinkers as well as citizens. She's involved in citizen science projects, one of which is the Mother Tree Project.

Kai: Yeah. So, not only has she published those 200 peer-reviewed articles, but she's actually trying to influence policy and practice, and having some success in doing that, not only through the book and the TED talks, but also through this–this project. I can't wait to talk to her.

Nancy: We wanted to also mention that she is a consummate mentor. She's supervised over 30 Ph.D. students as well as a number of postdocs, and she makes really an important contribution to the profile of women scientists in Canada and beyond.

Kai: And so, for Season Two, with our theme being the role of science in transformative change, she's going to be a perfect person to talk to. She's got these contributions to how we think about forests, as well as to the practice of forestry, and then she's got that mentorship angle and broader engagement with community building. So [that's] every aspect of transformative change we're going to have in this one conversation.

Nancy: Welcome, Dr. Simard!

[*Medley of Small Planet Heroes theme song:*]

If there's a pit in your stomach from the way that we live,
You want it to change, something's going to give,
We've got stories that'll give us a glimpse
Of better ways to reconnect everything.
We're Small Planet Heroes,
Small Planet Heroes.

Suzanne: Thank you so much. What a lovely conversation.

Kai: Hello, it's so great to have you here!

Suzanne: Nice to be here.

Kai: This is not going to be the normal conversation that you have about–it's not going to be centered necessarily around your book, although, of course, it's going to come up because it's such a great piece. It's going to be more thinking about your work in relation to "big change," system change, or *transformative change*, as called by IPBES (The Intergovernmental [Science-Policy] Platform on Biodiversity and Ecosystem Services). We're going to be thinking about how science *sometimes* plays an important role, how sometimes that role is limited in terms of its effect, and–and what it's like for those of us who are actually *pushing* for that kind of change from within the academy or from within a scientific perspective.

Let's talk about you and your path into this role as a scientist and as an advocate. My first wondering is: you talk about "speaking for the trees" in your book, and the one that I think of most when I hear that term is *The Lorax*. Do you ever feel like the Lorax at all?

Suzanne: I think many people feel like the Lorax. I'm not, but I–I definitely relate to that character.

Kai: Did you–did you read *The Lorax* when you were a kid?

Suzanne: I did! I mean, my parents read Dr. Seuss to us, and so yes. And then I read that to my own children.

Kai: Yeah, and you talk about how your early experiences in the forests, including with families that were involved in forestry, helped shape your views of those forests, as well as your desire to understand them better. But how about–how about that, like, the urge to do something about it. When did that come about?

Suzanne: I think when I started working. So I graduated from UBC as a forest–forestry student, and I started working in the forest industry. And what I was witnessing, what I had become part of, was it–it grated the wrong way with me because it didn't fit with how I understood forests. I understood forests as *whole systems*. Like I grew up in old growth forests. And think, you know, back in the 1960s when I was a kid, our whole–the whole province–was covered with old growth forests. That was the norm. And so we understood forests as deeply-connected relational systems. And then forestry taught me that *it wasn't that at all*, that, you know, it was all about the trees and growing trees for commodities to extract. And I thought, "That's not! The forest is a *living system*. It supports us, and you're–we're not looking after it in that way." So that's what got me going. I mean, I felt like I'd become part of this machine that was heading in the wrong direction. And I slowly realized it didn't–it wasn't an overnight thing, but it was always grating me. And then I, you know, I grew into who I am today.

Kai: Yeah, and so you grew into this identity of what we might call a *revolutionary*. I think a lot of the folks that we're going to have on this podcast, we might call [them] that in the sense that they're folks that are out there to change things in a big way. But would you wear *that* term "revolutionary" as a part of your identity?

Suzanne: I would never call myself that. [**Kai:** No] I feel like I'm–I have a perspective that allowed me an insight of where I came from, the family I grew up in (which were horse loggers), and then becoming a–it gave me an insight that a lot of people don't have. But the ideas that I have are ancient, so I'm not, you know, I'm not an inventor of these ideas. I'm just somebody to say, "Hey, there's another way to look at forests than we're doing right now, and it's got a lot of merit, and it could really help us as, you know, as we move forward with global change."

Kai: Yeah, and it seems to need to be a *pretty big* change, right?

Suzanne: It is transformative. It *has* to be transformative.

Kai: Yeah, because the clear cuts that we see today, they do not reflect the science that you're famous for, right? If the soils are alive with these vibrant connections between trees and with the fungal networks, then what happens when we have a clear cut? Just describe it at the scale of possibly 1000 hectares. Does that soil stay there and all the carbon within it?

Suzanne: So many things happen. And I invite viewers, you know, if you get a chance to, you know, go into an old growth forest. That's what a forest feels like. Then go into a plantation or a clear cut and you'll immediately see the differences, you know. Immediately it's hotter. That's huge. And then it's got a much different plant community, and that plant community is, you know, adapted to

these big, open conditions. That plant community reflects what's going on below ground. So the fungal community, the soil, food web–all gets changed because the plant community has changed above ground.

Kai: Because during the clear cut, most of those networks are going to die, right?

Suzanne: Yeah! So, yeah. So the mycorrhizas are–that's what I've studied, you know–these linkers that link trees together. They're mycorrhizal fungi. These are a particular kind of fungus that associates with trees or any kind of plant. There's only a few plant families–I think there's five in the world– that don't have mycorrhiza, so all the other ones have them. And it's a highly evolved, ancient symbiosis where the fungus grows through the soil and picks up water and nutrients and delivers it back to the tree or the plant, and the plant provides photosynthate in return. And so they're both getting their needs met. So if you take down the trees, you're also taking down those obligate mutualists that are the mycorrhizal fungi. It's not that they all completely disappear. Some are left behind, especially because there's other plants that still will come back: the early successional plants. But there are different, you know, different *suites* of fungi than the ones that are on an old growth forest.

Kai: Yeah. And much of the carbon that's stored in that soil is then vulnerable, right, to being respired to the atmosphere and contributing to climate change?

Suzanne: Yeah.

Kai: I find it so funny when I understand your work and its implications for climate: the release of carbon and [it] further exacerbating climate change. It makes me think of when I grew up, we distinguished between mining and the extraction of renewable resources. And I don't really see that much of a distinction anymore. Like it feels like we're mining the soils with forests, if we are stripping them so completely of the vegetation above ground that it's starving and killing the networks of all of these organisms below ground in an effectively–an irreversible way–because we're not replacing anywhere. We're not replacing those old growth forests with old growth forests in 400 years, right? The plan is to continue harvesting them as monocultures and even age stands over decades.

Suzanne: Yes, that's it. And you're right that it is an *irrecoverable* loss, because, you know, these forest floors, like in the coastal areas, they can be a metre deep in some areas. And they took 10,000 years to develop. And so if you're losing–you know, what we're finding is that 60% of the forest floor is lost immediately with the act of logging. It goes, you know, where it goes, I don't know completely. But that 60% took a *long* time to get there. So you're right that when we continue, you know, it's going to take that much time to recover it unless we do some innovative things, which I think there are things we can do. But the first thing is to stop doing that logging of these primary and old growth forests, so that we're–so that we're not furthering this irrecoverable loss.

Kai: Just stop it entirely.

Suzanne: Well–and of course, many people will go, “Oh, my God, we can't do that!”

Kai: Well, economically, the forest sector in British Columbia is subsidized in a kind of intentional way, right? It *would not* actually be feasible with the current business model. If I–correct me if I'm wrong–if we were not logging any of those old growth forests that it's, in a sense, it's the

high-value products coming out of those old growth forests that are subsidizing the cutting of the plantations that have been planted, which are *nowhere near* as valuable. Is that not right?

Suzanne: Yeah, I mean, the BC Truck Loggers Association estimates these plantations are about a quarter the value of the old growth forest. I think they're pretty accurate, you know, maybe even less valuable, because they're still obviously targeting old growth forests as *much* as they possibly can because they're so much more valuable in the economic realm. And then ecologically, they're irreplaceable.

Kai: So imagine that we did stop logging old growth. Back a few years ago on the *Mother Earth* podcast, you were excited that the province had just announced that it was going to stop logging old growth forests. Has that come to pass?

Suzanne: So there was the Old Growth Strategic Review that was led by Garry Merkel and Al Gorley. And that was, I think, three or four years ago. And there were, I think, 19 recommendations that would have amounted to basically stopping logging these vulnerable old growth forests. And as far as I know, you know, those old growth forests are coming down every day. [**Kai:** Yeah] I mean, we go out in my Mother Tree crew and we go to these forests that were 1000 years old and just logged last year, and we were measuring the impact. So it's happening every day.

Kai: That must be heartbreaking.

Suzanne: It is, it is, and it's *so* unnecessary. I think that's the part that is so heartbreaking.

Kai: So if we did stop that and we–let's still talk about clear cuts in the imagination that, of course, the forest industry is going to continue to log the plantation for us. What you've proposed is to retain some of the Mother Trees on the landscape as a way to mitigate some of these losses of the soil and mycorrhizal networks. How much–how much would that help? And how many–how many of the big trees would you need to retain in a forest?

Suzanne: So, yeah, this Mother Tree Project I started about 10 years ago, and it was, you know, I was–at the time–I was thinking, "We need to address clear-cutting, but in the–and then devise all these treatments for alternatives to clear-cutting." And what we learned in the process is, you know, these losses of biodiversity and carbon pools. And I came to the realization that the number one thing that we need to do is what we just talked about: stop logging old growth forests and stop logging primary forests. That's the first thing we learned. The second thing we learned was what we sought to understand was retaining old trees, which we called Mother Trees. They're just the biggest, oldest trees in the forest. How do we retain those and what patterns and different kinds of ecosystems, knowing that what you do in forests should be place-based? It should be about the ecosystem and the place, and it's not going to be the same answer everywhere.

Kai: Right. I just realized I was talking about retaining the big trees in a plantation forest but that doesn't really make sense, right? Because they're pretty much even-aged. I mean, they're the same age, and so they're probably pretty even-sized. How does that play out, the Mother Tree idea in a plantation?

Suzanne: So yes. So plantations have some variety as well. It's *not* the same as an old growth forest. There's so many differences. Old growth for one: the *huge* structure, so vertical structure, gaps in the canopy, you know, regeneration coming up under old trees. All the biodiversity associated with old forests, you know, it's an *immense* difference, but there is still some variety in a

planted, monotypic plantation. Yeah, you know, not all trees grow at the same rate. There's–there's stratification, and so you can still work with those plantations and we're doing this now. We're trying to restore some of the–the coniferous industrial plantations that are kind of like biodiversity deserts. And we're focusing on the biggest trees in those, protecting those big trees, especially if they're iconic, you know, trees that are valuable to First Nations (like–like cedar, for example), or even just the largest trees, and then using them as islands of recovery. So that they're like attractants to biodiversity, and that they advance or accelerate the development of old growth structures even in these planted forests.

Kai: And how many would you have to retain for it to make a real difference? Would it be like one in 100 or?

Suzanne: It just depends on where you are. So okay, so we–our project covers a climate gradient that's 1000 kilometers long, and we've got nine experimental forests across from dry, hot forests in Douglas fir, all the way to the coldest, wettest at the northern reach of the limit of Douglas fir in British Columbia. And so it varies depending on where you are along that big climate gradient. So what we found is that when you're in really harsh environments, like *very* arid or *very* cold, that retaining high levels of overstory [upper level of vegetation in a forest] is what protects values the most. You still get regeneration, but you protect carbon pools and you protect biodiversity. So we're–you know, we tested up to 60% retention. So we're saying 60% retention works okay, maybe even higher.

Kai: Right! So not, not retaining one in 100 the way I was imagining, the way– I think I had that picture in my head because of Lonely Doug, or, you know, some of these other cases where it's like one tree that you see standing that you're talking about.

Suzanne: And so, yeah, and so then as it gets more productive, so in warm, rainy environments, like on the coast of British Columbia, we have a site that's near here. We find that you can, you can take out more trees, because the whole system recovers that much more quickly. So if you want to maintain vitality and diversity and productivity of the forest, you can actually take out 90% of the trees. That sounds like a lot! But keep in mind that the trees are big and productive and grow fast. But one of the things we're finding, even as we arrived at this conclusion of retaining 10%, we're finding as climate is changing and we get heat domes and these big stresses that even those old trees are very vulnerable as the singles, and so I've revised what I think that we need to leave clusters around the big old trees to protect them.

Kai: I was wondering about that, yeah, that that's–that's fascinating. I'm just gonna ask: you mentioned climate change, and I–I wanted to go there anyway, especially in the context of fire. So I've been thinking about soils and mega-fires, so climate-fueled fires that are hotter and burn a broader expanse of space than would have been normal historically, right? Lots of people don't realize that there's a pretty qualitative difference between the fires that we hear and read about, the ones that burn through whole cities or towns, and that burn all the way down to the mineral soil, right? And many people don't realize that's actually not how fire was *most* of the time in *most* of these ecosystems that you work in, right? That many of those fires would have just cleared through the underbrush, might have killed some of the adult trees, but actually might have left many of them intact in some contexts. There's *such* a difference there, right between the recovery of a forest where you have the soils in some of the adult trees versus one where you're burning it all the way down to, as they say, the mineral soil. Can you just say a little bit about that?

Suzanne: Yeah, so most of British Columbia is characterized by what they call a *mixed fire severity regime*, and so that means that it's very patchy, just like you talked about. There might be some areas that are burned fairly severely, so that means a lot of the trees are dead, or even some of the forest floor is burned, but then there's *big* islands of other trees where it's completely skipped over, or it slightly burns through and and those are, you know, healthy systems that rebound really quickly. These legacy trees seed in the areas around them that have burned, and so the forest recovers. And of course, you know, we've outlawed Indigenous burning in British Columbia for over 100 years, and that created conditions where the fires didn't burn so severely because the fuel loads were lower, and they did this burning too.

Kai: Sorry–it was the repeated burning that kept the fuel loads low and the fires less severe?

Suzanne: Yes.

Kai: Now that we've *suppressed* the fires, of course, it's adding to the climate warming and drying that is making those fires burn so far.

Suzanne: Right, so you know the fire–I'm not a fire ecologist but–there's like the fire triangle, and you need fuel, you need ignition, and you need the right climatic conditions. And so we have all those things, right? We have lots of fuel because we outlawed Indigenous burning. We have the climatic conditions (it's way hotter and drier because of climate change), and then we have more ignitions, not just from people, but these drier, more climatically charged conditions create more lightning as well because there's more energy in the atmosphere. And so all of those things are working together to create this–this–this *very* explosive situation that is playing out in our landscape.

Kai: And so thinking about your work in particular there, what that means then is that in those places where the fires are burning hotter, they must be recovering much more slowly, and they must be *more* vulnerable to becoming something different, something else, something less productive and less diverse than the forest that were burned. Is that right?

Suzanne: Yeah, I mean, they're so extensive and so severe, and they, you know, they're like moonscapes [landscapes that are barren and inhospitable due to pronounced environmental damage] right after. If you drive through the Southern Interior, you cannot miss these extensive, huge, severe wildfires. [**Kai:** Yeah] And they are, you know, there is a recovery. So the native plants start to come back. If there's trees that live, they'll seed in. And so that does happen, but it's slower. And then there'll be areas that–that burn *so* severely and that's just ash, like really, really deep ash. Those are going to take a long, long time. I mean, really, you're talking about *pedogenic* processes that happen over hundreds, if not 1000s, of years.

Kai: Soil building.

Suzanne: Soil building.

Kai: Yeah, okay. Got it.

Suzanne: But I wouldn't, you know, there's one other thing that we're doing in the post-fire management of these places that is not, you know, helpful. One of the things–and it's really–

Kai: We being, like, Western industrial forestry? Is that what you mean?

Suzanne: Yeah, or the province, or whoever's managing the land. One is that we often grass seed these areas with domestic grasses, so that–

Kai: For ranching?

Suzanne: For ranching, mainly [**Kai:** Oh…] And so they'll put cows on these areas as soon as possible. And, you know, there's cattle grazing licenses all over the province and the forests, and these forests are not cow-adapted systems, and when they burn, they're especially vulnerable to cattle being in them. And I'm not trying to, you know, to denigrate the ranching industry *at all.* I'm just saying that these places are really vulnerable. They need time to rest and recover, and adding cattle and grass seed back in them is not helping, but that is the go-to prescription.

Kai: Wow. Let's pivot.

Nancy: Thank you, Suzanne. Some of the points that you broached in your conversation with Kai actually resonate very strongly with the Four Simple Solutions that you shared with us in your TED Talk back in 2017 [correct date: 2016]. I'll just reprise the first one: you suggested that we should increase local involvement and that would really enhance forest stewardship to those specific locations, as you just mentioned. Number two, you asked us, as you just enunciated, to save the old growth forests, and also not to cut–to stop cutting–but rather to cut less, and in doing so, you would save the legacies. And finally, you asked the audience to consider the very notion of letting nature heal, because mycorrhizal fungal networks are very resilient. But at the same time, it's a question of leaving nature alone for a while. So I was wondering if you could add something, a couple of points? What would you–given the time that's passed–what would you add to that list of "simple solutions"?

Suzanne: I'm so pleased that you read those. I had not reflected or listened to that since that was 2016 so eight years ago. I'm so proud of myself for enunciating those things. The one thing I would add right off the top is, you know, not just local communities–that's really important, local stewardship–but you know, honoring and upholding Indigenous stewardship. [**Kai:** Hmm] You know, as we come to the truth of what happened with Indigenous people in Canada, elsewhere in the world–but let's talk about Canada–there's a lot to uncover here. And revealing the truth of what's happened to the people and their land and their *relationship* to the land: that underscores and affects all of us. We think that we're–we're not affected–but we are all affected by it, and the unraveling (or the raveling) of our ecosystems is one example of that. The First Peoples are, you know, the rightful stewards of these lands; they know these lands; their culture, their governance, is embedded in the land; *it's about the land*. You know, imposing a colonial recipe on that is a recipe for climate change. And so that's what I would amend: first, it's not just local communities, it's *Indigenous* communities that need to be supported and upheld.

Nancy: Thank you. And your book is very clear and transparent about a sort of intellectual debt that is owed to traditional Indigenous ways of knowing. You mentioned Mary Turner, for instance, and how she coined "mother trees" to refer to birches, and Bruce Miller ("Subiyay"), whom you quoted in your talk as well, [his] notion of "tree people"--so intelligent beings who need to be understood as those with agency. I was wondering, Suzanne, if you could speak–I know that in your talk, you shared with us the experience of Jiggs, your–your family dog–who had fallen in the outhouse, and how in his recovery, you were able to see the [soil] layers and that identification in another talk that you gave, that you were a "child of the underground world." I

was just wondering if you could think more recently: is there another sort of epiphanic moment, or a moment of, like, sheer illumination that just made you feel renewed in your quest?

Suzanne: One that stands out…There's so many moments, it's hard to say there's any one iconic one like that! But one that really made me sit up is I was–I've been working with the Kwiakah Nation, and the Kwiakah Nation has a territory that's quite small. It's one of the smallest, if not the smallest nation in British Columbia. Their territory is in the Discovery Islands and on the mainland, just near Campbell River. They were removed from their territory in the late 1800s and, you know, through residential school systems, smallpox (as so many nations were), and then theirs was one of the first territories to be almost completely logged. And it's so thorough. And so I went there, the nation has basically restored their rightful sovereignty–or they're in the process of doing that over their lands–and they want to restore these damaged forests that have been converted [from] beautiful old growth to planted industrial plantations. And so I went there with them, and we were in an old–one of the few old forests that were left. We climbed up this hill and we dug down in. The forest floor was a metre deep. [**Kai:** Wow] It took, like, it took me a long time just–and finally I got my arm down, you know, to my armpit, down to the tippy toe of my finger. And I was going, "Okay, there's the mineral soil." So, like, a metre. And then–and that was amazing because it's so rich, right? It's like *centuries and centuries* of accumulation and decomposition, all those processes that the fungi and the food web are doing right there in that beautiful forest floor that is rich, rich in carbon and all kinds of life.

And then we went into–we walked from there into a plantation that had been logged not just once, but twice, and then a third time. And we walked in. We had to basically break our way into this dense plantation where there is no room to move, there's no plants in the understory, and we dug. And I got my shovel and I put it in the ground and *clink!* Within a few centimeters, we were at the mineral soil. So that had such a big impact on me and all the people that I was there with. And it was that moment of being in that place and making that discovery, that *visceral discovery* that we said, "We need to restore these places, and what are we going to do to do it?" And nobody knows how, but we go back, you know, to the basic principles. What created this forest in the first place? What do we have left after industrial that– do we work with? What legacies are there? I mean, there's still seeds and spores and the forest floor; there's still living trees; there's still birds that live there, right? There's still marbled murrelets in the old growth, and there's still eagles coming in, and we want to create, you know, accelerate the vitality of their homes. And so out of that grew, then, this passionate co-development with the nation to restore their ecosystems.

Kai: I can only imagine how that would have been so stark, that difference, right? For somebody who, like you now see the forest for its above and below ground life, right? And I think many of us would just be completely invisible to the difference, right, just like perceiving the trunks above ground. And yeah, we could see that, you know, we're having to crash through these branches because there's so much more undergrowth. But, like, the fact that there's a *metre* versus a few centimetres of that life below ground that, you know, maybe those centimetres didn't even continue much through the two or three rounds of clear cutting.

Suzanne: Yeah. I mean, and that, you know, we put these forests on these short rotations, and already at three rotations, we're down to a few centimetres. It's just not sustainable.

Nancy: As a consummate experimenter, including having your family members collaborate with some of your experience–experiments–such as [sister] Robin, as well as your late brother Kelly, and your

father, for instance. How has your approach to learning experientially evolved, especially in view of, you know, you have many students, and there's emergent technologies. Could you tell us a little bit about the adaptations that you've had to encounter and undertake?

Suzanne: Well, I always strongly believe (and I still do to this day), how I teach is–is that the best teacher for what I know is the forest. And so being in the forest is the first and fundamental thing. You know, the lectures and the textbooks is all secondary. And I still believe that, and that's what I instill in my students. We, you know, we're always out in the forest when I'm teaching here at UBC. And of course, I have a large crew called the Mother Tree Crew of students that have been with me for a decade. And they know the forest; they're forest ecologists because they understand how that forest ecosystem works.

As far as the emerging technologies: yes, we incorporated [those] all along the way too because they're helpful, you know. Things like, you know, if you're going to measure the height of the tree. Instead of, you know, when I was a student, you would use tapes and clinometers. Then we move to using range finders, and then we use lasers. And now we have satellite imagery, LiDAR [light detection and ranging] imagery that we can actually look at these things in a computer and calibrate our measurements with what the LiDAR tells us. And so we need to use all of these tools. And so we do, yeah.

Nancy: As a scientist, how would you define impact? What do you feel is the best measure of your own impact? For example, like, do you structure your goals around experiences and achievements? Or what is the more precious thing for you?

Suzanne: Well, I think I've–I think I've said it lots: my motivation–but I'll re-emphasize: the most precious thing for me is to see our forests protected and nurtured, and all the people who live in them [are] protected and nurtured, and vitality in their lives and well-being. That's what drives me. All this other stuff, like in academia: you know, how many papers you publish, and how many students you mentor, or whatever the numbers game is. You know, I had to–I had to fall into that to a certain degree too in order to be here. Otherwise, you can't exist here. But I think it's really good to always check on yourself and put it in perspective and say, "What is my real reason for being here?" There's so many things that we can talk about in academia or any kind of workplace that has all these, you know, these drivers that make people ill, actually, or can make them ill, and how that ought to change. But I always try to keep it in perspective. But I have to say that I also, like [physician and writer] Gabor Maté, you know, because he also, in his own personal life, suffered from this problem too. You know, we're all vulnerable to it. We're all in these systems trying to survive and get our needs met. But it's always good if you can step back and say, "What is my real purpose for being here?"

Nancy: Wonderful. I was wondering if you could speak about the difference between wisdom and then information, because oftentimes, if we think back to the title of your–your best-selling book, you talk about "the wisdom of the forest." What differentiates knowledge from wisdom?

Suzanne: That's a really good question. So you can read about a forest; you can know how to measure something. You know, you can measure very complex things, like, you can look at all the DNA in the microbial community and say, "I know about the DNA," but you might not have *any* idea of what the function is in that ecosystem. Or even if you had a small slice of one function, say–and this is, you know, molecular ecology is a lot like this, where we can identify this suite of organisms but we might say, "Oh, that one is good at nitrogen fixation," but every organism has

a multi-dimensional life strategy, and so we only know that one little aspect. And so the *wisdom* part comes in understanding that there's so much more than we're ever going to have in the knowledge centre. And so to treat the system wisely is to be humble and understand that it is about each organism working together, not as individuals, that it's a collaborative community approach to ecosystems, and that if you start, you know, *manipulating* that system with your own idea that, "Oh, we're going to create–and this is what's happened in forestry–we're going to create these beautiful big trees that are all the same species." Well, you're manipulating that entire system based on your singular objective without any wisdom about how that ecosystem actually works with this multidimensionality. So if we were *wise*, we would say, "The precautionary principle tells us we don't know everything, so let's keep these systems intact." That's wisdom versus knowledge.

Nancy: Thank you so much.

Kai: Nice. Now we want to talk to you a bit about your experience as a science communicator and an activist, maybe, or an advocate up to this point. So you've–you've done a lot and you know, both in terms of, we've talked about your TED Talk, we've talked about your book, we *didn't* talk about this program that you ran as a principal investigator called TerreWEB, which was training students to be science communicators. And this is actually how you and I first crossed paths, where one of my Ph.D. students, Paige Olmsted, went through that program. She *loved* that program, and she–I think she's still using what she learned in that in her work at Smart Prosperity Institute. And so you've had *all* these different roles: can you reflect a little bit when you think about helping society to *better* understand and take care of forests. What kinds of impacts have come from those different kinds of science communication approaches?

Suzanne: Yeah, you know, I think maybe the first thing is to talk about the common thread that runs through it all. And yeah, it seems like it's been highly varied, but I've always had this drive to protect forests because they're my home! So I want to protect my home and all the homes of my ancestors and my children. That's what drives me, and as I went through my career, it's always like, "Okay, we're doing that, and that's not protecting my home, so I need to change that. Oh, I'm doing this to protect my home, but it's not actually resonating with the people who are affecting my home. So I need to change that. So I need to learn how to communicate better. So then I need to develop, you know, there's an opportunity to answer, to create a program so we're better communicators of science and climate change science."

And so as we went through that, I was learning alongside the students, and so I remember one specific person that we brought in, and it was about telling stories. He told us how to, you know, what was, like, telling a story versus writing like a journal article, and they're like the complete opposite thing, right? You know, a journal article–or, you know, the way scientists usually communicate is you just–you lecture people. "This is the way it is," right? "This is what we did, and this is what we found, and therefore we conclude this." In storytelling, you invite them into the whole journey along with you, and they're the discovery, they're avenues of discovery too, and you're both delighting in this discovery process, and then "Aha!" At the end, there's like, "Wow, look what we figured out." That's a much more *powerful* way of conveying what we find in science than telling people and preaching to people. And so that led me to understand that there are different ways of communicating to meet my goal, which was to protect the forest. And so I started using those very techniques myself. I learned–I listened so deeply, I guess–and started employing those techniques to myself to protect the forest.

Kai: Yeah, and you can see the storytelling *in* your book, and I think in your TED talk as well. Because you're not just lecturing, you're not just telling us how it is, it's–it's all packaged in the context of the story of your life, in a sense, right?

Wonderful! I want you to reflect a little bit for–for folks that are taking this approach. So I wonder whether your strategy has changed a little bit beyond that, those lessons, the things that you've learned along the way *about* science communication, actually. And correct me if I'm wrong, but it feels like you're moving towards a different model, in a sense, of science communication where, from my perspective, as someone who was practicing science communication through that whole time as well, it was like our project as communicators of science was to relate the ideas from particular papers or from our body of work, right? It's like, "Okay, well, you have these findings about mycorrhizal fungal networks and Mother Trees and so let's help people to understand that science and what it means for practice and policy."

For me personally, like my journey changed, I think, really with the Global Assessment of IPBES, (the intergovernmental platform) where I realized that it's not enough to do that kind of piecemeal–it's like, you know, I have this little bit of science that ought to change this little bit of practice–because that's a *very* incremental approach, right? It's gonna–at best we could change a policy about clear cutting to, you know, one that might have some selective retention and that might be *marginally* better. But you know, economically, that's probably not going to be the policy that saves the old growth for us, right? Unless the *economics* of the system change, then it's going to be hard to justify to *not* cut those biggest, most valuable trees, right? And so then I started thinking about it differently, as being a practice where maybe we're orienting not around our particular science, but around the change that seems to be necessary given all that we know as a community. Does it–do you feel like you've made any of that kind of a switch, or are you still orienting around, like, particular foundations?

Suzanne: Yeah, you know, as I've learned–as I've learned from myself and my mistakes and my successes–and also as my goal has become more fulsome, it hasn't changed, it's just that it's more inclusive, I think, of small to large possibilities. And you know, so has, of course, global changes over my lifetime have emerged as a global [phenomenon]. It's not just about our local forest. It's the whole climate is affecting everything in my local forest. And so we have to think across all those scales. And I think that I've had to grow up to figure that out myself. And so it's not just communicating to, you know, even just people in British Columbia; it's communicating this stuff around in a broader sense. It's to–it's to talk to people's sensibilities of how they view the world and view themselves in the world. And I've had to grow up into that and say, "Well, what is my worldview and what is–what is holding us up to solve climate change or global change?" I've come down to realizing it is how we fundamentally see the world. And so I've tried to move myself (that's why I'm a more of an effective advocate of expanding our worldview) and–and highlighting or lifting the voices of other people, especially Indigenous people [**Kai:** Yeah], who have a more inclusive and more mature worldview, I would say, than the extractivist worldview.

Kai: Yeah, I'm glad to hear you say that in part because the way I phrased the question sounded so leading if it *wasn't* right about that shift in your thinking, but I felt I could see the way that you had embraced those bigger ideas. And in particular, I want to pick up on that because many people, in thinking about and in talking about your work and your book, have talked about how it helps us to see the forest *differently*, right? But just here, and this is exactly where I was thinking that we were going to go: your work doesn't just help us see the forest differently, it

helps us understand *everything* differently, right? And–and so when you talked on the *Mother Earth* podcast, they talked about reductionism versus holism. And I actually don't think that your science is holistic science. I mean, it is informed by holistic thinking, surely, but from my perspective, it's relational science, right? It's science that still employs reductionist methods. You're still using statistical approaches that any reductionist scientist would use. But you're in for–you're starting the whole inquiry in a place where the relationships are the reality, right? It's not like we assume that the trees are *separate* individuals and that they're from separate species, and then, "Oh, they happen to be in connection this way or that way." It's like, "No, no, we think about it like these are individuals of species that have been interacting in *these* ways for *millions* of years." They didn't come *pre-formed* into the forest; they actually became a forest together, right? And I think that way of understanding the world, I think it should shift *everything* about how humanity operates within it, right? Because if we are a product of our ecosystems the same way that the trees are (and how could we not be), then why would we stumble around without that wisdom that you spoke to and just imagine that we can just change anything the way we like and it'll just work.

Suzanne: It's such a–it's such a great question! And you know, just like in a forest, just like in human societies, we're relational beings, you know. We are a product of our relationships, and we would not exist as individuals without all those around us in our relationships. And we've actually always known this as human beings, like–-we evolved in the soup of everything else evolving at the same time. We're all co-evolved, in relationship. And it was just in the last few 100 years that our, you know, human hubris, took over. Maybe it goes way back even further than that, but that we as individuals reign supreme and dominated over nature, and that also within our own societies, that we can exalt an individual to become wealthy or powerful or that they grew up on, that they're self-made people. None of that is true, right? And it actually destabilizes our societies when we create huge inequalities like that by exalting the individual. You know, obviously, there's economic unrest and there's, you know, social inequalities that destabilize, but ecosystems are just not built that way. There is, you know, the diversity in relationships is what create[s] a stable, robust, resilient system. Ecologists have known this for a long time. We as human beings have known about this for a long time. It's just that we forgot and it came from a lot of, you know, social movements through, like, the last 1000 years that created these conditions. And now we have to unlearn it [**Kai:** Yeah] or relearn what we already know.

Kai: Yeah, and for a lot of us, we owe it to the many Indigenous people who have kept on reminding us, you know, whose voices were long silenced, you know, but whose messages have *almost universally*, across space and time, been about this relational reality.

Suzanne: Absolutely! And that we're all connected and we're all one, and they all–you know–all those communities, all those nations, have words for these things. Many of those words [are] lost, but they still exist today. You know, we're all connected; we're all one. We're already in relation–you know–we're all related.

Nancy: Suzanne, we were wondering if you could talk about the notion of productive discomfort? Where, in order to experience some sort of learning or at least, like some sort of catalytic moment or realization, it's important to leave our comfort zone. Could you speak on that vis-a-vis your experiences with science communication?

Suzanne: Yeah! Productive discomfort, I like that. So, you know, I actually am a pretty introverted person.

You know, I grew up, like many people, in a–not a perfect situation–and so I became, you know, I was quite shy and introverted. And so speaking out in public, speaking and standing in front of classes and big audiences (never mind doing a TED talk!) is way beyond my comfort zone. But I always had this drive because I grew up in my home, the forest, [and] I want to protect my home, the forest, and so I put myself out of my comfort zone and in it, you know, to reach my larger reason for being here, you know, which is that reason. And it's not just about the forest: it's about all of us, right? Forest represents our healthy globe and planet. So I pushed myself to do that and it has been, you know, the rewards have been *incredible*. It rewards me personally because I've grown so much and realize I can actually do that, but also that people are listening and it's helpful. It's helpful for people to say, "Actually, we have this in us and we can do it in a better way." So it's great if you can get yourself there, *you can do great things.*

Nancy: Absolutely. Canadian physician Dr. Gabor Maté has suggested in a podcast that we spend an enormous amount of time–our time–justifying our existence in this world, and oftentimes we do so through workaholism. And what suffers then is the ability to spend time for rest or joy or play, and I was wondering, how has your work ethic changed over the years, and what brings you joy?

Suzanne: Well, I–so, I guess I'm also a bit of a workaholic. I think that anybody in the academic environment, even as students, that you are driven to this. It's a habitual thing and it's pressed upon you. But I *cannot* exist in–so I live in the little town called Nelson. I don't actually live in Vancouver because it's too stressful for me to be in this environment all the time. And so I go there to be in my home forest. I raised my children there, and my–my oldest daughter, who's just starting her doctoral degree down at Oregon State, she said, "You know, Mom, I came down here and everybody's talking about their models and their stats and, you know, and I just realized that you're *not very academic*, Mom. You didn't talk about this stuff when I was growing up," and I realized, "Yes." I mean, I really did remove myself from it, even though I'm very *passionate* and my kids are *passionate* about the forest, and my husband at the time very *passionate* about the forest. So definitely that *passion* was there. But the workaholism, you know, talking about it all the time–we really didn't do that so much. We just went to the forest. Yeah, don't know if that answers your question, but…

Nancy: Wonderful, thank you. Ancient Greek poet Archilochus brought up the idea of the hedgehog and the fox. I don't know if you've come across that before, but he says that a fox knows many things but the hedgehog knows one great thing. And then what Isaiah Berlin, a philosopher back in 1953 did was he categorized a number of different writers and thinkers as hedgehogs or foxes. The hedgehogs would center their own, for example, writing or achievements around a big idea or a goal, whereas the foxes would look at a multiplicity of different ideas and goals. Are you a hedgehog or a fox?

Suzanne: I guess I'm a hedgehog. Yeah! I mean, I'm always, you know, I have a certain key philosophy of connection and oneness and to protect our vital systems. But that doesn't say that–mean that I don't look at all these different techniques to do that. So I am jumping around and going, "Oh yeah, that's a cool…," "Okay, well, wait till we develop that molecular tool and then I'll use it to meet my goal." Or, "Wait till these remote sensing people really figure this spectral imaging out, then I'll use that tool." So I definitely will look around; I'm not blind, but I'm always centered on that one. It sounds like I'm so simple, but yeah, that one!

Nancy: We'll just say you're a hedgehog *and* a fox, which is the name of the book anyway, right? One of

the signal lines in your book that I extracted was, "I was tired, but I was on fire." Do you still feel that way?

Suzanne: Yes, I am. Every day I go, “I'm *so* tired, but *oh my God*, we've got to do this thing, right?” So yes. And you know, as I get into–I'm 64, which is *shocking* to me, but I'm moving into that elder part of my life, and I'm like, “Okay, what's my role?” And I've learning that role. I've been learning it for the last 10 years and I'm tired, but I have a very *big* role to play still. And so yes, I'm tired, but I'm on fire to play that role.

Kai: Seems like you're on fire from here. It's like part-Lorax, part-Katniss Everdeen, you know? So what comes next, Suzanne? What do you have, and especially at this intersection of change and science: do you have ideas coming out of the last few decades? The big successes? I can only imagine there must have been failures, but I know about *none* of them, so but you will–

Suzanne: So many failures, really! What's next? I mean, did Kamala Harris think she was going to run for president? I doubt it. You know, maybe somewhere in her mind, she probably had it as a Plan A, B, C or D. But then that opportunity emerged and she went and she grew *into* that opportunity. And so I sort of, you know–I'm not her but–I sort of look at how my life has evolved, and I I learn and grow, and I go, “That's where I'm going” and so right now, I–as an ecologist, I started learning about Indigenous knowledge systems about a decade ago because I had a colleague, Teresa Ryan, who taught me so much and changed my life, really. All the struggles I'd had in the forest industry of “We need biodiversity. We need to protect old forests,” all the things I was fighting for and I was getting all this pushback, and I was like, you know, felt so diminished. And then she's just saying, “This is our worldview. That we're one with these places. Of course we're going to protect these systems. They *are* our systems. This is how we get, you know, vitality and wealth and, you know, and it's our obligation and responsibility to look after these places.” And I'm going, “Oh my God!” And immediately my life changed. [**Kai:** Hmmm!]

And I thought, I am always devoting even–I'm always devoted to the forest, but the forest is the people, and I'm *devoted* to being in support of Indigenous people and regaining their rights to look after the land, to carry out their obligations. And that the forest and all the animals *need* that, right? They *need* their people because they're suffering from neglect, because the people were removed. And so at that moment, I said, “That is my–-that's what my job is now, to use all I know in the translation of knowledge so that governments will listen, so that we can–they can–regain their title and rights to their land. To be able to live their rights out the way *they* want to with *their* knowledge systems.” It's better for all of us, for the whole planet. So that's where I'm going. [**Kai:** Yeah]. The specifics of it vary, but yeah.

Kai: Not just standing up for the trees, but also for the people who *knew* that we needed to protect the trees *all along.*

Suzanne: All along. Yeah.

Kai: Yeah, wonderful. Thank you so much for being here with us today, and this has been–

Suzanne: Thank you, this has been very uplifting. Thank you.

Nancy: Thank you so much.

Emma: And now for a short message from one of our conservation allies:

[*Medley of Waterbodies theme song*]

Colleen: False Creek matters a lot to me just because it allows me and others to really connect with nature, even though we're living in a giant city.
Fin: We're fundamentally connected to the water bodies and the surroundings that we're in.
Michelle: Blue spaces in particular are good for our mental and physical health.
Zaida: Welcome aboard! I'm Zaida and this is *Waterbodies*, a podcast from False Creek Friends.
Matt: The reality is that False Creek is actually quite alive.
Kai: How do we navigate the protection of these places that we love?
Mutuma: What do you imagine False Creek might look like in the next 10 to 20 years?
Eli: False Creek can become a beacon and a place to showcase the conservation efforts that are happening throughout the rest of British Columbia.
Soudeh: What it means to be a steward of a land.
Mendel: Watch, listen and subscribe to *Waterbodies* wherever you get your podcasts and visit falsecreekfriends.org to learn more
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[*medley of Small Planet Heroes theme song*]

Emma: Thank you for listening to this episode of *Small Planet Heroes*. *Small Planet Heroes* is a production of CoSphere, a project of the University of British Columbia. UBC is situated on the unceded territory of the Musqueam First Nation. Our guest this week was Suzanne Simard. Check out our show links in the episode description to learn more about their work and other ongoing projects. *Small Planet Heroes* was created by our Executive Producer, Dr. Kai Chan. This episode was edited by me, Emma Jarek-Simard. Production is by Maia O'Donnell, Sam Blackwell, Emma Jarek-Simard, and Clare Price. And your hosts this week were Dr. Kai Chan and Dr. Nancy Kang. Our show coordinators are Clare Price, Sam Blackwell, Maia O'Donnell, Dr. Nancy Kang, and Emma Jarek-Simard. Special thanks to Jai Ranganathan, Bilal Bartai, Elizabeth Ye, Katie Kathierson, Dr. Nancy Kang, Anahita Seraji, Dr. Sarah Klain, and Zaida Schneider. Our theme song was written and performed by Daniel Forrest. Our interviews are conducted and recorded at UBC Studios. And if you would like to join our Community of Small Planet Heroes, check out cosphere.net. If you would like to support us, subscribe to our podcast channel, rate this show, and follow us on instagram @smallplanetheroes. If you enjoyed this episode, feel free to share it and spread the word. Thank you for listening.

Selected Links to Things Mentioned or Discussed:

*Some definitions of terms used by Suzanne have been defined directly inside the transcript

Time's 100 Most Influential People fo 2024

IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services)

The Lorax by Dr. Seuss |Books

Suzanne's 2016 TED Talk: How Trees Talk to Each Other

Mycorrhizal fungi / RHS Gardening (Sample overview)

Old Growth Strategic Review Process - Province of British Columbia

Finding the Mother Tree: Discovering the Wisdom of the Forest

The Mother Tree Project

Suzanne on the Mother Earth Podcast

Big Lonely Doug | The Walrus

Kwiakah First Nation

Discovery Islands

Best-selling Books by Dr. Gabor Maté

TerreWEB

Smart Prosperity Institute

The Fox And The Hedgehog: A Story of Triumphs and Tragedy

Teresa Ryan - The Mother Tree Project & Program (MTPP)

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Theme song by Daniel Forrest

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