The Great Simplification

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[00:00:00] **Thomas Crowther:** This is the crux of the whole problem. Individual parts of nature are more valuable than the biocomplexity of nature. If we can build markets to value that biocomplexity, maybe there's the potential for those markets to actually propagate complexity over simplicity. Now, critics would say using the same broken economic system to try and fix everything will only cause more harm than good.

[00:00:20] So the opposing argument is that we just need to distribute wealth more equitably to the local landowners and the stewards of nature, who are the ones that work with nature and who value biodiversity inherently. And these are the people who can transform our future. I.

[00:00:38] **Nate Hagens:** Today I'm joined by Ecologist Thomas Crower, who studies the connections between biodiversity and climate change in earth systems. Tom is the founder of Crower Lab, as well as the chair of the Advisory Council, the United Nations Decade on ecosystem restoration, as well as the founder of Restore an online platform for global restoration of ecology movement.

[00:01:06] Crowder's Landmark research published in 2015 transformed our understanding of the world's tree cover estimating. There are around 3 trillion trees. Globally, his follow-up paper four years later estimated that if viable land could be protected, there would be room for 1 trillion more trees on planet Earth, which could capture up to a third of the excess atmosphere carbon.

[00:01:33] To date. This paper sparked massive public awareness about the importance of trees and catalyzed global projects focused on the restoration of natural forest systems. In 2021, the World Economic Forum named Tom Crowder, a young global leader for his work on the protection and restoration of biodiversity.

[00:01:55] These types of conversations always remain favorites of mine as we get to explore the possibilities of what our biosphere is capable of when given the support and space to fully enact its natural processes. Tom's work combines an

ecological approach with advanced technology and analytics to propel rapid and effective restoration across the entire planet.

[00:02:19] Please welcome Tom Crower. Tom Crowder, welcome to the program. Thank you so much for having me on, Nate. Looking forward to it. If the world wasn't, kind of falling apart, I would have people like you on all the time because your work on ecology and ecosystems and forests and biodiversity is what I'm personally most interested in and fascinated by.

[00:02:45] So let's just start with a, a big question. Can you explain why biodiversity is so important to life, especially complex life on planet Earth?

[00:02:57] **Thomas Crowther:** Yeah, well, that's a good setup. I do feel like I'm like the most privileged person on the planet that I get to just study this emergent property called biodiversity.

[00:03:06] This, when we talk about biodiversity, we're referring to the infinite network of living things that. Sustain all of the rest of the living things. Every species depends on other species to survive. And it's only through this emergent property of this infinite web, this network that allows us to survive.

[00:03:28] and it's a beautiful thing because many of us, you know, you might see David Attenborough documentaries about how some animals facilitate one another or mi you know, michal fungi facilitate plants or whales have remora fish that, that that get facilitated by them. But we also see that even.

[00:03:47] Antagonistic interactions also help biodiversity. So you see, when a wolf feeds on deer populations, it can increase biodiversity of the plants and transform landscapes. When links feed on hairs, they improve the biodiversity below. And we find that the deeper and deeper you look into this magical network, the more intricately dependent everything is on everything else.

[00:04:09] **Nate Hagens:** And that happened over time and became evolutionarily stable un until, you know, the humanity's great acceleration, perhaps, but these things happened over millions of years to become stable.

[00:04:24] **Thomas Crowther:** Yeah. So there's this idea that, you know, ecologists have been trying to understand how stability gets formed in these incredibly complex, dynamic systems for centuries.

[00:04:33] But one idea sort of stands out to me. It's called the stress gradient hypothesis. It's the idea, this idea that at the dawn of time when everything was really harsh and really stressful, life was pretty unlikely, but. Something magical happened. We still dunno exactly how it emerged, but life emerged on the planet and the presence of life started this chain reaction, this positive feedback loop where the existence of life transformed the environment so the other species could emerge, which transform the environment further so the other species can emerge, which transform the environment further so that more and more species could emerge.

[00:05:08] And once we got to the great oxidation event, with the oxygen being emitted into the atmosphere, you then building a world where thousands of species can emerge. But the deeper and deeper we got into those facilitating interactions, the more and more antagonistic interactions emerge, which means the more things started to feed on each other and compete with each other and fight with each other.

[00:05:29] And what I, one example that I was most inspired by at the beginning of my career is this idea that even if you put a. Fungi that are gonna fight against each other into a Petri dish, they will find this emergent property of biodiversity. So we stick two fungi in a Petri dish. One will usually kill the other.

[00:05:47] You stick a third one in, and sometimes that third fungus will kill the winner of the previous interaction, but it might also lose to the loser. And that means you get like a rock paper, scissors system, right? So one beats the other. That means they all survive. The system doesn't collapse.

[00:06:03] Now, that can be quite rare when you've only got three fungi, but as you add a fourth and then a fifth, and then a sixth, and then a seventh, the chances of finding those rock, paper, scissors, those what we call in transitive loops, increases and increases. So biodiversity gives rise to more biodiversity.

[00:06:20] It stabilizes biodiversity. the essence of biodiversity is in its. it's diversity gives rise to stability. And that is why we've all been able to proliferate on this planet.

[00:06:32] **Nate Hagens:** So I have a lot of questions, Tom, but I'm gonna use this opportunity to show my fossil from the great oxidation event 2.1 billion years ago in, Northern Minnesota, which was an ancient ocean.

[00:06:45] These are strites, fossilized in iron, one of my prized possessions. okay. So first of all, briefly define biodiversity for us. And then I have some questions.

[00:06:57] **Thomas Crowther:** Can I just say that was not a setup that I was just talking about the great oxidation event, and you're sitting next to fossil oxidation event.

[00:07:03] It actually sitting, it's

[00:07:04] **Nate Hagens:** sitting under like piles of books and, power bar wrappers and other things. And I was like, where is that thing? I haven't seen it in like a year. So thank you for the reminder. What were

[00:07:15] **Thomas Crowther:** the chances I was gonna say GOE in that answer. So good. Define biodiversity, my friend.

[00:07:21] The infinite network of life that supports. The rest of life. But the challenge is I will add a caveat in my opinion. The difficulty with biodiversity is that humans are incredibly good at noticing individual parts of this network and valuing individual parts of this network. So we, we see the banana plant and we go, great, that's awesome.

[00:07:45] But the second we place a value on that part, those banana plants get propagated at the expense of the rest of the forest. We value the carbon and that's great. Carbon's wonderful, and it's great if ecosystems are destroying carbon, but we value that part and then we propagate it at the expense of everything else.

[00:08:02] And the challenge with biodiversity is not getting stuck into any individual definition of any individual part, and instead recognizing the whole.

[00:08:10] **Nate Hagens:** So if we have 10 species and then there's an 11th that is added, it's not like the whole thing is 10% better. there's some other math going on. Yes, exactly.

[00:08:22] **Thomas Crowther:** Exactly. You can't characterize biodiversity by the number of species. Sometimes, for example, you cut down a rainforest, you'll actually get more species of microbes in the soil because you've gone from hundreds of fungal species to thousands of bacterial species in the grassland. that will emerge afterwards.

[00:08:39] So if you were only to calculate biodiversity by the number of species, you'd be vastly misrepresenting the natural state of things. So in my opinion, biodiversity is, it's a, it's more of an emergent property of the complexity of life in its natural state. the complexity that has emerged over millions of years of these incredible, all evolving ecosystems.

[00:09:01] **Nate Hagens:** So I am a big fan of, David Sloan Wilson. And, recently deceased EO Wilson's, paper on multi-level selection where they studied humans and that in ancestral times, selfish individuals out competed, cooperative individuals within a group, but cooperative groups out competed, non-cooperative groups.

[00:09:27] And so that humans are hardwired both for cooperation and competition depending on circumstances. So in your little story about life, beginning life and biodiversity, going towards more biodiversity, what role does cooperation, hold in, the natural kingdom historically?

[00:09:47] **Thomas Crowther:** That is a really good point.

[00:09:48] That's a really good question because there's a lot of debate of over this topic, you know, this the selfish gene idea or the, the, relative importance of, Positive interactions versus negative interactions within nature. and I actually like to think about it through the lens of feedback loops, right?

[00:10:08] So a positive feedback loop is one where, An inciting process kicks off a reaction that reinforces that process and makes it happen more and more. So that those could be examples like facilitation, like, you know, the presence of the coral

reef attract fish, which produce feces that then, provide nutrients that allow the coral reef to grow more.

[00:10:33] So the coral reef thrives because of that. Positively. Is that called symbiosis? That's not quite a symbiosis. The symbiosis when there's, is, when there's a mutualism is when there's an act like an individual species depending on another, but the symbiosis, I think you're referring the, a mutualism is just when the presence of one benefits the president of other of the other, whether it's trying to or not.

[00:10:53] But yeah, these are all symbiosis. Ultimately, these are all ways in which. They positively interact each other, interact to shape each other's presence. And the more of those symbiosis you have, the more species you'll get. But at the same time, there are these negative interactions and sometimes those negative interactions get a bad name, like the cheetah or the, or the, predators or the competitors or the fighters.

[00:11:17] And what's incredible that we learn through the process of biodiversity is that those things, those negative interactions, as you might, if we were to anthropomorphize them, well, it's not anthropomorphizing if we were to just characterize 'em as negative, what we learn is that actually they are exactly as important for the stabilization of biodiversity because.

[00:11:39] If you don't have those negative interactions, then one species will always emerge and demolish the entire system. So if you can imagine that classic example is, you know, you might have heard of LA of Volterra, one of the earliest, group, com. They were very early quantitative ecologists, and they saw hair and lynx populations would undulate over time.

[00:11:58] As the hair populations increase, then the Linx populations would increase, which would make the hair populations fall. So the Linx populations fall, so the hairs that go up and the, and they're just undulating together, and that's because of a negative feedback loop where antagonism or predation is maintaining the system.

[00:12:12] So it's really this magical balance between the positive feedback loops and the negative feedback loops that forms this immensely magical system.

[00:12:20] **Nate Hagens:** Let me ask a difficult but simple question. Why should humanity in 2025 care about biodiversity? And it seems to me that it's generally assumed that biodiversity is a good thing, and that people care about it and they're looking at hotspots, biodiverse hotspots.

[00:12:42] And I think, but I, my sense is that we, want 11 species rather than 10, and we don't really understand the depth and the importance of the things that you are saying and why or not in all the climate and planetary boundary discussions, why isn't biodiversity and this intricate interlinked complexity of, symbiosis and mutualism and all the things like front and center?

[00:13:07] Big question.

[00:13:08] **Thomas Crowther:** It's a big question. It's also the question that I go to sleep thinking about every single night. So the first point is a very easy one. Why do we need to say biodiversity? Well, because everything you've ever eaten, drank, breathed, worn, sat on, consumed anything has come from biodiversity.

[00:13:27] It has come from nature, and it would never have existed without it. There is some people say 40%, 50% of the economy is dependent on biodiversity. I say, that's absolute nonsense. Clearly 100% of the economy is dependent on biodiversity. We wouldn't be here if it wasn't for biodiversity. So that part of the question's easy, why it's not integrated into the rest of our societal thinking and our, you know, the, sustainable development goals and the, planetary boundaries concept and all these things.

[00:13:57] This is a bigger question. I think society is only just waking up to this complexity. We've, it's like society was woken up to the climate conversation and they suddenly realized climate change is devastating threat to our, to all of humanity. And so everyone got behind it and this movement began, granted still not big enough in my opinion, but it's still as momentum for this movement when you then say, well, now actually there's an even bigger threat underpinning it, which is the loss of biodiversity.

[00:14:22] People go, oh my God, okay, what is biodiversity? And you go, oh, it's this complex system. And they go, oh, it's a bit too much. And so for me it's this. Biodiversity has their power to inspire people, but the complexity of the topic might

have gone over people's heads. And I think what's critical right now is that we highlight that this is an even bigger wave.

[00:14:43] It's an even bigger tidal wave coming behind climate change. It's an even more fundamental threat to the existence of our planet and to the existence of our species. And we need to be exactly as urgent in our drive to save biodiversity on this planet 'cause otherwise. even if it didn't, even if it wasn't necessary for our survival, would we even want to live on a planet where biodiversity didn't exist?

[00:15:05] **Nate Hagens:** So I would like you to give some concrete examples. here's one that I can remember, and you can either explain this or offer your own. When I taught, reality 1 0 1 at the University of Minnesota, I used this seven or eight minute video where there was a relationship between plants and ants, and there were like 50 species of ants, and a 50 species of plants and flowers.

[00:15:30] And when you removed a few species of ants, there was no impact on the flowers. And when you moved a few more species, there was just a slight impact. And then that stayed kind of constant for a while, but. Then when you remove like half of the species of ants, there was a massive decline in the, the presence of these plants, or I don't remember the details.

[00:15:52] So can you give some, specific example of the actual decline in biodiversity past a certain point has a tipping point or a domino effect where a monoculture or a, a viable, living things don't have the biodiversity to function as a, whole, a healthy ecosystem.

[00:16:16] **Thomas Crowther:** That's a and again, a perfect analogy because biodiversity, you can almost imagine it as a web, just like, or a net, imagine a phishing net, you wanna catch some fish, you need a functioning phishing net.

[00:16:27] But as you start snipping individual rungs on the net. It's still okay. The, it's, there's redundancy built into it, right? There's, if you have enough species, there's redundancy. You can lose a few links and it, and the system doesn't collapse. Once you've snipped the net, too many times it starts to have some really big holes, but maybe it's still functioning as a net because some of the central cords are still there.

[00:16:50] Eventually you're gonna lose. A part of that net, you're gonna snip one of those chords and the system falls apart entirely. It's no longer even recognizable as a net. It's just a thing with a hole or a giant, whatever it is. It's dangling rope. And it's this tipping point between being a net and being just a collapsed system that we are actually experiencing a lot around the world.

[00:17:13] Right now. We are seeing systems that were maintained by positive feedback loops like the coral reef and the fish. As long as the coral reefs are there and the fish are there, then the boats will be sustained. But then you'll see overfishing or D or coral bleaching, one part of the system will be gone, which means the other part disappears, and then the entire th thing collapses.

[00:17:32] And you see examples of this in ecosystems all across the planet. One of my good colleagues, Manuel, Duo, he's a, he studies ecosystem resilience, and he thinks 51% of the ecosystems across the planet, or at least more than 50% of the ecosystems across the planet, are currently tipping into those unstable states, or they're tipping out of their stable states.

[00:17:56] And it's usually because you've broken one of these links, you've broken one too many of these links like an, easy example would be forests are currently turning into grasslands in many ecosystems around the world. What happens is you know, we remove some trees. The forest is still okay. It's still producing enough moisture in the air to sustain forests.

[00:18:15] It's still blocking out enough light so that the understory, is, in its natural state, and fungi are able to propagate. Once we've lost enough trees, suddenly the system starts to tip quite wildly in another direction because the light breaks through, and that means grass can emerge and grass evaporate.

[00:18:33] They have evaporate transpiration at a much faster rate than the, trees. So moisture gets lost, which means the soil dries out more, which means fungi disappear, which means bacteria arrive instead, which then promote grass, which then dry out the soil even more so that the trees can't survive.

[00:18:48] And gradually you've built this new feedback loop that quickly tips the ecosystem into an entirely new system altogether. And we're seeing that all over the planet. Forests are tipping into grasslands. Wetlands are tipping into drylands. In

the, northern hemisphere. In the northern hemisphere, we see shrublands tipping into forests.

[00:19:04] it's, it's quite chaos when we see these systems, when we see biodiversity within these systems just being lost to that extent that the systems will tip.

[00:19:13] **Nate Hagens:** So when we think of life or a tree or an ecosystem, that is a narrow boundary definition of something that has complexity in biodiversity, which would be a wide boundary, a definition.

[00:19:30] And our economic system typically uses narrow boundary definitions. So for instance, I know in Spain, they're doing a lot of monocultures, with eucalyptus and other trees. So from an economic, narrow boundary, vantage point, oh, look, there's more trees in Spain. That's a good thing. But from a wide boundary perspective, we've lost the biodiversity and the complexity of the ecosystem.

[00:19:56] can you speak to that?

[00:19:58] **Thomas Crowther:** Yeah. you nailed it. Those trees are not an ecosystem. That monoculture of eucalyptus plantation is nothing to do with a functioning, thriving ecosystem that can be sustained in the long term. It, if you were to see it through the lens of a farm, that's fine. You know, we, we need farms, we need agriculture, and I'm a massive fan of agriculture, and we certainly need that.

[00:20:19] But that is what that plantation of eucalyptus is. it's a paper farm, and if we want it to be recognized as a viable ecosystem that will trap carbon and store biodiversity in the long term, then it cannot be a monoculture. Because the only thing that maintains the stability of the system is the interactions with other species.

[00:20:38] One group of organisms alone in a monoculture cannot be sustained because fundamental rule of ecology is every species depends on others to survive.

[00:20:46] **Nate Hagens:** So, Moving into your most prolific, academic background, which is centered on trees, and forest. why are trees and forests and those sorts of ecosystems so important to biodiversity and the planet?

[00:21:04] **Thomas Crowther:** Yeah, so I would just throw out the caveat that actually we work on grasslands and peatlands just as much as we do on forests, but it is true that the forest topic has received a huge amount of attention in recent years, and I think that is due to the momentum that's growing around climate change forests store.

[00:21:23] Hundreds of billions of tons of carbon. And when they're healthy and they're old and they're diverse, they can store that carbon for millions of years. It's, it, they are an incredible trap of carbon. that's not to say that grasslands aren't storing loads of carbon and peatlands aren't too, but these systems are really gaining momentum because they, are a system that we have depleted so much.

[00:21:47] **Nate Hagens:** How can they store it for millions of years? There's no trees that live millions of years. So they die and then what?

[00:21:53] **Thomas Crowther:** Yeah. Correct. Individual trees come and go all the time. But the forest system is what sustains the forest is ecosystem is what stores carbon for millions of years.

[00:22:02] **Nate Hagens:** So it's, some are dying and some are growing and taking in more carbon as they grow.

[00:22:06] And the net is a, storage of carbon

[00:22:09] **Thomas Crowther:** Exactly. In the same way that your cells are dying and then regrowing and your system is maintained. The forest is the same emergent property of this collective of organisms.

[00:22:19] **Nate Hagens:** So, your most famous study, to date, was a sort of global tree census, which reported that they, we currently have around 3 trillion trees on earth, and room for another trillion.

[00:22:34] Tell me about that research. how did you go about putting this data together and what were the big takeaways from that work?

[00:22:42] **Thomas Crowther:** Yeah, so I would say at the time our understanding of the sort of. The understanding of our planet came from a very heavy focus on the physics and chemistry of our planet.

[00:22:52] And we didn't have many global models about aspects of nature because it's really hard to measure this complex system in its wholeness. so we were kind of in, inspired to do this by an NGO that wanted to do large scale ecosystem restoration, but they wanted to know how many trees should they restore in order to have a meaningful contribution.

[00:23:13] If you dunno how many there are to start with, it's hard to put things in context. So they asked us a simple question, how many trees are on the planet? And we tackled this by essentially reaching out to thousands and thousands of ecologists coordinated by hundreds of research groups, all of whom had been studying their forests in different ecosystems around the world because all of them have data on the density, the structure, the height, the diversity of those plants.

[00:23:40] They could share that data with us and we could start to build this global picture. The more and more data we had, the more we started to understand the patterns of tree density around the world. And then you link that up with satellite observations and you've got all you need to make a global model about the structure of global forests.

[00:23:55] And yet we were pretty, pretty astonished to discover that there's over 3 trillion trees on our planet. But it was also quite a sobering discovery. 'cause we realized that there was want, or they would naturally be about double that number. It would naturally be at almost 6 trillion trees. So we've halved the scale of this global forest system, and in fact we continue to lose about 10 billion trees every year.

[00:24:17] **Nate Hagens:** Over what timeframe did we go from almost 6 trillion down to 3 trillion trees?

[00:24:22] **Thomas Crowther:** 10,000 years start the agricultural revolution. Really?

[00:24:25] **Nate Hagens:** And just a nerdy, side question. I know that there are around 6,000 species of mammals. Do you know how many species of trees there are?

[00:24:34] **Thomas Crowther:** In fact, funnily enough, using exactly that same dataset.

[00:24:37] We published a paper just two years ago showing that there's about 70 or 80,000 trees tree species.

[00:24:43] **Nate Hagens:** Yeah. Cool. So, What would be the benefit of having an additional trillion trees on earth? And is that project still underway?

[00:24:54] **Thomas Crowther:** So yeah, this the, funnily enough, this was actually the next study that followed on.

[00:24:59] Once we'd showed that there's trillion, 3 trillion trees on the planet, we wanted to figure out, alright, is there any room for recovering more ecosystems? And we realized, obviously, of the area that's been lost, let's say 3 trillion trees have been lost of that area. We still extensively use about two thirds of it for cities and agricultural land.

[00:25:18] And so that's obviously out of bounds. These are places where people are managing their ecosystems. Obviously we'd love for them to manage them more in more generatively and integrate biodiversity. But these are places where you don't wanna be. You know, there, there could be conflicts between people and nature, but we also realized that there's about a third of this land, which is not under heavy human footprint, where if it were the economically viable option for people, that there's the potential for these trees to recover.

[00:25:45] So about a third of that land could potentially recover. And what was pretty staggering to us at the time is that we estimated that if those ecosystems were ala, were able to regenerate, if we could put up fences, let nature return that it would capture over 200 gigatons of carbon. So that's about a third.

[00:26:05] Of the carbon that we need for our global carbon drawdown goals in the fight against climate change. And when that information came out, it just went viral.

[00:26:15] **Nate Hagens:** Well, not to mention the carbon benefits, but also the, if done in a right way, the, the biodiversity benefits potentially. Right?

[00:26:24] **Thomas Crowther:** Oh, absolutely.

[00:26:24] From my perspective, the entire goal of this is to revitalize as much biodiversity as we can on the planet. And let's face it, the people who depend on that biodiversity, there are millions of communities around the world, billions of people around the world who are fundamentally dependent on local biodiversity for their own wellbeing.

[00:26:43] And it's those people for whom biodiversity recovery is most vital. So, yeah, this is a human story and a biodiversity story.

[00:26:50] **Nate Hagens:** So, my understanding is that you received quite a bit of pushback and criticism from the ecological community on that paper, for being overly simplistic. Can you expand, expand on the nuance, the drawbacks, within your idea to restore a trillion trees?

[00:27:07] **Thomas Crowther:** Yeah, it is true. We got some heavy pushback and it was a pretty hard time. when was this? This was in 2019. Okay. 2019. We published this paper in the journal science. A third of the forested land can be restored. That's room for a trillion new trees, a third of our climate goal, carbon drawdown goals.

[00:27:25] Unbelievable. You know, front page news on every, in every newspaper. But it was pretty devastating as well, because yes, people said it was oversimplified. And in all honesty, I wanna be crystal clear. Yes, any global model you have ever seen is an oversimplification. There is no way you are capturing the full nuance and detail.

[00:27:44] So what a, what these global models like this do is you'll have lots of places where there's an underestimate, lots of places where there's an overestimate

and you hope through the, basic fundamentals of statistics that the you'll, overestimate as much as you underestimate. And as a result, the total global amount gets more and more robust the more data you have.

[00:28:05] And we had huge amounts of data, so that's why this paper sort of got into science. That's why it got all this attention. But the real problem, the real challenge at the heart of our, of 2019, which was a pretty defining moment in my career, was that in our. In our, communication about this study, that's where we were over overly simplistic.

[00:28:28] We said we can restore a third, we can restore a trillion trees and, and have massive contributions to climate change. The problem is if you say that to the media or to the general public, understandably, they might assume that means planting rows of trees, not allowing nature to recover, and that subtle difference.

[00:28:50] Led to headlines saying planting a trillion trees will save the world, which is fundamentally incorrect. And it's also, it's dangerous for the climate change conversation 'cause people can use it as greenwashing. They can, you know, plant a few trees and ignore the real challenges of cutting emissions and, you know, limiting their greenhouse gas emissions.

[00:29:08] But it's also devastating to the biodiversity movement because people are cutting down rainforest to plant rows of pine trees, which is the exact opposite of what we would ever want to have. Our study was about the real potential of complex biodiversity nature, nothing to do with brutal, vast monocultures of carpet, simplicity that destroy life on earth.

[00:29:29] So it had its pros and cons. I have

[00:29:32] **Nate Hagens:** a ton of questions on that. So presumably planting trees in an area where there are no trees, would be a benefit, especially if it was a lot of different kinds of trees. And not just eucalyptus, but planting trees where you had to cut down existing things to plant new ones, obviously that, that wouldn't, contribute to, a larger goal.

[00:29:58] So is the, just the planting, is that a negative or is the It's the nuance behind the concept of planting.

[00:30:06] **Thomas Crowther:** I'm so glad you asked that. 'cause somet since then, I often tell this story and people go, oh, Crower says planting trees is bad too. That is definitely not the case that I am neither for or against planting of trees.

[00:30:18] What I'm for is revitalizing nature wherever we can, as long as it's for the wellbeing of the people who depend on it. So in some cases. If you're in a place where forests naturally existed, but they're struggling to recover, maybe the soil is degraded or the microbes are not there, then planting can actually be a really active po positive action, especially if you're doing it in a diverse way.

[00:30:41] In other systems, you might just wanna remove the sheep and the trees will recover naturally. And what one really big question we have in ecology is, which ecosystems will recover on their own? Which ecosystems do you need to be active? So there is no real answer about where, whether planting is good or bad.

[00:30:58] The only question is, where can biodiversity be returned and how should we achieve it?

[00:31:04] **Nate Hagens:** Here's a dumb question. in the NGO and government and you know, various institutional orgs around the world, how many of them have the ability to even model some of this ecological biodiversity complexity that you've been describing?

[00:31:22] Or is it just a guess?

[00:31:24] **Thomas Crowther:** I would say that. Advances in academia over the last five to 10 years in global ecological modeling have been absolutely transformative. 'cause we now for the first time have the ability to access the knowledge of people all across the planet and build these incredible models that is slowly starting to seep into the industry or the not-for-profit or the governmental world.

[00:31:47] And I think it is slowly making its way. I don't think it's there yet, but gradually this richness of knowledge is starting to seep into those systems. But until this, until un until now, they have all been. Devastatingly de in biodiversity and strong biodiversity information.

[00:32:05] **Nate Hagens:** So, it was my understanding that actually President Trump in his first term, kind of took the 1 trillion trees as a, rallying, cry among other people in the world.

[00:32:18] So, five years, five, five or six years on, how have governments, NGOs, and businesses been responding to this call, to grow our tree census from 3 trillion to 4 trillion?

[00:32:31] **Thomas Crowther:** The reaction's been unbelievable. I would honestly say it's been the most astonishing thing. So five years ago. When the first headlines came out, it is true.

[00:32:40] Everyone was talking about how many trees can we plant, how many trees can we get in the ground? And that was oversimplified. Again, tree planting can be great if it's empowering a local community, but in reality, mass plantations are not what we need. And so the conversation was kind of blurred. There was a lot of people doing wonderful things, but a lot of people doing greenwashing.

[00:32:58] However, the pressure, what's really interesting is. Both the positive and the negative feedback that idea got pushed the conversation in a really, positive direction. So grassland scientists correctly said, you should not be planting trees over native grasslands. Biodiversity scientists said, should, you should not be doing monocultures, climate change.

[00:33:20] Experts said, should, you should not be using this as an excuse to cut emissions. And over the last five years, the whole conversation, the whole narrative has changed. First, nature is now a front and center part of the climate negotiations. It's in the conversation. And second, they're not just talking about trees and planting trees.

[00:33:37] They're talking about how do we find and empower the indigenous communities? Who are the people protecting trees? How do we empower the local communities and farmers who are the ones that are revitalizing biodiversity for their own wellbeing? And that is a much richer and more nuanced way of restoring global biodiversity.

[00:33:54] And honestly, since the launch of the United Nations decade on ecosystem restoration, that movement has been flying.

[00:34:00] **Nate Hagens:** Is there a clearinghouse that is able to, rectify and, collate the climate and the ecology and the soil, and the trees, within these organizations? or is it, is it so many reductionist experts, even though they're system scientists talking about their thing?

[00:34:20] **Thomas Crowther:** Yeah, the reductionist thing is still pretty devastating. Unfortunately. Some people are counting numbers of trees, others count, area of land. There's always a reductionist version of this assessment. But one thing I am quite excited about is, you know, we're all a big fan of the planetary boundaries concept, which is nailed the physics and chemistry of the planet.

[00:34:39] And they are now increasingly integrating biodiversity information into that annual update census. There's a massive network of ecologists, collaborating on a project called Seed, which is measuring the sort of complexity of biodiversity across the globe and seeing how that's. Being depleted or recovering in different regions, and that's getting integrated into that planetary boundaries assessment.

[00:35:02] So I do think there's gonna be big change in the coming years.

[00:35:04] **Nate Hagens:** So I do remember reading something you wrote using the term biocomplexity. What? What does that mean?

[00:35:10] **Thomas Crowther:** Yeah. I think biocomplexity is the term that I use to get people past the confusion around biodiversity in essence, when people think about biodiversity, they think about the number of species or they think about the number of trees, and both of those are oversimplifications that will cause more harm than good.

[00:35:31] The point about nature, the point about biodiversity is that it's. Strength and its stability is in its complexity, its biological complexity across genetic levels, across species levels, and across ecosystem levels. You need genetic diversity within species. You need a diversity of species and you need complex structured ecosystems that can support all of this.

[00:35:56] And so bio complexity was a term that I started using quite recently to characterize that complexity of the system across those three levels. And if we have a healthy level of bio complexity, we can then start to say, this is an ecosystem that's getting back to its natural state.

[00:36:13] **Nate Hagens:** In the one corner we have bio complexity, and in the other corner we have dollars and euros, and yen.

[00:36:23] it does seem to be like totally opposite goals for the long-term health of our, you know, our planet and the viability or perceived viability of our next quarterly, economic system. But I agree with you, Biocomplexity is ultimately where it's all at, in the intermediate and long term for sure.

[00:36:46] **Thomas Crowther:** This is the crux of the whole problem. Individual parts of nature are more valuable than the biocomplexity of nature. So if that is the case, then we're always gonna propagate those parts, which is ultimately the driving. Mechanism behind the creation of this seed bio complexity index that I told you about.

[00:37:04] If, we can have a measurement of that biological complexity, and then if we can build markets to value that bio complexity, maybe there's the potential for those markets. I. To actually propagate complexity over simplicity. This is the sort of the dream of the movement. Now, critics would say, and I, in all honesty, I probably agree with them in many ways, using the same broken economic system to try and fix everything will only cause more harm than good.

[00:37:30] 'cause if it drives inequitable distribution of wealth, it's still only gonna lead to billions of people being trapped in an economy that doesn't allow or where they're trapped in non, with no non extractive alternatives. So the opposing argument is that we just need to distribute wealth more equitably to the local landowners and the stewards of nature.

[00:37:50] Who are the ones that work with nature and who value, biodiversity inherently. And these are the people who can transform our future.

[00:37:58] **Nate Hagens:** And are there signs that's happening? And do you have any information on the census, in 2025 on trees? Is it increased from 3 trillion or what kind of positive signs can you tell us?

[00:38:10] **Thomas Crowther:** The numbers still go down. We're still seeing massive deforestation, particularly in the tropics. all driven by external demand from the global north, requiring, products that are leading to, large scale deforestation. But there are incredible signs of recovery in thousands of locations across the hundreds of thousands of locations across the planet.

[00:38:37] And what we are seeing is a slowing of the, rate of deforestation, and we're seeing an increase in the rate of recovery. So while things still are on a downward track, the trajectory of that track is changing. And what I'm really excited to see is that now every pledge that you hear about biodiversity at, a climate conference or a biodiversity conference, every pledge is about.

[00:39:01] The empowerment of local communities, the empowerment of dig of indigenous populations, and through that lens, that is how we're gonna get ecological recovery. Right.

[00:39:10] **Nate Hagens:** So in the last few years as a follow up to your call for a Trillion Trees, you and your lab developed a platform called Restore, R-E-S-T-O-R.

[00:39:19] Can you tell me about this platform and, what was the vision for its creation and where does it stand today?

[00:39:26] **Thomas Crowther:** Yeah, we branded it awkwardly, just removing that e just to make it complicated so then people might miss it. I'm glad you spelled it out. restore is, it was born out of this unbelievable momentum in 2019.

[00:39:38] We had farmers and communities and indigenous populations literally emailing us in the flooding us with emails asking for. Information about biodiversity. So information about the ecology of their system so they can restore it. And obviously we can't answer one by one. So we built this system to just share the world's ecological data with those people.

[00:39:58] But the emergent property of that was so much more valuable than the data that we were sharing because what happened is hundreds of thousands of farmers and indigenous communities and local populations started delineating their areas, just drawing around their gardens, drawing around their farms, drawing around their regions of interest.

[00:40:18] And in the process, what actually formed is this incredible social media network, hundreds of thousands of people showing exactly where they're doing conservation or restoration. And that formed the basis of a marketplace. So right now, today, restore is, it's sort of like Google Maps, but instead of seeing hairdressers and shops, you see conservation projects, restoration projects, regenerative farms, and it's a place where you can go.

[00:40:45] To source things. If you wanna buy sustainable coffee and see the individual trees where that coffee comes from, or if you wanna buy honey, or if you wanna find an ecotourism holiday that's incredibly beautiful somewhere else in the world, and you can directly contact those people and engage.

[00:40:59] You can donate to them. You can buy their products, you can support them in, you can go and volunteer. You can now. The environmental movement is just at your fingertips. It's for all those people out there who grew up being like, I wish I could just be involved in the movement now. It's so simple.

[00:41:15] **Nate Hagens:** This is a slight reframe with words.

[00:41:18] I mean, you just said the environmental movement, the, wouldn't you agree that a better, moniker is the ecological movement, especially given your focus on bio complexity and biodiversity? The environment to me seems like, this is how humans are in the things that are around us, and the ecological movement to me seems like it's a system that we're embedded within.

[00:41:38] **Thomas Crowther:** I could buy into that as an ecologist. I struggle to separate ecology from everything else, but you are very right. This is an ecological movement. it's a movement of plugging us all back into the ecological system. Every single one of us sits on chairs and wears clothes and eats food that we have no idea where it came from.

[00:41:56] I don't know if buying this helped the environment or hindered it, but I'm. Pretty, it's pretty likely that I hindered the environment by buying this t-shirt, but if I knew exactly where it came from and I could see those trees, then there's the potential that I could choose the one I could choose a product which looks like it's having a positive environmental footprint rather than a negative one.

[00:42:16] And once you start having that empowerment, it's unbelievable the feeling that you can get. You just simply by being a, buying a t-shirt or a a thing of coffee, you can actually have a positive footprint on nature and it just empowers people to engage in the ecological movement.

[00:42:31] **Nate Hagens:** Alright, so, so let's go to this website, restore.eco.

[00:42:36] so tell, me what you mean by all this.

[00:42:39] **Thomas Crowther:** So yeah, if you log on, what you'll see is. Hundreds of thousands of points dotted around the world on a global map. And if you zoom into one of these points, you can see high resolution imagery showing every single plant that's growing in that area of land.

[00:42:56] So this was an area that was drawn by a farmer, called DEA, who Grows Coffee, is someone I'm a project that I'm familiar with. It grows incredible coffee in Ethiopia and what Desta gains for free having drawn around his area. Is he gets free ecological data. The information that we've calculated about the species that grow there, the amphibians and birds that might be able to live there, the carbon that's in the soil and the vegetation, the water dynamics, and all sorts of ecological insights.

[00:43:26] And that's really useful for his land management or his, you know, choice of species.

[00:43:31] **Nate Hagens:** Is, this, unidirectional? Or, can that person say, well, I found a new sort of salamander here that's not on your list.

[00:43:39] **Thomas Crowther:** That is a very good point. they can share that information with us and we can update those estimates for, from their thing.

[00:43:45] 'cause again, ours are only ga vague, you know, ecological estimates from a research lab here in Switzerland. So when they update that information, that then adjusts the entire model so that the bio biodiversity data for all the other sites starts getting better too. But what's really useful to DEA is he also has all of his information at the top.

[00:44:05] So he shows when he started, shows how long he's been working on the land, and he also shows his website where you can click and directly buy his coffee. So within two clicks, you are not only seeing his site, but you're able to buy the products from his site. And what you can see quite clearly from Duster's site if we zoom in, is that this is a full, intact, beautiful rainforest.

[00:44:26] This doesn't look like a degraded farm landscape that we're used to. This is a place where instead of removing the forests, he's actually. Planted the coffee trees underneath the canopy of an intact rainforest. And because the rainforest traps water and nutrients, he doesn't need fertilizers and irrigation like the farmers next door.

[00:44:43] So he is actually, it's an example where nature is more profitable for deta, the healthier nature is, the better his coffee CRA plants grow and the better his profits are. So it's one of thousands of examples where healthy nature actually makes local people more money. And these are the projects we want to be sourcing all of our products from.

[00:45:01] If everything we bought came from a project like this, we would be having a positive footprint in every single purchase we make every day.

[00:45:08] **Nate Hagens:** So could we, just outta curiosity, I'm gonna try to draw a square around red wing, Minnesota, like 20 kilometers, a square. Perfect. And, could you analyze that for me and tell me what I'm looking at?

[00:45:24] You are gonna analyze it for yourself. Well, it says the, there's 1,340 potential plants. 12 potential amphibians, 50 potential mammals, 160 potential birds, temperate, broadleaf, and mixed forests. and, you know, current, and potential carbon sequestration, organic carbon above ground biomass.

[00:45:49] Holy crap. There's a lot of net primary productivity, which is tracked over time and it's actually higher than it was 10 years ago, which is interesting. well, there's a lot of stuff here. Annual evapotranspiration, land cover, tree cover, lost by year, tree cover. Interesting. Holy crap. So this is all data that comes from, Google Earth and your site integrates it?

[00:46:20] **Thomas Crowther:** It doesn't come from Google. Well, some of them come from Google Earth, but most of them are from global ecological data sets, global data sets that are published by academics around the world. So you see next to each one of the points, there's a little I button.

[00:46:33] If you click on that, you'll see where the source of data is, and you can read the paper and you can understand where it came from. So

[00:46:38] **Nate Hagens:** here, global human modification, 0.51. how does that rate,

[00:46:45] **Thomas Crowther:** so, human modification? So if you click on the I tab, what it'll describe is that, is it's on a zero to one rating.

[00:46:53] So one would mean, I think it's in its complete intact state, and zero would mean it's completely destroyed.

[00:46:59] **Nate Hagens:** Yeah.

[00:47:00] **Thomas Crowther:** Oh, the other way around. Actually, zero means no modification. One means total modification, one's completely

[00:47:04] **Nate Hagens:** destroyed. Yeah. Human population within my square, 37,000, within 10 kilometer buffer, 107,000 within a 50 kilometer buffer.

[00:47:15] 2.3 million. Yeah. That, that all makes sense. Wow. This is cool. So anyone can look at any place in the world where they live or where they're interested in and draw this up.

[00:47:26] **Thomas Crowther:** Yeah, exactly. You can go learn how big your garden is, learn how many species are in there, learn what the potential species are, and, you can figure out how to manage the system in a cooler way.

[00:47:35] Or you can just go and find products to buy and engage in the, movement that way. Just sort of a, an entryway into the environmental space.

[00:47:42] **Nate Hagens:** So what are your, are there some particularly inspiring stories from, your work on restore? Other than, you know, you mentioned the, coffee place.

[00:47:52] what other things have you discovered?

[00:47:54] **Thomas Crowther:** So what the overarching theme is. It is absolutely staggering to see how many hundreds of thousands of people are actually making more money because nature's thriving. when nature makes you more money, you cannot stop it from growing across landscapes.

[00:48:15] Deter is an example where nature is making it more profitable, and that meant all the other farmers in the nearby landscape started doing the same thing, allowing trees to recover on their farms so that they have more profitable coffee. One of my favorite examples though, is in, in Costa Rica.

[00:48:33] Costa Rica is a, a sort of flagship example for the environmental world because the government, around 30 years ago initiated their payment for ecosystem service program. It's a, like many of the countries in Central America, they were having huge deforestation rates. And instead of, allowing that to continue the government distributed wealth to local farmers, they said, if you can protect the nature that, that we all depend on, we will give you money to compensate you for the, financial losses.

[00:49:05] And there's been a big question mark over about, over whether these things work or fail. What's staggering is Costa Rica, the government agreed to share every single one of those sites with Restore. So if you go to restore into Costa Rica, you'll see thousands and thousands of these little shapes around individual small holder farmers.

[00:49:23] And that meant we were allow, we were able to measure the biodiversity in those shapes. And we actually had a PhD student go out with a sound recording device sticking it to trees across Costa Rica. And the incredible thing he found is

that across these sites, this distribution of wealth actually restored the soundscape of the ecological system to about 86% of its natural recovery.

[00:49:49] So, if you imagine that 30 years ago, all of these sites would've been degraded pastures or, the places where forests had been removed for grazing. And if you compare the soundscape. of the payment for ecosystem service sites, you'll see that 86% of the intact soundscape of the rainforest had returned, in those 30 years.

[00:50:11] And the amazing thing about that story is it corresponded with a, with direct economic growth for the entire country. For anyone who ever goes to Costa Rica, it's crystal clear that nature is a fundamental part of their cultural identity. Every business seems to be promoting biodiversity. Every smoothie shop seems to be nature positive.

[00:50:31] The ecotourism industry is absolutely booming because people go there because of their love of nature. And that improvement in biodiversity has led to a massive improvement in the economic situation for Costa Rica. And it's a perfect example of how nature can become the economic choice at a national scale.

[00:50:49] If we can just have other governments doing the same thing, who knows what might happen?

[00:50:53] **Nate Hagens:** So this is an example of. Like, a dead whale is worth, a million dollars, and a live whale is worth nothing. so it's, a way to put our values into our economic, choices. But if we somehow have economic growth and we get more dollars or whatever the currency is in Costa Rica, then we spend it on refrigerators and air conditioners and other things.

[00:51:23] So there, there still is a, an environmental impact if we grow. Yes.

[00:51:28] **Thomas Crowther:** Actually, so there's something, the model that you've just described is called the environmental cosme curve. It's this assumption that as people get more money and get more developed, we'll buy more stuff up to a certain point, and then we're rich enough and then we stop, and then that falls.

[00:51:43] I. R Recent evidence has suggested that actually that kne curve is completely wrong. The biggest driver of degradation on the planet is inequality. We've got a small number of people with massive environmental footprints and then billions of people. The people who live in direct association with nature, they are trapped with no non extractive alternatives.

[00:52:04] They are forced to live in an economy where they have to plant eucalyptus trees outside so that they can get paper so that 'cause the only economy will give, will fund them for that. Those are the people for whom, if nature can be the economic preference, if they can be a, an economic alternative with a, with healthy nature.

[00:52:21] These are the people who know best how to find the regenerative options and the sustainable options whereby nature always thrives. There is no single location on the planet where a degraded ecosystem is more valuable to the local people than a recovering one. We just need to balance that inequity and find and lift these people out of poverty, and they have the power to find the regenerative solutions now.

[00:52:45] The curve gets complicated after that, but at the beginning, at the poorest ends of the, of our economy, these are the people that need to be lifted out of poverty so that nature can do better.

[00:52:54] **Nate Hagens:** Well, in a broader, context as well, we're headed into what I call the bottlenecks of the 21st century.

[00:53:03] And there's the bi, the macro biophysical scale of how big can our global economy be. Right now it's between 19 and 20 terawatts of continuous energy and materials, being accessed, but the other is the ecological carrying capacity of the planet and other places. And this work that you're describing, taking agnostic, the biophysical, throughput for the moment, it will help, put a floor on the loss in carrying capacity and ecosystem destruction.

[00:53:36] And so from there we can regenerate. So. Tell me some stories on the potential for Earth to regenerate our ecosystems, because you don't hear about that a lot, and it seems that the opposite is happening. I have heard stories that if

we stop fishing in the, some of the seven world fisheries, that in like a decade fish can, recover almost completely with the exception of the huge large fish.

[00:54:06] But tell me some stories about the ability for Earth to regenerate. on the issues we've discussed,

[00:54:13] **Thomas Crowther:** the regeneration capacity of nature is unbelievable. It is so much faster and more efficient and more, I wanna say, Inspiring that I think most of us understand. You know, there's examples like Chernobyl, you know, after the Chernobyl disaster, people moved away.

[00:54:35] Within a decade, nature's already recovering within a couple of decades. We're already seeing large predators moving through the landscape. Wolves are coming back. You see that natural ecological balance falling back into place as soon as humans stop degrading the ecosystem. these are things that happen unbelievably quickly after, after, these kinds of disasters.

[00:54:57] Right. But are they only because of disasters? No, there's plenty of other examples too. So there's, one of my favorite examples is in, I think it's the, I. Iber a wetland in, in, in, in, Argentina, where they si simply the reintroduction of Jaguars into a system was built to regulate capi Barra, population.

[00:55:24] So there's massive numbers of KBAs, grazing all the grasslands, grazing, all the all the vegetation reintroduction of those predators. Almost immediately rebalanced the system into one where wetlands could recover. Thousands of species of birds could exist. the entire system recovers. You'll see so often with eco ecological systems, you just make one little tweak.

[00:55:46] You just recover the top predators or you remove the grazing pressure and this system will recover. Another example is Yellowstone National Park, the reintroduction of wolves and how quickly the entire landscape completely transforms. And obviously my favorite stories always involve the people too.

[00:56:03] When local people are economically empowered by nature, that's when it'll recover so much better. There's this incredible movement called the F-N-M-R-F-M-N-R movement. It's a pharma mediated natural regeneration in, Across a range of countries in Sub-Saharan Africa, and it's incredible. These are

places where desertification is a huge environmental pressure, but also increasingly degra, degradative farming systems have led to a complete destruction of the soil.

[00:56:33] So farmers are having to move away. They're having to move out of the countryside, they're having to move towards cities, and it's contributing to other socioeconomic pro problems all over the continent. This is places, these are places where. simply the management of local trees can actually improve the fertility of soils and farmers are able to then stay and make more sustainable livelihoods across thousands of hectares of land, stopping the desertification and increasing food production at the same time as improving biodiversity across the landscape.

[00:57:05] So when people are economically empowered by the recovery of nature, that's when it just spreads like wildfire and you can't stop it.

[00:57:12] **Nate Hagens:** Let me put you on the spot here, Tom. I've had many population ecologists, on the show and, many people, are quite confident that we are on, not yet in, but on the verge of a sixth mass extinction.

[00:57:29] do you think that's the case? And if so, is it still avoidable if, we come to our senses and do some of the things that you've been suggesting?

[00:57:37] **Thomas Crowther:** I think it's a fact that we're on the verge of a sixth mass extinction. I think we are causing. A loss of biodiversity at a rate that is almost unprecedented for a biological trans.

[00:57:49] You know, we are a, single species causing this, loss. It's unprecedented and it's difficult to imagine the world that will result if we continue on this trajectory. That said, I do not believe that we're continuing on this trajectory. I may be in a completely, biased and narrow-minded world, which I certainly am, but I get to work every day with these farmers and indigenous communities who are saving nature and getting more money for it, which may, which empowers them to save more nature, and then they bring in more stability.

[00:58:21] And when you see that happening, the transformation of livelihoods and the transformation of nature shows that people and nature can thrive together. And if these concepts can spread, I truly believe that in every single location on the planet there is. A solution where nature can become the economic preference.

[00:58:39] We've not found it in most of them, but I believe that it is possible to find it in every location on the planet. And if we can lean into that, I do believe there's the potential for these positive feedbacks to build a better world. We're not, we're still going in a bad direction, but, we can build a better one.

[00:58:56] **Nate Hagens:** So, I'm proud to claim that a great number of the viewers of this show deeply care about nature. so following up on your point you just made, what specific pieces of advice do you have for individuals who wanna aid their local ecosystems and creating more biodiversity?

[00:59:15] **Thomas Crowther:** I mean, my simple answer is go on restore, find some local project, buy all of their products and improve the world with all your purchases.

[00:59:24] But I think genuinely my deeper and more sort of, systematic answer. Is to simply try to enjoy the process. I personally am very privileged that I love nature, I love working with nature, and that empowers me to work more with nature. But this is simply happening through a positive feedback loop.

[00:59:48] And if you can find a positive regenerative action that brings you more joy, more health, more comfort, more, saves you money, that makes you more money, that there are so many ways that the regenerative option can be profitable to you or helpful for you. And if you can find that the benefit that comes with it is incredible and it can, it can't help from building these kind of positive feedback loops where you'll do it more, which means it'll be get easier, and then others around you will do it more, and then it'll get easier.

[01:00:18] So there's no individual action to take. But I feel like the process of en of, enjoying, I. The fight against biodiversity loss is the best way that we're gonna fi that we're gonna succeed.

[01:00:31] **Nate Hagens:** So we have some mutual friends who have shared with me that you are a very accomplished wildcrafter. you wanna say any words about that?

[01:00:40] **Thomas Crowther:** My life is all about bush crafting. The second I discovered I've, I was, I grew up obsessed with sports and tennis and kite surfing and football. And I went from hobby to hobby. And when I discovered sitting in a

forest and whittling a little knife or a spoon and eating a, eating some food that I gathered from the, from nature.

[01:00:59] I've never gone back. It's just, it's taken over my entire life. And I think it stems from some deep evolutionary appreciation for the feeling of making a fire without matches. It just, it, you cannot avoid the feeling of satisfaction that comes with something that our ancestors would've benefited from so much.

[01:01:19] And I think it's just baked into our evolution that you can't not love that.

[01:01:23] **Nate Hagens:** I think I would love that. I just don't think I could do it. How many fires have you started without matches in your life?

[01:01:29] **Thomas Crowther:** I'm telling you, I was so bad five years ago. I couldn't survive a night in the forest. But YouTube's unbelievable.

[01:01:36] There are loads of videos and I don't like learning. I'm not a very good, I'm dyslexic. I wasn't good in, in like school listening to lectures, but just watching these guys on YouTube. It's the most entertaining TV ever, and in the process, you've learned bits and bobs and you get to go through it. I've now built thousands of fires without matches.

[01:01:53] It's the most satisfying thing when you can get a spark to ignite a fire or when you can like rub two sticks together and get a, get an ember. It's. Game changing. You can't, you'll never go back.

[01:02:03] **Nate Hagens:** So you live in Zurich right now, right? And so you find somewhere in Zurich to go bushcraft?

[01:02:10] **Thomas Crowther:** Yeah. That's one of the beautiful things about Switzerland is however, wherever you are in whatever city you are, the, you're never more than 30 minute walk from a little patch of forest.

[01:02:18] And yeah, deep in the forest, I've built my little hou, my little hut and my little chair, and I just sit there whittling fires. It's incredible.

[01:02:25] **Nate Hagens:** so, so what are next steps for you, Tom? There seems to be, from what I've heard, an unfriendly parting with, a h Zurich. but according to Swiss media, it appears you've been treated quite unfairly, but are now exonerated.

[01:02:43] would you be willing to give a summary, and what's next for you?

[01:02:47] **Thomas Crowther:** Yeah. I have recently been through arguably the most devastating phase of my life. we, I. I'll put it this way. Our research group is uncharacteristically big. We had 60 people perpetually in this research group. And honestly, as a young professor, my ambition and my dream and my philosophy was, if I'm best friends with everyone, we will.

[01:03:10] Friendship will be the foundation for all great things, and we'll do incredible stuff. And in all honesty, in most ways, that was exactly true. I think these close friendships and socializing built incredible foundation for research. But unfortunately, as I've grown older, I've come to realize that also causes complications when it comes to authorship positions or salary renewals.

[01:03:32] really close friendships can cause complications. And unfortunately, towards the end of my time at a TH, Small group of people, raised a number of issues and accusations about my, my, my leadership. yeah, and fortunately the media has, sort of cleared a lot of that up, but it led to a very difficult sort of phase and we've agreed to part ways between myself and the university.

[01:03:57] So the crowd lab will be moving on to our next destination that I'll be announcing sometime soon.

[01:04:03] **Nate Hagens:** And what do you really wanna do next? Five to 10 years?

[01:04:06] **Thomas Crowther:** Next five to 10 years, I want to get fundamental biodiversity information into our economic systems and into our political systems. At the moment, people are making decisions about nature without any information about the fundamentals that underpin it.

[01:04:22] So if we can get that. Biological that, you know, bio complexity information into everyone's score sheets and into everyone's term sheets and into

everyone's, recording of the state of the planet. Then we'll have decisions that are built around the protection of this incredible stuff that we all depend on

[01:04:41] **Nate Hagens:** here.

[01:04:42] I'm, all for that. if you have some, additional few minutes, I have some questions that I ask all of my, guests. you and I in our brief interactions have largely talked about ecology and biodiversity, but you're clearly aware of what some call the human predicament or the meta crisis.

[01:05:02] What specific, recommendations do you have for people being alive, during these times? Being aware of all the things that we face.

[01:05:11] **Thomas Crowther:** Now, my answer might be to some people it's gonna be vague and unspecific to others. I think it might be a mindset shift. There are no individual actions that, that I would pull out above any other, every single action we make, every day, every single purchase we make every day has a footprint on the world, which means every action we take has the potential to have a positive footprint.

[01:05:36] I think the real challenge that we have to get our heads round is how to enjoy. The process somehow climate action and biodiversity action needs to stop being a chore. It needs to be an opportunity. The anxiety is completely natural, but it only drives inaction. But if we can wake up in the morning and feel thrilled to buy that vegetarian burger instead of the meat burger, or excited to, to buy our coffee from Duster's Coffee Farm rather than Starbucks, we are gonna build a feedback loop of positivity that will drive more and more positive action.

[01:06:13] **Nate Hagens:** And how do you, as a professor, that you teach, in addition to your research, you obviously have had students, over the years. What sort of advice do you give to young humans, 18 to 25, who are learning about all the, the hurdles that we face?

[01:06:30] **Thomas Crowther:** So what I try to get across is. The f the environmental crisis that we're facing is not a result of bad people making intentionally bad decisions.

[01:06:41] I truly believe this. I do believe on the planet that every single person is making the best decisions they can, given the context of understanding that they have. The problem that we are facing is an economic system that undervalues nature, that undervalues the system that we depend on. It values parts that.

[01:06:59] Build their own positive feedback loops at the expense of the system that we depend on, and it drives inequality, which causes mass degradation. So fighting the environmental crisis doesn't necessarily require hate and aggression. It requires that we find the solutions to distribute wealth towards those local people who are the people protecting nature?

[01:07:19] And this sounds like a wishy-washy thing, but there are so many financial mechanisms that do it. Debt cancellation, cash transfer programs, payment free ecosystem service programs, even things like wealth distribution, mechanisms like, universal basic income. Things like this have the potential, I'm not saying they will, but they have the potential to drive massive ecological recovery at the same time as lifting people outta poverty.

[01:07:42] **Nate Hagens:** What do you care most about in the world, Tom?

[01:07:44] **Thomas Crowther:** Honestly, the beauty of wilderness and the biodiversity that supports it, I just feel overwhelming. Pain and agony. When I see ecosystems being lost and when I see the animals being displaced and everything I want in the world is to stop. This destruction.

[01:08:04] **Nate Hagens:** Well, if you had a magic wand and there was no personal recourse to you, what is one thing you would do to improve human and planetary futures

[01:08:14] **Thomas Crowther:** other than flame throwers on the backs of all the wild animals to protect themselves? again, this is probably gonna sound like a very wishy-washy answer, but having come back from a meditation retreat with you, I would say I would like everyone on the planet to be able to come together into a mindfulness meditation retreat and actually experience the pic.

[01:08:35] The spectacle of our interconnected beings, the spectacle of our awareness together. And I swear 99% of our antagonism would diffuse into a system where we have more empathy.

[01:08:48] **Nate Hagens:** I'm not sure 99%, but I think a lot of it would, and much more to say on that topic in the future. it, it was a, a big shift, in awareness, wide boundary awareness.

[01:09:04] so if you were to come back on this show in six months or a year, you are kind of a ecological polymath of sorts. What is one topic that we didn't discuss today that is relevant to human and planetary futures? That you would be willing to take a deep dive in because you're passionate about it?

[01:09:24] **Thomas Crowther:** So the topic that I'm allocating all my energy to in the coming months.

[01:09:29] I'm calling it nature's limits. So if you imagine, you know when the EU announced their EU restoration law farmers were marching in the streets saying, no, don't protect more nature. We need our agriculture to be safe as an ecologist. I completely empathize with that perspective, but I must tell you that it's.

[01:09:49] Fundament. it's, driven by a misconception of nature. We need nature so that we can have agriculture. So there's a, gradient of degradation. If you go from a fully intact ecosystem, you need to remove some nature to get forests to, to get agriculture. But once you've removed enough, that line will start dipping in the other direction.

[01:10:10] And we can now calculate the tipping point for every single country on the planet. And we can say exactly when you start depleting nature and it will start depleting your agricultural yields. And if we can calculate that exactly, we can then have the data to show those farmers and the policy makers exactly how much more nature you need to get on your country so that you can maximize your agricultural outputs.

[01:10:33] Because there's no way we'll have agriculture in a world where we don't have nature. We fundamentally need to find the balance between the two.

[01:10:40] **Nate Hagens:** Let's do that. That sounds fascinating. Thank you for your time, and your important work in the world. Do you have any closing comments? for our viewers, Tom Crowther?

[01:10:48] **Thomas Crowther:** I think we've covered almost everything other than just get out in nature and love it. That's the only way to do it.

[01:10:55] **Nate Hagens:** Thanks so much, Tom, to be continued. Thanks so much. If you enjoyed or learned from this episode of the Great Simplification, please follow us on your favorite podcast platform. You can also visit the great simplification.com for references and show notes from today's conversation.

[01:11:15] And to connect with fellow listeners of this podcast, check out our Discord channel.