

Santa: I'm Santa Ono, the President and Vice-Chancellor of UBC. This season of the *Blue and Goldcast*, I'm speaking with the people who are helping to shape UBC's next century.

Our Vancouver campus sits at the tip of one of the most important estuaries in the province, the Fraser River. In this estuary alone, there are 102 species at risk of extinction. My guest today studies this area, as well as how to best save species at risk. Indeed, how best to approach conservation as a whole. Tara Martin is a Professor in Conservation Decision Science in our Faculty of Forestry and a Liber Ero Chair in Conservation. Thanks so much for joining me.

Tara Martin: Thank you for having me.

Santa: Well, I've really enjoyed hearing you speak in different venues. As you know, I've been very, very involved and interested and hopefully, I can be supportive of you and your very, very important work. I've been very interested in conservation, then decision making, and in estuaries, specifically, since I was in middle school. I just wanted to, before we get to your current work, ask you a little bit about what brought you to conservation work?

Tara: I think like many folks that are passionate about conservation, from a young age, I was surrounded by nature. I grew up in the Salish Sea, where I'm joining you today. Those plants, those animals, those smells, the sounds were what imprinted on me very early on. Then, I also had the fortune to travel quite a lot with my parents as I followed their paths around the world. I spent much of my youth also in Australia, another place of incredible biodiversity and beauty.

Conservation was always in the back of my mind, but it wasn't actually my first path. My first path was medicine. I soon realized when I got into pre-med that while I was passionate about healing and finding solutions to really complex problems, I wanted to focus on finding those solutions for our biodiversity. I found ecology. I finally found a science, ecology and conservation science that would help me to find those solutions for our biodiversity crisis.

Santa: Well, like I said, your passion really resonates with me personally, my favorite estuary, as you know, is Chesapeake Bay. I watched in horror as that biosphere was being influenced by human actions and human decisions and how ultimately that was a threat to humanity, as well. It's not just the remarkable biodiversity in the estuaries, but our economy, whether it's in BC or the state of Maryland, beyond the economy itself, just the beauty of the world is that threat because of the decisions that we make.

That's why what you're doing is so important, and I view you as a physician, a healer of the world. Thank you for making that decision along the way. Let me ask you, what are some of the current issues with the way conservation is practiced?

Tara: Conservation has traditionally been very focused on understanding the threats to biodiversity loss, which is a really core information, and assessing the threat status of species. We have this IUCN Red List, The International Union for the Conservation of Nature has designed this risk assessment, if you like, for species. That has been a method that's been used to prioritize our investment in

conservation. There are some problems with that approach and that understanding the threats does not necessarily translate into investing in the right actions to abate those threats.

We've essentially been really good at documenting the train wreck in biodiversity loss. We know a lot about what's going on, and we know a lot about the causes, but we've spent far less energy thinking about and developing and testing solutions to recover species. Then when we look at what we are investing in, often we're investing in species which are the most threatened, possibly, the most costly to recover, and possibly, the least likely to recover. That's because we're ignoring some really important information in the decision-making process, like the cost of management, like the likelihood of recovery, or the political social feasibility of implementing a particular action to save those species.

Santa: Well, it's very, very complex. I used to think about particular species when I was thinking about the threat of human decisions on estuaries. As you point out, there are many species, and prioritizing the wrong species is part of the problem. The question I have for you is this, it really requires quite a bit of knowledge and training to be able to make the right decisions. Can you talk to me about where the powers that be are currently, politicians and people that are in regulatory agencies, that could have a positive impact on making the right decisions? Are they properly trained? Are they properly resourced? Are there deficits and the tools that they have to help them make the right decisions?

Tara: I think this is a great question. There are some really brilliant people that are working in our agencies to try and bring about better decision-making. There's many obstacles as well. Certainly, insufficient training is one of them and cultural legacies of just doing things a certain way, and the kind of inertia that comes with trying to change some very embedded ways of thinking. There's also lack of funding and lack of resources.

I think universities and conservation science and the development of conservation science, and decision science, in particular within UBC and other universities, is really important for starting to change that culture and change that inertia within not just government agencies but also across some of our non-government organizations.

Funding is a big issue as well, we have over 600 species at risk in Canada. These are federally listed species under our Species at Risk Act. Within BC, we have over 1,800 species that are in decline, and around 240 of those are also listed under the Species at Risk Act. We've got a lot of species that are in trouble, not doing well, and we have a fraction of the resources needed to actually invest in the recovery of those species.

In fact, we don't even know how much money we need because that's the analysis that we haven't done yet. If this was a business and the business was to recover species at risk, one of the first things you'd want to know is, "Well, how much is that going to cost?" That's a piece of research we haven't done yet and something that my team is working to fill that gap. Because once you know what the price tag is, then we know how much we need to leverage and how much we need to fundraise

for, but we also can start to make better decisions about how to spend the money that we do have.

Santa: Well, it certainly is a very complex situation. Then I really applaud you and your team for your very strategic efforts to educate individuals who are in positions of power, but also the next generation of leaders that will move into positions in government and in agencies so that hopefully, they will begin to make the right decisions. One of the things I wanted to ask you was about activists.

I've been very inspired by the activism of the younger generation, and they certainly are focusing on the threat of climate change, and that it is an emergency. Do you think that they're familiar enough with the threat to biodiversity? They certainly are aware that there is global warming, they are very sensitized to the importance of divestment in their view. Do you think that they are familiar with the threat to everyday lives with what's happening with our biodiversity?

Tara: When I look at the younger generation, I feel incredible optimism because I think we have an incredibly intelligent, and active, and vocal group of citizens growing up and really calling us out on decades of poor treatment of our biodiversity and poor treatment of the planet in general. I do think there is an awareness of the connections between our treatment of biodiversity, our current climate crisis, also a connection to these huge inequities and injustices across the globe. I do feel optimistic that we have some very vocal leadership.

I feel optimistic too as I watched in Canada First Nations gain increasing capacity within their nations, and watching these young leaders emerge, who are really calling for indigenous-led governance across their territories, and who are thinking very hard about the need to use our resources in a different way, in a way that makes sure that there's going to be resources in seven generations time, in a way that sustains biodiversity, and all of the things that we derive from that biodiversity over the long term.

At the same time, there are some very strong, embedded, and powerful forces, which are resisting any level of change because it potentially impacts their bottom dollar, so we've got some very big barriers to overcome, but I think there's a lot of very good and young talent working to chip away at that.

Santa: I agree with you 100%. My question wasn't really a criticism of them. If anything, it's a criticism of how we educate and our priorities as an older generation, as you say, some very powerful individuals in different institutions, where it's not to their immediate term advantage to address these issues. Even to some extent, I would say, that one of the things that perhaps we can do better in education is to talk about the big picture, that we talk about modern biology, biotechnology, and I'm actually a molecular immunologist.

I'm really talking about my own deficiencies and people like me, who got really excited for a lot of good reasons about molecular biology but had a deficit and may still have a deficit in our understanding of the impact of climate change on biodiversity. We need education as well. You're right. I think the younger generation is inspirational. My question was really more focused on, are we doing enough to educate ourselves, those who are currently in decision-making positions? Are we

doing enough to give that broad-ranged education to the youth so that they understand the threats that we face as a civilization? That was really the genesis of my question.

Tara: I think there's so much that we could do around educating our current leaders around the biodiversity crisis that we're in. When I look across the university and how we teach, there's a lot of silos. We all need to scale up and look at the connections between conservation science, and molecular biology, and geography, and forestry, and mining, and to start to get some, I guess, cross-pollination of ideas but also of solutions to this biodiversity crisis.

Faculty of Forestry is a really perfect example of that. We're starting to intersect more, but classically, many of our faculty were really about how do we do in classic forestry, grow bigger trees, faster trees, more rotations, and maintain the allowable annual cut at a certain level, how do we optimize all those things? Then, there's another department which is trying to mop up the mess of all that decision-making. There really needs to be more integration, which I think our faculty is really starting to tackle that in a good way. They're trying to link, "How do we maintain our resource base without eroding the conservation value of the overall estate?"

Santa: Well, thank you so much for that example of your faculty. I'm very happy to hear that those conversations are actually underway. I want to get back to your actual research and scholarship, you work on the Fraser River Estuary. Tell me about the work your team has done around salmon species in the estuary.

Tara: The Fraser is historically Canada's richest salmon river. It's quite phenomenal. In fact, it's one of the most productive salmon river systems on the whole West Coast. We have 53 distinct genetic populations of salmon within that river system. They're called conservation units. They fall in five different species of salmon, but they're essentially distinct populations that don't interbreed.

What we've been looking at is trying to understand what are the management actions that we can take to help maintain and recover many of these populations? Almost all of them are not doing well. We've already had some extinctions of some conservation units, and we're facing near extinctions of some others if management actions aren't implemented soon.

We set out really to ask the question, "What are the management actions we need to take to save these populations of salmon? Where do we need to take them? How much is it going to cost? What's the likelihood of success?" That was a process that we undertook not just for salmon, but for 102 species that use the Lower Fraser Estuary in particular. That Lower Fraser Estuary where we live, essentially, our backyard is an incredibly rich area for biodiversity. What we want to know is what are the management actions we can take, that are going to allow us to recover and maintain all of those species for the least cost to society?

Santa: Anybody who's interested in your work, I hope that those listeners out there will take some time and really do a deep dive on your work to understand how comprehensive your approach is. I think when they're doing so, they'll also see the contributions of quite a group of remarkable students that you have on your team. Thank you for talking about your work on the Fraser River Estuary.

I want to take you in a different direction. There are multiple First Nations in this region. One of the things I've been very impressed with is their knowledge of the importance of the biosphere, their understanding and unique approaches to ecological knowledge. Can you talk a little bit about your interactions with different First Nations? Have you learned something from them, from their millennia of experience, and has that been helpful in your scholarship?

Tara: I'm glad you raised this point in this question. Working with nations in the Lower Fraser and in the Salish Sea has been one of the most rewarding and humbling experiences of my life. Growing up in this region, in these islands, I used to wander the shores and the forests, and I would come across evidence of people having lived here for millennia before me, whether it was an inland midden or a shell midden along the beach, or arrowheads, or stone anchors. Even when I was a kid, there were burial boxes up in cedar trees on some of these outer islands.

This evidence was everywhere but every time I asked a teacher, even a family member, no one could tell me about the people that used to live here. I grew up in this, surrounded by the evidence but really in a vacuum of knowledge about the nations that lived in this region and that had shaped this region for thousands of years. It wasn't until I left Canada to pursue studies overseas in Australia, that I really started to think about that in a much deeper way.

When I returned back to Canada, many years later, it became a really important part of my research was to understand and learn from the people who were the traditional owners of these areas. My work now is very strongly linked, I'd say co-developed with nations in the regions in which we work. Our work in the Lower Fraser, we work closely with the Lower Fraser Fisheries Alliance, which works with 22 nations in the Lower Fraser. We work with the Musqueam and the Tsleil-Waututh and the Tsawwassen, and Squamish nations.

In the Salish Sea, we do a lot of work around what we call eco-cultural restoration. One of the most endangered ecosystems in the Salish Sea is the Coastal Douglas-fir bioclimatic zone. Within that, we've got these Garry Oak ecosystems, which is these incredible wildflower meadows. Essentially, they were gardens. They were gardens that were cultivated over millennia. Those ecosystems are our most endangered ecosystems now in all of British Columbia.

One of the key threats to those ecosystems has been the loss of First Nation management. The loss of fire, the low-frequency fire that they used to use. The loss of their propagation and seed collecting techniques. The loss of hunting to keep herbivore numbers low so that these plants could flower and set seed. A really exciting project that we're working on now is in collaboration with First Nations in the Salish sea to undertake this eco-cultural restoration to bring back people into these landscapes, these nations, and their traditional practices in stewarding these incredible ecosystems.

It's a really important conversation we need to be having at universities and with our students because I do believe that conservation will come hand in hand with reconciliation.

Santa: Absolutely. How can your work help us as a society rethink the way we do things with respect to the climate emergency?

Tara: I think the climate emergency can often seem overwhelming and almost disempowering because it's so overwhelming. What can we do as an individual, as a region, and as a province, and as a nation? The empowering part of the work that we're doing is it's really about finding those solutions at different scales. We can look at within our communities, what are the most cost-effective strategies that we can take at the community level to adapt and mitigate climate change? What can we do at a regional level? What can we do at the provincial level?

It really provides us with a pathway for action, and that is very much needed because these problems can seem too big, too overwhelming, and almost disempowering, but there's so much that we can do.

Santa: Absolutely. Here's my last question. I think I asked you this before. I talked a little bit about perhaps our ability to work with you to amplify important messages to different levels of government. Is there some other way we, as UBC, can be helpful to you?

Tara: One of the big gaps that we have at a provincial level is that we don't have a species at risk legislation. This is very challenging if we're trying to maintain biodiversity, but we don't even have a regulatory mechanism to do it. It makes it very, very difficult. It would be really wonderful, as a university, if we could try to work and encourage our provincial government to build the Species at Risk legislation for the province, and finally, to have a piece of policy that is really based for the sole purpose of protection of species and ecosystems because, at the moment, we have nothing of the sort.

Santa: I want to just thank you so much for being on *Blue and Goldcast* today.

Tara: Well. Thank you, Santa. It's been wonderful speaking with you. I'm really excited about how we can work together in the future.

Santa: Tara Martin is the UBC Liber Ero Chair in Conservation and a Professor of Conservation Decision science in our Faculty of Forestry. That does it for this month's episode. You can find links to our guests' work as well as previous additions to the show at blueandgoldcast.com. You can also find us on your favorite podcast app, like Apple Podcasts. You can tweet at me @UBCPrez. That's Prez with a Z. I'm Santa Ono. Thank you for listening.