ClassAct HR73 Half-Earth Forum II

PROTECTING HALF-EARTH: OPPORTUNITIES AND OBSTACLES

April 17, 2023 07:00 PM Eastern

Welcome

Marion Dry
Good evening. I'm ***Marion Dry***, Chair of Class ACT HR73, and it is my honor to welcome you to this ClassACT Forum, Protecting Half-Earth: Opportunities and Obstacles. ClassACT Forums bring experts and activists together to educate all of us about the issues we face in this complicated time, and to provide us with strategic information about actions we can take to contribute to making this a better world. Let's get started. And in order to do so, I'd like to introduce our moderator John Kress, and our panelists.

Classmate ***John Kress*** is a distinguished scientist and Curator Emeritus at the Smithsonian National Museum of Natural History. He was curator of botany for over 30 years and formerly served as the Interim Undersecretary for Science at the Smithsonian, and Director of Science in the Grand Challenges Consortia at the same institution. He is currently Co-Chair of the Earth Bio Genome Project, an international effort to generate complete genomes for all species of plants, animals and fungi on the planet. John is currently writing the *Smithsonian Trees of North America*, to be published by Yale University Press. He is a fellow of the American Association for the Advancement of Science and received the Parker Gentry Award for Biodiversity and Conservation from the Field Museum of Natural History, and the Edward O Wilson, Biodiversity Technology Pioneer Award, as well as serving as affiliate faculty at George Mason University. He is visiting scholar at Dartmouth College.

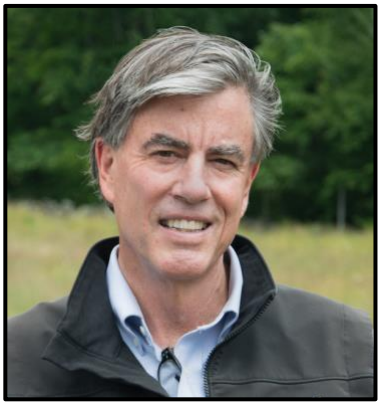
Kiani Akina is a sophomore at Harvard College from Kahuku of Oahu, Hawaii. Kiani studies environmental science and public policy with a focus on the Pacific Islands and Indigeneity. In the

summer of 2022, she worked for the Kuleana Coral restoration, where they work to restore coral colonies on the outer Hawaiian reefs. Kiani introduced the practice of Hawaiian kilo and the Indigenous practice of observation to better land and ocean stewardship. Kiani hopes to attend law school and then returned to Hawaii to work with her communities and to make better climate policy, incorporate Indigenous knowledge into land management and restoration, and help Native Hawaiians get land back.

Classmate ***Jason Clay*** is the Senior Vice President for Markets at the World Wildlife Fund, which provides thought leadership on global issues and trends affecting food and the environment. He ran a family farm, worked at the USDA, taught at Harvard and Yale, and spent 15 years working with Indigenous and displaced people. Jason is currently exploring new business models and markets to address producer livelihood and assets while reducing key impacts for producing food globally. He's leading a two-year proof of concept with the Global Environment Facility and the World Bank to explore Codex Planetarius, a set of minimum global environmental standards that reduce the key impacts of producing globally traded food.

David Foster is an Ecologist, Director Emeritus at the Harvard Forest, Harvard University's 4,000-acre ecological life laboratory, and President Emeritus of the Highstead Foundation, which is dedicated to increasing the pace of land protection in New England and beyond. David's research focuses on interpreting landscape dynamics, from climate change and other natural and human processes, and

applying these insights to conservation and management. In 2010, David and his colleagues developed "Wildlands, Woodlands, Farmlands & Communities," a vision for the New England landscape that argues for regional forest and farmland conservation, integrated with resilient community development for the benefit of nature and all people.



Cristián Samper is the Managing Director and Leader of Nature Solutions at the Bezos Earth Fund, and has served as president and Chief Executive Officer of the Wildlife Conservation Society since 2012. Prior to joining WCS, Cristián served as director of the Smithsonian National Museum of Natural History, and was the Founding Director of Columbia's Alexander von Humboldt Institute. He served as Chair of Science on the Science Advisory Body of the UN Convention on Biological Diversity, and was one of the leaders of the Millennium Ecosystem Assessment. He is a Member of the Council on Foreign Relations, and a Fellow of the American Academy of Arts and Sciences. It's now my great pleasure to welcome John Kress to begin the discussion.

Opening Thoughts

John Kress

Thank you, Marion, and welcome everyone, to tonight's forum on Half-Earth. I'm sure to many of us, the world seems to be in a rather sorry state these days, socially, economically, politically, but also

environmentally, with the rapid loss of biodiversity and escalating global temperatures. But I also want to remind everyone that things have been worse. You can imagine that 65 million years ago at the end of the Cretaceous period, an asteroid hit the planet, causing massive environmental destruction and species extinction, including, as most of you know, the demise of the dinosaurs - it was pretty bad. But out of that destruction arose a great expansion of new living things. Flowering plants, new insects, birds, mammals, and one species in particular began to take shape, called Homo Sapiens. The world and biodiversity got going again after that major impact by an asteroid.

This is what Ed Wilson taught many of us as Harvard undergraduates in Biology 101, about 50 years ago - that life is unbelievably complex, that it is easily perturbed, but that it goes on. Ed Wilson was an inspiring teacher, a diligent scientist, and an unrelenting global environmental advocate. And after devoting his career to understanding and protecting nature, he came up with the idea, near the end of his life, that the only way to keep life going was by setting aside 50% of the planet as a zone to be protected long into the future. How long into the future? Well, for as long as it will take us, the single species that is causing this upheaval, to learn how to coexist with the other 10 million species on the planet. He called his idea Half-Earth, and he saw it as the only solution.

A little additional history: in 1990, about 4% of land and oceans had been set aside as protected areas. Today, about 17% of the Earth is protected. The United Nations Convention on Biological Diversity, which recently had its 15th world conference last December in Montreal, now calls for protecting 30% of all land and sea areas by the year 2030. That's about twice as much as is protected today. This 30% goal has been echoed by many conservation groups and nations around the world including the US. It is known colloquially as "30 by 30." Half Earth goes beyond these ambitions by setting a target of protecting 50% of the planet. The question is, are any of these targets realistic and possible?

Last October, Class ACT HR73 convened a panel of classmates in the same type of forum, who have worked in the field of biodiversity and environmental conservation for a good part of their careers. That forum concluded that the goals of Half-Earth will require not only a major boost in land and sea protection to 50%, but will also demand significant changes in our lifestyles, our utilization of natural resources, our economies, our cultural practices, and our political priorities. This sounds a bit like the hurdles the planet faced back at the end of Cretaceous period when the dinosaurs went extinct. The difference, though, is that today, this environmental crisis is being caused not by an asteroid, but by one species. Unlike that asteroid, we might be able to change course, if we can muster the courage to do so. This evening, we have a second panel to address Half-Earth and how it will unfold in the future, if 50% protection is imperative to meet the challenges.

As you've heard from Marion in her introduction, all the panelists are highly experienced and greatly motivated to solve the pressing environmental issues facing us. From major conservation NGOs and foundations to biodiversity research institutes and environmental sciences programs, our panelists have a direct connection to Harvard and the environment, either as faculty, students, or graduates. We're going

to divide the questions and the panel discussion into five main sections. The first round is what I like to think of as setting the stage for Half-Earth. For this round of discussion, I would like each of the panelists to begin with a short statement about themselves, their interest in the environment, and why they decided to be on this panel in the first place. And then they can directly address the question I'm about to ask.

Topic One: Drivers of Environmental Change

So, question number one: what are the drivers of environmental change that must be addressed as Half-Earth unfolds over the next 20 years? We're going to start with Cristián Samper. Cristián, let us know what you think about what these drivers are.

Cristián Samper
Well, thank you, John. And it's great to be joining this panel to have this conversation about an incredibly important topic for all of us. As you heard in the introduction, I grew up in Colombia, and as a young kid, as a biologist, I spent time hiking in the Andes. Some of the areas in southwestern Columbia where I went out to collect plants, I found, a few years later, to have been destroyed. It's at that point when you realize that you can't just document extinction, you have to do something about it. And to be able to do something about it, you must understand those key drivers of climate change. Of course, we have to remember that today, we have transformed about 73%, of the land surface of the planet into various kinds of production systems. Some are highly degraded systems. Most areas of the ocean have been impacted by fisheries. And you could argue that every corner of the world is being impacted by climate change today. So, if we want to understand it, we have to tackle this biodiversity crisis. And one thing you didn't mention, John, of course, is about 1 million species may be in danger of extinction. This century alone, that's about 1 million out of (depending how you count them) at least 10 million species, not even going into microbial diversity. That's a whole other can of worms, no pun intended.

But the EPS report has actually honed in on five direct and indirect drivers. The direct drivers are five main categories: the transformation of habitats, the over exploitation of species that have commercial value, climate change (which we can talk about more later), pollution, and invasive species, which is critical, especially for island ecosystems, and for some freshwater systems. And of course, behind all of these, you can find demographic, cultural, economic, institutional, and many other kinds of indirect drivers. So be to be able to set aside these problems, we must move ahead and protect some of the key areas of the planet; we have to make sure we secure those key places that are still left. But we also have to restore some of the areas that we have lost. So we do not have 30% to protect, we actually have probably less than many of these places. And we are going to have to rebuild, restore, and rewild some of these areas.

But in the end, most importantly, we have to transform the way that we live. And that's an absolutely critical issue for all of us. How do we live? How do we get around? What do we eat? All of these are issues because we have to reduce the pressures on these natural ecosystems. And of course, the challenges of the solutions, as we'll hear in this panel, vary widely across different continents. Whereas the Eastern United States was largely cleared as already coming back in many areas, we see that on a continent like Africa, where the effects of poverty and conflict have huge impact, and where the estimate is that the population is going to double, the situation is only going to be exacerbated by things like climate change. So I think the solutions are going to be different for different countries, different continents, and different regions. And I look forward to discussing these as part of the panel this evening.

John Kress
First, Cristián, thank you very much. I wanted to point out when you were that graduate student hiking through the mountains of Southern Columbia, I think we met for the first time at La Planada, if you remember that encounter.

Cristián Samper
That's absolutely correct. And I remember going and collecting heliconias there. John and I of course overlapped later, when I was the Director of the National Museum of Natural History. We worked on a whole bunch of things together, John, but thank you so much. I know one of the great honors was that you actually named one of the species of your beloved heliconias (*Helicoinia samperiana*) after me from Colombia, and that's a way of documenting these incredible species - our task is to make sure that we protect them for future generations.

John Kress
Well, Cristián, you deserved it. So okay, we're going to move on to Jason Clay. Jason, give us some idea of your thoughts on drivers of environmental catastrophe right now.

Jason Clay
Let me talk a little bit about my background, because in the 1980s I set up a company to try to prove that the rain forests were worth more as rain forests than they were as either cattle ranches or soy fields. And we tripled the price we paid to producers for things like Brazil nuts, or rice, which you can buy now readily in the US markets. But ultimately, we failed because we underestimated the power of the ranchers and the soy producers to move into regions like the greater Amazon. So I think the lesson I took away from that is that we really need to focus on the commodities that are driving destruction of many parts of the world, in particular food production, which has had the biggest impact on the Earth of any human activity.

The reason food is so important for Half-Earth is that we already use or have degraded and discarded half of the land to produce food. One activity is responsible for 70% of habitat loss, biodiversity loss,

more than 70% of water use, and a third of all greenhouse gas emissions (a lot of that is from deforestation). That's the single largest cause. But it also uses more chemicals than any other sector, it pollutes soil, freshwater marine environments, and has eroded about half of the topsoil on the planet. And this is going to affect our ability to be resilient in food production going forward. As the global population has increased, as we have gained access to globally traded food, we've included increased production through technology and efficiency, but also through the expansion of food production. That's where I think it might be better to call it agricultural sprawl, which shows what we've been doing in lieu of expanding and producing more with less.

We've altered half of the land area, we've added another billion people in the last 12 years, we're going to add another billion people in the next 15 years, and we'll be almost up to 10 billion by 2050. They will consume more, and they'll consume differently, especially animal proteins. And we've seen even with all the awareness about animal proteins, the consumption of animal proteins is increasing faster than most other food categories. The numbers don't lie. Population is a big driver. But consumption is equally important. The average American consumes about 30 to 40 times the amount of food as the average African. A cat in North America and the EU consumes in its lifetime about the same amount of resources, food resources, as the average African.

If there is a choice between a starving child and a tree, the tree is going to lose every time. So to prevent such choices, we need to shrink the footprint of food. We know that we need to reduce greenhouse gas emissions by about 80% by 2050. What most people don't understand is that we need to reduce absolute uses of many other things. How do we reduce from food not just greenhouse gas emissions, but also land used? Water used, agrichemicals used, other inputs used?

How do we do this? It's easy to say, but much harder to do. We can increase productivity and focus on soil and genetics, we can increase efficiency, use fewer inputs, focus on biology more and on agrochemicals and chemistry less. We need to reduce food loss and waste; we currently waste about a third of all the food we eat - that means for every two kilo calories we consume, we waste one. We could increase by 50% the amount of food available if we eliminate food waste. These are all things that are easy to do. Shifting consumption is probably where we can make the biggest reduction and it's also one of the things that's going to be the hardest to work on. Especially reducing animal proteins being consumed, and all the feeds that are fed to the animals. We know how to do these things. The question is whether we will, or not.

Topic Two: What is a Protected Landscape?

John Kress

Jason, thank you very much - extremely pertinent to the entire world, to say the least. Okay, here's the second question. We've dealt a bit with the drivers. And this is a question I'm often asked about Half-Earth a lot in terms of what the definition of a protected area is. So the question is, how do we best

define a protected landscape? And especially with regards to the rights and histories of Indigenous people in local communities, as well as current land use, whether it's for agricultural use or other types? So Kiani Akina. Could you please address your thoughts about what a protected area is?

Kiani Akina
Yeah, of course. Again, my name is Kiana Akina. I guess, a little bit of a background: I'm a current sophomore at Harvard studying environmental science and public policy. I'm in Elliot House! I love to see all the Harvard alums on here. Elliot House is the best house!

A lot of my focus here in undergrad has been around traditional ecological knowledge in Pacific Islander communities, and other Indigenous communities as well. To get into this question a little bit, it's much more nuanced than it initially seems. I wanted to start with a general definition that I think is accepted by many conservation organizations, and Americans, which is from the Department of Environment and Natural Resources. They define a Protected Landscape as areas of national significance, which are characterized by the harmonious interaction of man, land and water, while providing opportunities for public enjoyment through recreation, tourism, and other economic activities.

I think there's some crucial things that can be improved with this definition, and maybe even redefined. But just for today, I want to focus on one piece of it, and it's the last part which is providing opportunities for public enjoyment, the recreation, tourism and other economic activities. So many Indigenous peoples, including Native Hawaiians, which I am, understand that we as humans, we can't own land. Rather, we're in a familial relationship with one another, and then what you regard land as our kupuna, or our elder or ancestor. We understand this through the Kumulipo, which I have a copy of right here. This is our Hawaiian creation story - it was traditionally passed down through chant, but today, obviously, we have it written down in Hawaiian, and also in English, which I'll provide for anybody who's interested to read later. But through the Kumulipo, we understand that our relationship with protected landscapes is a familiar one, because our ocean relatives and our land relatives came before us as humans. Our first relative is the coral in the ocean. And this is actually what drove me to do the restoration I did the summer after my freshman year, and has fueled my interest in Indigenous science studies.

I think it's clear that our relationship with protected landscapes should not be contingent on the value they can provide for humans. Instead, we should be incentivized to protect and steward land, because it's our elder, it's our predecessor, and therefore it also has the right to exist just like we do. While Half-Earth is a bold and very inspiring call to action, and Protected Landscapes sound very comforting, both are still very anthropocentric, and present a human view of nature - protecting lands and waters and oceans for the benefits of humans. I think we need a more inclusive and a holistic approach to protecting biodiversity.

I want to introduce a framework instead of a definition for us to think about surrounding protected landscapes. I want to look at it through the lens of human-nature relationships, which we describe as kincentric ecology. As I mentioned earlier, Indigenous folks are in a reciprocal relationship in which humans are stewards to the land as their kin. And kincentric ecology is an area of focus that Dr. Enrique Salmon has built upon for many years. I believe that if we can create a societal shift that protects and embeds nature as a relative, and a part of our identities, that we can better steward land and protect biodiversity.

Kincentric ecology is a place-based Indigenous practice, and the key word is place, as it differs in different regions of the world. It differs on every Pacific Island that you go to, just as it differs with different Indigenous tribes here on the continent. But I want to acknowledge that if we are to incorporate this version of traditional ecological knowledge through kincentric ecology, that we recognize its roots before implementing it into Western production methods and Western science. I believe that most of us have heard some version of the factual statement that despite the fact that Indigenous people make up just 5% of the global population, they're protecting 80% of the world's remaining biodiversity. And this is evidence of just how crucial kincentric ecology is. Its interconnection of kinship, stewardship, and of knowledge is exactly what's protecting 80% of the world's biodiversity.

Implementing kincentric ecology into Protected Landscape stewardship will require working with and learning with Indigenous communities. I don't pretend to have all the answers for how we can implement this into American policy and Western farming and biodiversity and conservation systems, but I know it's feasible, and I've seen it in practice in the Zapotec nation, where over 300 Indigenous environmental stewards are applying community-based forest management to protect their forests from illegal deforestation and logging. I've also seen it in Hawaii through community subsistence farming, fishing, and with taro farms.

John Kress
Kiani, thank you very much for that perspective and all those ideas. They add greatly to expanding our idea of what a protected area is and where it comes from, to say the least.

Okay, let's move on to David Foster. Give us some ideas from Harvard Forest, and what you've seen on the definition of protected areas.

David Foster
Thanks very much, John, it's wonderful to be here as part of this forum. I'll just add a bit of detail to the background, which will explain the approach that I take.

I arrived at Harvard in 1983 as a junior faculty member in organismic and evolutionary biology. I spent my early years, like most new faculty members, working to build my resume and secure as strong a base as I could at Harvard. But by the time, in 1990, that I became the Director of the Harvard forest and the

Head of the Long Term Ecological Research program (LTER), I became convinced that all of what we were doing in our research base was for naught if we didn't apply it directly to the way that land is managed, land is conserved, and acknowledge that people ultimately live their lives in relationship to the land.

The last half dozen years or so, I chose to move from Petersham, where I was based and where 50 people worked daily as part of the Harvard Forest, into Cambridge, so that I could take a greater part in engaging with students and other faculty to try to advance this kind of conservation and ecological agenda across a greater part of the university.

What I'd like to do today is draw mostly from work that takes place in Harvard's backyard (the 42 million acres that comprise the six states of the New England region), and talk about work that comes from two efforts.

The first is *Wildlands, Woodlands, Farmlands and Communities*, which is a regional scale effort that started at the Harvard Forest but now includes academics, conservationists, and state and federal agencies all across the region, in which we actually propose goals for New England to set 80% of New England aside as conservation land. This is land which is 70% comprised of forest, recognizing that New England today is 82% covered by forest. 10% of that would include the strictest form of protection as wilderness or wildlands. We also ask to set aside about 7% to 10% of land which is in agriculture.

The second study that I'm going to refer to is a new study that's coming out in May 2023, which tabulates and maps all of the wildland areas in New England. This is the first time any place in one region in the United States maps all of the public, federal, state, municipal, and private nonprofit organizations/individual land dedicated to nature. It allows nature to be forever wild in a permanent way in which impact and management by humans is minimized.

So what do those studies lead me to is the single major driver of environmental change that we need to address. It's one that's been articulated already: land use. It's a conversion of forest land and food producing land into other types of land. It's the degradation of intensively managed forests and farms. The three major crises that we're dealing with globally of climate change, biodiversity loss, and human welfare, are all inextricably tied to land use. Change in all of these areas must be addressed simultaneously, by looking at the way that we live. And let me just give a few examples from our own backyard, that is, our own Cambridge backyard in New England, and how little attention we actually pay to land loss.

So for the last 25 years, New England has been losing 25,000 acres of forest every single year. It's 82% forest covered, and we treat that just in a completely lackadaisical fashion. Even a state like Massachusetts has more than 60% forest. And yet Massachusetts has the highest rate of deforestation of any of the New England states. The single largest driver of that change right now is energy production,

solar farms, and transmission of energy. Only 25% of New England is currently protected, and most states have extremely weak targets. For example, the state of Connecticut, which has between 19 and 20% land protected as a state goal, has a green goal of reaching 20%. Only the state of Vermont, which has a bill in the legislation right now that proposes to conserve 50% of that state by 2050, is even coming close to the kind of broad and ambitious goals that we need.

So let me just end by something I'll come back to: academic institutions play a key role in informing people and acting on land use change. And that's something that we should consider much more within this forum and beyond.

Topic Three: Restoration of Degraded Landscapes

John Kress
Thanks, David, thank you very much. I want to extend some of the ideas that you just brought up in terms of protection and land use, and ask you to talk a little bit about restoration. From what Jason and Cristián said, we know so much of land has already been degraded by humans. What is it going to take in terms of restoration to get some of that back and actually protect this 50%?

David Foster
Well, I mean, as Cristián alluded, New England is a fabulous example for the potential of restoration. In the case of New England, it's actually passive restoration. 150 years ago, New England had half the forest cover that it does today. The vast majority of the land had been either cleared, or intensively logged numerous times. And inadvertently, because of the opening of lands in the Midwest and the far West, which drew extensive agriculture out of the region and to other parts of North America, land in New England was abandoned from active use or turned into less intensive use. And the response was absolutely phenomenal. Over the next century, there was a doubling of forest cover. And today, in many parts of the region, it's very difficult for most people walking in the woods to tell that the land has had that type of intensive use. And so I think it comes directly back to what Jason alluded to, which is the way that people behave on the land. And if we modify our behavior, lessening the intensity and the extent of our use, there is extraordinary potential for restoration, both naturally and through direct human activity.

John Kress
Very good. Okay, Cristián, I want to turn to you because I want to take us off the land and into what is 70% of the planet: the sea. I know you've been involved in some restoration projects in oceans. Do you want to talk about that a minute?

Cristián Samper
Sure, John, I'm happy to do that. And thank you for reminding us that the majority of the planet is covered by the oceans, and there are incredible things happening there right now.

We've seen you alluded to the figures of protection and protected areas for the ocean, but much less is protected in the ocean than on land. As a matter of fact, according to some estimates, we have about 7% of the ocean protected, and it might actually be closer to 3%. So we have a long ways to go, we're looking to at least to get to 30%, which is at least four times the total area.

Now the good news is there's good progress we've made in many areas; the United States has actually made a lot of progress in that regard thanks to some of the work that's happened in the northern Hawaiian Islands and across the Pacific and many other areas. And a very important development just happened barely a month ago, which was a global agreement on what's called the Biodiversity Beyond National Jurisdiction (BBNJ). Let us not forget that the majority of the ocean falls outside the national boundaries, and after more than 10 years of negotiations, there is a global agreement to actually protect 30% of these areas beyond the national jurisdictions. So I think this is a good step forward.

Now, we do know that even small, very locally managed marine protected areas can have a hugely positive impact in terms of local livelihoods because of a spillover effect. And communities, for example, in places like Fiji and Madagascar, have set aside relatively small areas that they manage, sometimes on a rotating base. And what we know is that if you build up the biomass there, you have bigger fish, and they will automatically lay exponentially more eggs, and that will spill over. And because of the ocean currents, even small protected areas can have a huge impact in terms of restoration, and the livelihoods of many people. So there's a win-win-win solution here that we need to pursue much more aggressively.

For me, one of the most important things that we're working on is taking place in the eastern tropical Pacific. This is the area that spans from the Galapagos Islands through Colombia and to Panama and Costa Rica to the Caicos Islands. Just a year and a half ago, the four presidents of these countries came together in Glasgow and decided to create the largest transnational marine protected area that exists today. In just one year, the total area that's protected tripled from 200,000 square kilometers to more than 600,000 square kilometers. And of course, right now, it's not only about declaring them on paper, but managing them as a unit. So the additional element here is they've agreed to create a single biosphere reserve that will cover all four countries. And that will be a first because we have to recognize that so much of biodiversity and certainly fisheries do not respect national boundaries.

Just to give you an example, the iconic hammerhead sharks that are found in the Galapagos that divers love to go and see, are breeding in the mangroves of Panama. So one of the things that we're doing right now is really strengthening the science, looking at the working organizations who look at the migrations of these animals across these areas. We're also exploring the sea mounds because we know so little about what lies underneath the surface. And just today I was looking at a paper describing a new underwater sea reef that was found in the Galapagos at 600 meters depth, completely unknown to science. So there's tremendous potential with what we can do here. It's good not only for conservation,

but it's crucial for the fisheries. We need to look at not only protecting that 30%, but sustainably managing the other 70%. And of course, we need to take into account climate change, because we know climate is having huge impacts on the oceans, which are absorbing so much of the heat, that it is creating all kinds of disruptions impacting people and wildlife.

Topic Four: What about the Non-Protected Areas?

John Kress
Great, Cristián, that's just what I wanted to hear: to include those marine environments and how we're going to deal with them as well. I mean, it's all connected, we can't separate these things. But it's good to get that perspective. Let's look at the other side of the coin a minute and go on to another question. And I'm going to ask this to Jason, first. We're talking about protecting 50%. Well, what are we going to do with the other 50% that's not protected? We're obviously going to have to change what we're doing with that land and sea area. So Jason, what do you think about that, in both landscapes and marine escapes? What do we do with the 50% that's not protected?

Jason Clay
I think part of the answer to that is how do we bring nature and wildlife and biodiversity back into farming and into food production systems. Ever every producer on land can produce more by actually taking land out of production and not wasting resources trying to farm land that's marginal. That land is perfect for producing carbon sequestration for water retention and stream flow over the year for clear streams, less soil erosion, etc.

We need to begin to show landowners that there are other ways to make a living and to survive than simply by trying to produce commodity crops in low price markets, etc. So I think we're going to see, as we move forward, that that there will be more bringing nature into farming. That's because I think we do have to reclaim some of that land.

We've been working in Brazil on these kinds of things, including how to reforest areas that have been cleared for ranches. One of the proposals I've just made recently to the Lula administration in Brazil is that they put a 1% environmental levy on all commodities that are exported from the country, so that every buyer has to pay some of the environmental externalities of what that commodity production is producing, and then use that money to reforest critical areas, reparian areas, watershed areas, etc. We've even developed a model where we can take that money and leverage green bonds with it, where we have 30 or 40 year funding at lower interest rates that can be used to cover some of these same costs.

But most importantly, I think we're also using the reforestation as a way to bring local communities back onto these lands. Most ranchers can provide very little labor - they can't afford to replant forest, which is also an expensive thing. But we can help cover the cost of that, and pay communities to gather seeds and then come in and replant them. We can also pay them at a survival rate for five years, not just for getting

a seed in the ground, but a seedling in the ground, so that you actually have something. But here's the real part: the rancher is going to own the carbon that any tree sequesters, but the communities get collection rights to the nuts and fruits and essential oils. And we've already developed markets and contracts with both Tigario and Natura in Brazil, two big companies that make personal care products, etc., to begin to look at bringing biodiversity back onto ranches in a very different way.

So I think we're just scratching the surface on these kinds of things. I was just reading a piece that showed that if we managed key large animals, both in the ocean and on land, we could actually increase carbon sequestration. The one example, that came out of that that I thought was really interesting was that if we had a $30 price for a ton of carbon, ranchers in the West would make more money growing bison than they would growing cattle, without selling them for meat at all. Well, that's a whole different ballgame. And it really opens up the potential of a lot of land that probably has been used pretty marginally for a long time.

So I think we've got to really think about how to shift existing productions, not just because climate change is going to force us to anyway - I mean, the fisheries are moving 25 miles a year, or something like 500 miles in 20 years, we've already documented that – and crops in the Midwest are moving about 2 to 25 miles north a year. And so they're going to be having to come in with something later to grow. Well, why not make it biomass? Why not make it sequestered carbon? Let's find markets for those for those things.

And then we also need to shift more production off farms entirely. Indoors, vertical agriculture, hydroponics, there are many ways to reduce the impacts of producing food, reduce the waste as well and make it more available in food deserts. Without actually always trying to till the soil to do it.

John Kress
This discussion is getting more and more interesting with every comment. Kiani, how about you, maybe building on some of the things you said earlier about protected areas? Maybe we don't even distinguish between protected and non-protected. But what are your thoughts?

Kiani Akina
I want to preface my thinking and my understanding for this by relying on the work of Dr. Jessica Hernandez. She's coined the term eco-colonialism, which includes three layers. The first is the governing of natural resources without the consultation of indigenous people, and not respecting indigenous sovereignty, which goes back to what I had mentioned earlier about protected landscapes. The second is the severe altering of landscapes because of settler colonialism, and the ideologies that it's produced, which includes climate change. And the third is the lack of resources offered to Indigenous peoples and communities of color that are already experiencing decreased biodiversity, climate change impacts, and displacement.

Another concern with Half-Earth is that it poses this question of where are people going to go and will this displace people, specifically Indigenous people? And I think a lot of answers to caring for land and ensuring that that doesn't happen can be answered through this idea of kincentric ecology. But I guess this doesn't specifically answer the question of what we do with the other 50% of land? I have a few ideas, but I think I mostly have questions.

Indigenous people have converted deserts into gardens, and dry lands into taro farms, and numerous different landscapes into thriving ecosystems through their place based kincentric ecology. I believe that creating opportunity for Indigenous stewardship on both sides of the Half-Earth, both 50 percents, can protect biodiversity and create biodiversity, and also what was mentioned earlier about carbon sequestration. Which brings me to my next point, but I also want to highlight that I know that natural climate solutions and carbon sequestration is highly debated and heavily politicized. And so I am not sure that there's a right answer for this. And I'm sure that many different people on the panel and viewers as well have different opinions on it.

We can use some of this land for, quote-unquote, natural climate solutions and carbon sequestration, especially for clean energy technology initiatives, so long as they're executed in a manner that consults the surrounding Indigenous and rural communities, and is something that is economically beneficial for those communities. This means that the energy and the revenue stays either within that community or grants them the autonomy to figure out what they want to do with that energy.

And I think, actually, a poor example of a clean energy initiative that didn't remain in the community was what happened in my hometown, in Kahuku, Oahu. They built windmills right behind our elementary school and high school, even after the community repeatedly asked for them not to be built. You can find more information on this by looking up Kahuku wind turbines. And the energy doesn't stay within our community, we have no autonomy over where it goes. And so it's redirected into Waikiki and into Honolulu, which are heavily tourist areas, and predominantly non-Hawaiians live there.

Some questions that I want to pose are: just how do we ensure that 50% of the land we are aiming to preserve doesn't displace Indigenous and rural communities? And in the case that it does, because of climate change migration, how do we ensure that people have access to continue cultural practices and kinship to the land? And how feasible and seriously realistic is splitting up our efforts into 50% protected land and then 50% non-protected? I think it may be a little idealistic, and I think we need a more innovative and realistic approach to biodiversity protection.

Topic Five: Changing our Lifestyles

John Kress
Kiani, thank you, I think many would agree that Half-Earth may be a little idealistic. But we chose it as a theme because it gives us an opportunity to think about all these things in a concrete way, whether or

not we'll go that direction. But I want to move on to the last question, and Kiani, I'd like to start with you on this. And this gets a little bit more personal. Describe how you think your lifestyle and the lifestyle of peoples around you are going to have to change as we change the planet. And we've already all alluded to this a little bit, but I'd like us to get into some concrete things, and also some idealistic things. What are your thoughts about that?

Kiani Akina
I first want make it very clear that I think that individual actions are important in solving the climate crisis, as well as protecting biodiversity. And I think there are many things that we can do to make small switches like buying biodegradable, reusable, and recyclable items, planting native species in our own backyards, and supporting the efforts of Indigenous communities who are rallying behind environmental actions.

But I think, in the grand scheme of things, our individual actions are not nearly as significant compared to our collective ones. And just like there's no one point person to blame for creating this mess, there's not one person to clean it up. So I think we should focus on tackling the climate crisis and protecting biodiversity collectively, rather than individually. I think that's going to take brave and radical imagining on what our futures can be. It's going to take courageous and young leadership in government, policy, and in science that prioritizes the collective wellbeing of ourselves and future generations, which I think are equally important.

But I guess, on a more personal level, it may be obvious based on my previous comments, that I'm committed to sharing my own lived experiences and my knowledges as an Indigenous woman, as a Native Hawaiian woman, and I will continue to spend the rest of my college and professional career advocating for the implementation of traditional ecological knowledge. There was a time in my life where I was vegan for a few months, and I really was like, “this is going to help, this is going to make a big dent on the impact of climate change.” Although it will help if a majority of us can go plant based, I really think that that if we focus on education, participating in movements, and in actions that are more collective, we can make the biggest difference that way. It’s going to take a lot of buy-in and serious critical thinking from all of us.

John Kress
Well said. Cristián, what do you think about lifestyles? And what do you think about you and your family and your children?

Cristián Samper
Well, let me start with that last point: that one of the things that really gives me hope is that next generation. I see my own children and other young people, and the awareness that they have around issues of environmental justice, like the ones we just heard, is really quite remarkable. I only wish I had had that opportunity with them when I was a teenager.

And yes, I think it does start at home, and it doesn't change the issues, but the personal choices everyone else makes do have a role to play. Just to give you one specific example: I gave up eating tuna about 17 years ago because I was so concerned about these issues. It's not going to solve the problem, but it's little actions like that that go a long way, like the choices we make about how we get around. That's one of the good things about the pandemic, is that we're getting used to these kinds of forums, so we don't have to fly around and go to all these events, and we can actually do it and reach many more people. So other personal choices that we make include getting more involved, particularly in university settings, and trying to have conversations with some of the next generation pf people being trained. One more personal choice that some of us have is how and where we invest to apply pressure. Fortunately, I think there's more and more awareness in some of the financial sector about some of these issues. And the choices we make can actually help influence some of these areas. I think I'm very encouraged by some of the recent movements that we've seen in the last few years.

The last issue that I will bring up was a very personal choice that my wife and I made, when we got married 20 years ago, to invest in training the next generation of leaders. We felt it was important to create a fund in Colombia, called Fondo Colombia Biodiversa, which is specifically designed to support undergraduate and graduate students in Colombia that are interested in conservation and sustainable use and understanding of biological diversity. Every year we give out 10 fellowships, which are small contributions, but at the right point in the students' careers, a small boost can really make all the difference so they can pursue a project in the right area. I'm very happy to say that 150 of them have been awarded to date. Some of the students are now faculty at universities in Colombia, as well as the United States. And now, we're getting what we call, as biologists, the F2s, the students from those people that we supported, to send us their students. So that is a way of helping build through education. That's another personal commitment that we have made.

John Kress
Thank you. Let's go on to Jason. What are your thoughts about lifestyles?

Jason Clay
I'd like to just pick up on what other people have said: everybody eats. And we've got to get informed about what our choices do to the planet. We need to not just get informed, we need to vote about these things. It's not just buying something at the cash register that's produced better. It's also politically reinforcing the systems that could make it better.

Currently, at least from what I've seen, it takes about two generations of people coming out of poverty to shift diets. And I don't know why that is; I think it's because of what people see and how they are raised, et cetera. We don't have that kind of time anymore. So whatever we can do to bring our children and our grandchildren along in this process, and to actually to follow them and their process, I think would be important. People are going to have to shift their diets, there's just no question about that. It's going to

mean eating less meat - doesn't necessarily mean eating none. We've got to stop buying out of season produce. We need to be focused on what is being produced where we live, and stop wasting food, period. What everybody can do is just try to produce some of their own food, and to see what it takes to do that. It will make you a conservationist, it'll make you a food conserver faster than anything else. I'll leave it at that.

John Kress
Well, that's a pretty good place to leave it. David, you get the final comments on this question, and then we're going to move to some questions from the audience, who have been listening so patiently to everything we've been saying here. So, David?

David Foster
Okay, let me pick up on a few things that have been mentioned, but also try to address a few that haven't. I think it's critical for all of us to actually look at the Whole-Earth, not Half-Earth. There are not and should not be any sacrifice zones. We should conserve at least 50% of the Earth, but we need to live with and observe and care for nature, as well as secure large expanses of land with relatively few people, or people who are living very lightly on that land. That means that we need to change our perspective, and we certainly need to change our behavior, in terms of our consumption pattern and our relationship to the land.

To pick up on something that Kiani talked about earlier, we need to hold very near and dear in our efforts of conservation those lands that are secured for nature itself, out of respect for nature, and out of the respect for relationships of humans and nature. And so the wildest of lands, the lands that are operating with as little impact by humans, should be especially in sight for us.

Now, it turns out that in the study that we did in New England, if you look at 42 million acres, 3.3% of it is actually protected for nature, in and of itself. A remarkably small amount, and much lower than the 10% that we recommended back in 2010. And so, we should embrace rewilding, we should embrace nature's ability to take care of itself.

And let me just end by saying there was this remarkably uplifting piece in The Washington Post by Rebecca Solnit a couple of weeks ago, which was entitled "What if climate change meant not doom, but abundance?" It comes from a book that she's releasing this month called *Not Too Late: Changing the Climate Story From Despair to Possibility*. I think that all of the behavioral changes that we're talking about in our backyards, at a regional scale, and globally, those should all be viewed positively as improving the quality of life and the state of human beings. That's what we're trying to accomplish here. This is not austerity. This is not depriving us of riches and abundance. This is giving us focus on what's important, and giving us a very different type of riches and abundance than we're used to valuing.

Responses to Panelists' Earlier Comments

John Kress
Thank you. Before we go on to some questions from the audience, I'm wondering if any of you have any responses to something you heard another panelist say, or if you have any further comments on anything that we've talked about?

Cristián Samper
John, I want to pick up on the comments that we heard about Indigenous issues, and particularly tenure rights. Look, I completely agree that we know many of Indigenous communities have been stewards and guardians of these areas for a long time, and certainly, the view we're taking toward something like 30 by 30 is not only doing it in the right place, but doing it the right way.

A huge part of the equation here is securing tenure rights for some of these communities. For example, we're supporting the Global Alliance of Territorial Communities in a project that's geared toward trying to secure the tenure rights for about 1 million square kilometers of tropical forest, recognizing that many of these areas by been occupied by Indigenous peoples for many generations, and for hundreds, if not thousands, of years. And yet the Indigenous peoples do not have tenure rights. We see this in Brazil right now. We see what's happening there. And yet, some of the areas that we're looking at are home to dozens of uncontacted and isolated tribes. So it's really important to make sure that these communities have the right to choose in terms of their own development. But I do agree that in many cases, these local communities will be key stewards for the land and on the sea. So I think that's a really important area.

And I think today, unfortunately, it is true that conservation has had a very troubled history in places like Africa, but there's a right way of doing this. Looking at protected areas, not in the traditional sense, but looking at conserved areas, looking at the role of local communities in doing this conservation work. So I think that's a very important point. I just want to invite us all to embrace that as we move forward.

John Kress
Cristián, thank you very much. Jason?

Jason Clay
One thing that that has come up is how to bring oceans into this and talk about them. I think that as somebody who's looked at the transition from wildlife fisheries into aquaculture, we need to use a lot of caution when we're thinking about this issue. With aquaculture, and blue food generally, we don't want to make the same mistakes in the ocean that we've made on the land. And it appears in many places that we're headed towards exactly that wrong direction.

There are two other issues that I would like to pose very quickly that we haven't mentioned yet. One is the projection that between 1 and 1.5 billion people will be displaced by 2050. We're already at 200

million. Imagine if one in eight people - that's about 15 people on this call - were displaced. How are food systems and protected areas defended against that? There's not enough barbed wire in the world. And then the other issue is the 10% to 15% projection of decline in net primary productivity because of climate change. We're going to have to swim harder to be treading water.

John Kress
Is that your final statement, Jason? How about David, or Kiani. Do you have any further comments before we go to some questions?

Kiani Akina
I just wanted to comment real quick on both what Dr. Foster and Dr. Clay said. I think to add another perspective to what's going to happen with forced migration because of climate change: it potentially puts indigenous peoples and people all around the world actually, in a place where culture and language will be lost. All of these things that I've shared with you guys about ways that we can protect biodiversity, this is how their knowledge is lost, through forced migration. And so I also wanted to highlight that as well and then go back to what Dr. Foster was saying about this idea of land first and prioritizing land.

We have a tiny bit of saying, or, more of of a way of life, in Hawaii: Aloha Aina. It literally translates to a love for the land. But it's actually more of something that I think most Hawaiians are actually born with - it's this responsibility to care and live with land. And I think I didn't explain this earlier, but this is why I chose to study environmental science and public policy here, even though I'm definitely more of a humanities girl myself. I chose this because it is part of my responsibility. Because I'm so privileged to be Hawaiian: I was born with this responsibility to care for and advocate for my ocean and land and water relatives. And so I just wanted to bring that piece of knowledge we have in my culture to this conversation.

John Kress
Great, thank you very much, Kiani. David, any last comments, or should we dive into some questions?

David Foster
I want to dive into questions, but let me just thank Kiani and say that I think all that she said is exactly why we need to think of the whole earth. We do not think about setting aside nature and then having a place for people. People have to be intertwined with that nature in a variety of different ways in a variety of different intensities. And it is only by doing that, well that we're going to be able to conserve that much nature and develop rich relationships with it.

Questions and Comments from the Audience

John Kress

Okay, thank you. Alright, here's a question that's come from the audience, and it kind of relates to a number of the things we've said. They ask about gardens and agriculture, not for humans, but for the rest of biodiversity. Is there a place in our gardens for pollinating insects, for herbivores, for dispersers, and such things? The question was a bit longer than that, but I think that's the general gist of it. Any thoughts about gardening for the rest of the planet?

Cristián Samper
Agreed. I think if there's one lesson we've learned is, nature can be resilient. And, of course, the millenary practice used by many of the Indigenous communities in the Amazon is all about using some of the land and letting it return back not only for fertility, but for other creatures in this area. I mentioned, for example, some of the marine communities and coastal communities in Fiji and others. So I think there's a lot of good examples there. So, absolutely.

When we think about restoration, I fully support the term in its true sense, restoring. And so many people think that restoring is just planting trees, but let us not ignore the power of natural regeneration. As long as we have enough of these places left, and seed banks and nearby forests and oceans and others, restoration can actually be a very effective way of bringing things back. I think David made the point of a lot of New England going through natural regeneration, but there are things we can do to accelerate it. The challenge, of course, is that we do need to look at all of these things: protected areas, restoration, food systems, if you have climate change. I think that is something that's changing very fast, and of course, many of these areas are not going to be effective for that. The question that pops up is what's the baseline we're trying to go back toward or restore toward? Because it's not going to be easy to go back to some of these old ecosystems - many of them are not going to work. So I think it's going to require some adaptation and some new mechanisms, including potentially including some new species that are going to be part of the solution. This is a very important area. But I do love the term rewilding. I think it's an important way of bringing nature back and giving it space. And I think if there's one lesson we've learned is, if the conditions are right, it will come back.

John Kress
Any other thoughts on that? Yes, Kiani?

Kiani Akina
Sorry - I think this is the question that Natalie Adams had posed in the chat. And so I just briefly wanted to touch on this, especially because they had brought it up specifically for Massachusetts, and I'm currently working on a project mentoring high school students at Cambridge Latin High School, and they're creating a community garden. They're prioritizing planting Indigenous species to hopefully bring in native insects, specifically, bees, beetles, and wasps. If you want to join later at happy hour, Natalie, I'm happy to chat about this more in depth. There's a practice called the Three Sisters method, although it's called a bunch of different things among different tribes. And they basically plant three different native species together. So we have corn, squash, and beans, all planted together. And it's supposed to,

hopefully, once we get this garden up and running, increase the amount of wildlife that is attracted to the area. So if you want to chat more about the research I've done with those students, I'm happy to talk about it later.

John Kress
That sounds great. Here's a question that's kind of along those lines, but not exactly. We all are very familiar with pandemics and the spread of diseases. And that has a lot to do with protected areas and the interaction between people and species. Any thoughts, as we go forward, on how that is going to be added into the equation of what we're doing in terms of Half-Earth?

Cristián Samper
I'll jump in. At the Wildlife Conservation Society, we did a lot of work in the Wildlife Health and the One Health concept. Let us not forget that so many of the diseases that we're looking at are zoonotic in origin. Not all, but the majority are. I think one of the things that's been very clear is that a lot of these have to do with things like wildlife consumption, illegal wildlife trade. And there's no doubt that as we have more and more people living in the forest and more people consuming, putting pressure on this, it really has a huge impact.

One of the projects that we worked on about three years ago, early in the pandemic, was looking at this study of forest rats in the markets of Vietnam. What's fascinating is when you look at these rats, all of them have different kinds of diseases that they're carrying around, but as the supply chain would start taking these rats and bringing them into urban centers. They get piled up, combined, and they become perfect brewing areas. By the time you get these rats in the markets of Hanoi and other places, you'd literally have dozens of these viruses that are out there. So I think there's a real question here, and that's why controlling wildlife trade is a key area, especially for mammals, and for some of the birds. The other thing we've learned is that as we move more into the forest, there's good studies from India showing that is that as human-wildlife interface increases, the probability of that disease spillover from wildlife populations into humans increases exponentially. There's a lot of debate around this, but I think in general, very clearly, there are some precautionary things that we can do that will help us reduce the likelihood of future spillovers and future pandemics.

And a lot of what we looked at is the concept that some of you know as: One Health, which I think is getting more and more traction, which ties back to the idea of sharing this planet with many other species and living in one with nature.

John Kress
There was one specific question for you, Jason, that I'd like you to address, and then we're going to go on to some other things. You said aquaculture was going in the wrong direction. What did you really mean by that?

Jason Clay
I've been working on aquaculture at the World Wildlife Fund since the early 90s, when I was asked to write a piece comparing shrimp aquaculture impacts to those of wild caught shrimp. And it seemed to me at the time that even with the loss of mangroves that up to that point had been attributed to shrimp aquaculture, the industry had learned a lot and could actually improve its impacts considerably if people adopted what was already known, and then improved on that. The problem with shrimp trolling is the impact on benthic areas, which we're just now understanding is a potentially big source of greenhouse gas emissions. But for aquaculture, it's that money often comes in before the science or the research is done, or from sources that aren't aware of what the impacts are. So you could have, for example, escapes, you could have disease transfers, you could have large use, and in fact, one of the biggest fisheries today is for fish meal and fish oils, reduction fisheries, that's largely for the aquaculture industry. It takes about 8 to 14 kilos of fish to make one kilo of fish oil. And so you're beginning to see really large compounding of these impacts in aquaculture. If we're doing bivalves, they could clean up water, they could do a lot of different things. But even with bivalves and seagrass, or seaweed, we've seen that people often take other things out of the water in order to put those in. So it has impacts on biodiversity too. Nothing is really done without an impact, and we just have to be aware of that and understand what is more acceptable and what the trade-offs are. And a lot of times we rush.

Calls to Action

John Kress
All right, I think that's what the person was trying to get at. Okay, we're in the last phase of our panel discussion here. And this is what we term “Calls to Action.” It's a chance for each of you as panelists to just take a couple of minutes and say what we need to do next. So let's start with David.

David Foster
Right. So I'm going to focus in on one thing that should be near and dear to the hearts of this ClassACT audience, which is looking to academic institutions. I think that academic institutions are misaligned in their almost extreme focus on greenhouse gases and emissions and sustainability. Not that that's a bad thing, that's very good for addressing climate change, but it's missing the connection of all of this to the land. And there's very little focus within sustainability initiatives, within major forward-looking missions of academic institutions, to both treating land well, that's within its own direct impact, and helping the different sectors of academia. The institutional leaders, the faculty, the students, and the alums can actually mobilize in ways that can help to address land-based issues. And Harvard is a great example of this, because there are relatively little resources, and relatively few faculty who focus on land and water issues in the way that we're talking about them. A tremendous amount of focus on energy, emissions, and emission related climate change and other kinds of impacts. And yet, there's so much more that could be done towards using the resources of the University to make sure that we are doing the right thing by nature.

John Kress
Great, I think that's something that ClassACT can have an impact on, I really do. Okay, Jason, how about you?

Jason Clay
I guess I would say help restore habitat and biodiversity in areas of use in any way you can, either by supporting efforts financially, by taking part in them, doing it yourself, or by voting for it.

John Kress
Succinct, thank you, thank you very much. Cristián, your final thoughts on action?

Cristián Samper
Well, to pick up on Jason's last point, first thing I would do is vote for the right people, get the right people in the right offices that are going to actually bring about this change, and get those people elected. Second is to look to universities to train that next generation. Every single area of Harvard training people that embraces environmentalism in every profession is part of the solution. And the third issue, for everyone on this call, is just to pick three things you can do, do them, and share them with at least three more people.

John Kress
That'll exponentially add up, for sure. Kiani, you have the last word here.

Kiani Akina
I just want to invite you all to critically think about the ideologies I posted earlier about kincentric ecology, and ask yourself what you can do to carry on this practice in your life. As a starting point, I've gathered a list of supplemental readings which are in the chat, and also some books, all of which are by Indigenous authors. Some pertain specifically to island nations, and others to the Amazon and the rest of the continent.

To build off of what Dr. Foster said, I invite you to recognize the tribal nations and lands that you currently reside on and find ways to get involved and support the environmental work and activism that they are already doing within your communities. Because a lot of these institutions like Harvard are lacking these perspectives and these knowledges. There's a website called www.native-line.ca, where you can find out which tribal land you live on, and you can find their website and contact them that way.

But aside from the readings, and I guess all of the education that we can engage in, I have two specific asks: the first is, this past fall, me and 13 other undergrads created the Harvard Climate Coalition, which is an umbrella organization for all the environmental groups on campus. We connect with the grad school and grad school organizations, as well as the larger Boston community - we're doing a lot of work to bridge these gaps. We have a lot of activities, panels and conversations that are open to our

alumni as well. If you go to our website, you can get involved with us that way. And the last thing, is that especially as alumni, you have a lot of power to persuade Harvard to do good things. And those, I think, are what Dr. Foster's said: get more professors and more classes focused around these environmental conversations, especially from an Indigenous perspective, because it's crucial to start talking about this. Then we can come up with solutions and inspire the rest of my classmates to help fix this mess that we're all in together. Thank you, everyone.

John Kress
Okay. Very nice. I think that's why we're here. And when I hear all these comments, and all these proposed actions, I think of all the all the work we must do, but it's all doable. And I think that's what discussions like these help us to understand. Currently, ClassACT HR73 is going to initiate two major actions. I just wanted to mention those and we'll wrap it all up.

One is we've decided to try to strengthen and broaden land trusts from local to global areas, so we can actually permanently protect some lands, and to share with people as well as the rest of biodiversity.

The second thing is that we now have a major effort moving forward to try to orchestrate the final ratification by the US, of the International Convention on Biological Diversity. Many of you may know, 197 countries signed that treaty, and one hasn't. And that's us, the US. We feel like if we're going to have a seat at the table, and we're going to make inroads in this, we need to ratify that treaty and get the Senate to do that. So that's another action that we're going to be taking as we move forward.

I would like to thank all the panelists for your great participation, great preparation, great responses. Now I'm going to turn it back over to Marion Dry, who's going to have a few final comments, after which I'd like to invite you all to join us for the after-forum salon, if you have any further questions for the panelists, or just want to chat amongst yourselves, those of you that have been listening. Marion back to you.

Marion Dry
Thank you, John, and thank you all, for an extraordinary conversation. I personally have learned so much and feel greatly inspired. ClassACT always has a call to action as well, and we want to encourage every person watching to act. Work on any of the calls to action our participants have suggested. Join the ClassACT work on the biodiversity treaty ratification or land trusts. To join the efforts, please fill out the Google Form that Diana has listed in the chat or email us at classacthr73@gmail.com. We all know that there is no time like the present. I want to thank all of you: John, Cristián, David, Jason, and Kiani, you're just fantastic. So many different perspectives and so many important things to think about. My thanks also go to the members of our program and production teams: John Kress, Jason Clay, Andrea Kirsh, John Noran, Jacki Swearingen, Sarah Ulerick, Diana Lobontiu, Katie Marinello, Kate Freed, and our videographer, Rick Brotman. And finally, thank you to all of you who joined us this evening.