

# Grazing, Grass and Gas

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**Greg Dalton:** Welcome to Climate One, a conversation about America's energy, economy and environment. To understand any of them, you have to understand them all. I'm Greg Dalton.

Today, we're discussing preservation of ecosystems in the age of global change. California's rolling hills and grasslands are one of the iconic images of the golden state. Beyond their beauty, they are also an important part of the state's economy and ecosystem. Worldwide, grasslands are being cut up by development and impacted by cattle grazing and agriculture and other activities. Cows and other livestock grazing on grasslands are a big source of carbon pollution. Some researchers say grazing patterns can turn that around and actually help cut greenhouse gases. Over the next hour, we'll look at the importance of grasslands to economies and ecosystems ranging from California to Montana, and all the way down to Patagonia in South America. We also will touch on the testy relationships between conservationists and ranchers and the impact of hydraulic fracturing.

Joining our live audience at the Commonwealth Club in San Francisco, we're pleased to have three guests. Pete Geddes is Managing Director of the American Prairie Reserve. It's an effort to set aside three million acres in Montana. Kristine Tompkins is Founder and President of the Conservacion Patagonica - did I say that right, close - and its effort that it already has set aside two million acres in Patagonia, and she's also a former CEO of Patagonia Clothing Company. And Whendee Silver is Professor of Environmental Sciences at UC Berkeley that studies grazing patterns and carbon. Please welcome them to Climate One.

[Applause]

So Kris Tompkins, let's begin with you. How did you go from running a clothing company to setting aside lots of land in South America for conservation? Tell us briefly that story.

**Kristine Tompkins:** Well, certainly. My husband, Doug Tompkins, had a lot to do with that. He retired, sold his business -

**Greg Dalton:** Also a clothing entrepreneur?

**Kristine Tompkins:** Also clothing - in '89 -

**Greg Dalton:** He founded Espirit and North Face?

**Kristine Tompkins:** Yes. And like Doug, both of us felt that we had done what we could and felt like we should do within the clothing business and we wanted - we just decided to spend the last third of our life, most likely, trying to protect those places that we have come to love over the years of climbing and skiing. And our identification with wild places is quite strong and really that's how we got started, and we chose Chile and Argentina because they were both areas that we loved, and the idea of living down there was quite attractive.

**Greg Dalton:** I bet. Well, we'll get into more of that and the company and the conservation in a minute. Pete Geddes, a group of people from Silicon Valley decided - largely were instrumental in setting aside some land in Montana. Tell us how that came about and that story of Silicon Valley to

Montana land preservation.

**Pete Geddes:** Sure. I think that Montana just has a natural attraction to people, particularly if they grew up in urban environments. We're the fourth largest state in the Union, with the size of Japan with a population of less than a million people. So there's lots of wide-open spaces there. And our founder and founding board, indeed, spent their careers in the Silicon Valley and technology and venture capital, and came to Montana to see this project, which is now about ten years old.

And its effort to put together, much like Kris is doing at Patagonia, 3.5 million acres of native short grass, sagebrush steppe we're working in one of the last poor places in the world where at least native grasslands remain in a large enough state and still intact, meaning they haven't been plowed, to do some meaningful conservation. So it's interesting, Kris is working in one of the other two, so you have 50 percent of those grasslands represented here tonight.

**Greg Dalton:** And Whendee Silver, tell us why grasslands are important, they're beautiful but why are they so significant to save them?

**Whendee Silver:** Also, grasslands cover about 40 percent of the earth's surface. People don't realize that it's the dominant cover type. And in California, it's about 50 percent of our land area. So it's a really important biome. It's also important because it provides a lot of services that we depend on. It is the dominant way in which we get a lot of our protein. A lot of - most grazers, sheep and cattle, are grazed on grasslands. And in fact, almost all the grasslands in the world are grazed either by native species or by livestock.

So they're important to provide services for us. They're also important from a climate perspective because grasslands tend to occur in places where it's hot and dry. And so those plants, the plants that grow in grasslands naturally have adapted to put a lot of their energy and a lot of their biomass, the tissues that they make, below ground into the soil. And any time a plant does that, the material that they put into the soil has the potential to turn into carbon - soil carbon - and thus, can get stored in the soil. And any carbon that goes into plants that eventually goes into soil is carbon that's not in the atmosphere, and grasslands have the potential, when they're healthy, to store a lot of carbon. And so they have the potential to help remove carbon from the atmosphere and store it in places relatively safe for pretty long periods of time.

**Greg Dalton:** So is setting aside a few million acres of grasslands in Montana and Patagonia, is that a significant carbon endeavor?

**Whendee Silver:** It certainly is a start, and I think that it depends on how those sites are managed. I think if you manage them in a way that helps build those soil carbon pools then yes, it can make a difference. However, unfortunately, a lot of grasslands are managed in ways that release carbon to the atmosphere, and so many of our grasslands globally and in the U.S. and in California are degraded. They've lost a lot of their carbon. So what we've been trying to do is figure out, well, how can you manage those systems to bring that carbon back into the soil, take it out of the atmosphere and store it. And that leads to healthier ecosystems in the long run.

**Greg Dalton:** Pete Geddes, is this part of the conversation in Montana? The climate conversation? Do people acknowledge that climate change is happening in Montana?

**Pete Geddes:** Well, this joke is just too good to tell - and so to not tell, so I'm going to tell it. And that joke is that every public meeting in Montana, we begin with a prayer for global warming. It was snowing when I left at 5AM this morning, but Montana -

**Greg Dalton:** You think that prayer is going to come true, whether you like it or not.

**Kristine Tompkins:** Yeah.

**Pete Geddes:** Right. Well, the way that – for those of you, who've been in Montana, we have some pretty good fly-fishing in the state and beautiful river systems and those depend on snow. And we're already starting to see it in the mountainous western half of the state. We see less snow in the winter and we see earlier runoffs in the spring, and this is just empirical data. So there's not much interest in arguing about it.

From our perspective, the role that we feel our grasslands can play in terms of carbon sequestration, and amelioration is making sure that this prairie doesn't get tilled. That's the number one threat that our lands face, primarily through perverse incentives in the farm bill.

**Greg Dalton:** And just because chilling releases the carbon up into the air.

**Pete Geddes:** Exactly. And Whendee can tell us all about the science of that but it basically releases the stored carbon. And one of the reasons we're working on the Northern Great Plains of Montana is historically these grasslands have been grazed rather than farmed. So 95 percent of the area in which we work is still intact native prairie.

**Greg Dalton:** Kris Tompkins, is the climate impacts down in Patagonia something that people are seeing, recognizing?

**Kristine Tompkins:** Well, I think the science community is. I don't know that the layman would that glazers in Southern Chile are becoming well known for the rate at which they're disappearing. But in terms of forest impact, you don't really see those kinds of things. I actually do have one event taking place which within the southern beech forest, the caterpillar, there are plagues of caterpillars that are actually wiping out certain tracks of southern beech forests, and that seems to be –

**Greg Dalton:** Like the beetle that we've seen, yes.

**Kristine Tompkins:** – seems to be related to change in climate behavior but I'm not sure about that.

**Greg Dalton:** Whendee Silver, California's climate plan now includes management of grasslands. So tell us about how that could be part of the solution?

**Whendee Silver:** Yes. So that's a very exciting development for us. We've been working for the last five years to try to understand if grasslands can play a role in California's climate change solutions. And the new plan that came out is just beginning to outline what the role of grasslands might be but it's certainly a recognition that in California we're rich in grasslands and we're rich in this potential to be able to use these ecosystems as ways of helping to mitigate climate change. There are many different approaches that are being explored.

One of the ones that I think has the greatest promise is kind of a funny approach some people think, but it's taking the waste, the stuff that we throw out, the organic stuff that we put into landfills, food wastes and plant wastes and all the other things that we don't want, taking it out of the landfills, composting it and then applying it back onto the land. And we can do that with our own urban wastes and rural wastes but we can also use things like animal manure and animal waste products

that right now are often being applied in a raw form which produces greenhouse gas. Composting that even just a little bit appears to lower the greenhouse gas emissions and has the potential to increase the storage of carbon in soils.

So it ends up being an even bigger game because the plants grow more, the ranchers love this; they're getting a lot more forage out of it. But we're also taking care of a waste problem that we have. We don't have enough landfill space anymore to throw the stuff away. And so we're using it back on the land where it came from originally, and using it to help grow more food and get that carbon down in the ground.

**Greg Dalton:** Cows are often thought of as a big greenhouse gas problem because of the methane that they release. So is California going to manage cows differently, fewer cows? What's the cow situation?

**Whendee Silver:** So one of my postdocs, Dr. Marcia De Lange did a life cycle assessment for that. And a life assessment is really just taking all the numbers like an accounting sheet, and putting them altogether, all the pluses and all the minuses, all the cost and all the benefits and seeing where it ends up in the end. And so she looked at what the cow methane emissions were and the landfill methane emissions and how much savings you have and all the transportation from moving the stuff around. And the way it came out in the end is that as long as you don't increase the herd size too much, you still get a net gain. But the real catch in all of this is not to increase the herd size.

And so we went to talk to ranchers in California and also in the Great Plains because, again, this approach has the potential to be used there as well. And we said, "Well, if you were able to grow more grass on your land, would you just buy more cows?" And they said, "Absolutely not. It would just offset needing to buy more food from outside." They would be able to have a more locally sustainable approach, and that wouldn't need to necessarily import food. So it looks like, from that perspective, it's likely to work as long as the herd size doesn't increase, and it sounds like the ranchers probably wouldn't be increasing the herd size.

**Greg Dalton:** Pete Geddes, have you had any conversations like this with ranchers in Montana that are interested in composting or the cow situation?

**Pete Geddes:** The place that we work in Montana is so remote that is - and there's none of that going on there. And by in large, the ranchers have done a fantastic job of managing the grass. The herd carrying capacities are quite sustainable now. This is partly due because most of the land that the ranchers graze on is federal-public land administered by the Bureau of Land Management, so it's regulated in some sense. But again, our chief concern would be just making sure the soil stays right side up rather than getting turned upside down.

**Greg Dalton:** Let's talk about the reintroduction of predators starting with jaguars in Patagonia. That's a really big deal. And then we'll get to wolves in Montana. Part of your goal in this restoration effort is to reintroduce predators that have not been in the landscape for the last whatever. So tell us about that, Kris Tompkins.

**Kristine Tompkins:** Well, first of all, our jaguar reintroduction is taking place in Northern Argentina, outside of the Patagonia Region. They never went that far. But the jaguars in the Iberá Wetlands system have been extirpated since the 1930's. And as we have been restoring grasslands in certain areas within this very large wetland, part of restoration has to be the reintroduction of the species that used to be there and are currently not.

So we started with the giant anteater about six years ago. And those are successfully back into the system. We're working on peccaries and eventually tapirs. But of course you have nothing if you don't have the primary predator; therefore we started the project of the reintroduction of jaguar in this area. And it's a long-term program. Obviously, it has social, cultural ramifications. It has a lot of contiguous issues attached to it. But one of the specific reasons we do it and the reason that is possible in Iberá is we have over 700,000 acres of no-conflict zone which is very hard to imagine in most places no matter where you are, and the fact that it's a wetland so you don't have the impact, the human impact, cattle moving in and so on. So it's an area where it's a viable opportunity to introduce them, which is the first effort in the world.

**Greg Dalton:** You said no conflict meaning no wars, no arguments?

**Kristine Tompkins:** No conflict, that is no cattle, no dogs, no humans, that it is open, it is - no one is living inside this area.

**Greg Dalton:** Wild to nature, as in nature world.

**Kristine Tompkins:** Yes.

**Greg Dalton:** Okay. And has there been resistance by ranchers and others to introducing jaguars who are worried about their livestock or worry about human impacts?

**Kristine Tompkins:** Actually I think we're working the only place in the world where the province is anxious for the jaguar to come back. It's a very tough province, the Corrientenos kind of imagine themselves as sort of guerreros, very tough, very independent people, not so interested in the national government. And they see the jaguar as their soul mate in a way.

And so it came as a complete surprise to us. We were ready for five to ten years of socialization of this idea. And now the big criticism is we're not moving fast enough. So it was a very unusual circumstance.

**Greg Dalton:** So it sounds like they're Texans. [Laughter]

**Kristine Tompkins:** Yes. Texans with big knives down their backs.

**Greg Dalton:** Okay. Pete Geddes, the wolves, was it possible that your restoration efforts will include reintroducing wolves, which have been reintroduced in Yellowstone not too far away?

**Pete Geddes:** Yes. I think our goal is that we're a biodiversity project. And Kris made a very good point about space. And our project is about space. We're putting together the largest wildlife reserve in North America. So the 3.5 million acres when we're done, just for comparison to Yellow Stone's 2.2 million acres. The way we're going to do that is we're going to buy about half a million acres of private land which knit together this public-private land, check the board pattern up in Montana which is a legacy of failed homesteading in the state.

Predator needs lost of space. And the easiest way to get social acceptance, we talked about this last weekend, Greg, and I know Kris faces the same thing. Our problems are not biological or ecological. They're sociological in terms of reintroducing big predators. Wolves in the state of Montana are now controlled by the state. They were introduced by the federal government. So we have very little to say about them except that our goal is to have enough acreage put together such that when they come back naturally to our lands, which they will, they're probably already there in some spots,

they're very good at expanding territories, they don't get in conflicts with the ranchers.

The last thing I'll say about that is there's very, very innovative work going on in Montana and up along in Rocky Mountain Front trying to help ranchers relearn what they used to do and know, and that was herd and tend their animals in very different ways than they do now. Right now they just sort of turn the cattle up because there's no need to run around and make sure that - there are big predators. There are certainly coyotes and other predators on that. So it's a sociological thing. It's getting people to understand these predators do have a space in the landscape but we also have the responsibility to make sure that our neighbors are not suffering, undo economic loss and such that economic loss. Ranchers, particularly in Montana, I'm sure Kris finds this - they have a real animal husbandry obligation. They feel moral responsibilities for these animals. And watching them get eaten is upsetting for sure. So again, if we can get enough land together, work on some of these sociological issues that are the real nut for us to crack, I think we can have a place for big predators.

**Greg Dalton:** So it's upsetting for a wolf to eat a cow but it's not upsetting for a human to eat a cow?

**Pete Geddes:** You haven't spent much time in Montana, Greg. [Laughter]

**Greg Dalton:** Explain for us why reintroductions of apex predators are so important and how that would benefit the ecosystem.

**Pete Geddes:** Yes. I think most of your listeners and viewers are familiar with Yellow Stone National Park where wolves were reintroduced. Prior to the reintroduction, the wolves basically had been gone for almost 50 years. So wolves like to eat elk. Elk like to eat willows. Beavers like to eat willows. So you have this sort of cascading effect when you remove these top predators from ecosystems. You have too many elks, as we did in Yellow Stone. You don't have enough willows. You don't have any beaver. They left the park basically. So you have all these sort of knock on second order effects and that we're working in Montana. Just last week some colleagues - we have a team that lives out on the reserves and said there were moose back in this part of the world. And it's not great moose country, that's for sure.

So over time, as you can start to put lands together that are big enough to let these animals run around on, the top predators have a hugely influential impact all throughout the ecosystem in all different sorts of ways. And you can start to get some of these things back.

**Greg Dalton:** There's a big generational land transfer going on from certain generation of families to others. And I'd like to know how that's playing into approaches towards conservation and perhaps other - if that's happening in Argentina and Chile to think about. Are there families wanting to continue in ranching or they're trying to get out? Is that opening up opportunities for conservation?

**Pete Geddes:** Yes, definitely. That's why we're working in this part of Montana. And again, we're up on the northeast corner north of the Missouri River. This part of Montana's land that probably should never been settled if any of you have read John Wesley Powell's works and he states on the earth land of the United States. This is an area where we try to replicate the successful homesteading that worked fine in Iowa and in Ohio to get 160 acres; you can improve up on it. You get it except we're well west of the 100th Meridian, which is the line of aridity. And this is land that was settled in cooperation with railroads and the government trying to dispose of the federal state. And it is a brutal place to make a living.

So where we are in our particular part of Montana, people have been leaving since the First World

War. So it's a version of the story. It's hard to keep the kids down in the farm when they're seeing the lights of boatmen in Missoula; it's really a tough place to make a living. People move out over time. And this intergenerational transfer of ranch lands that you talked about, Greg works well with out conservation strategy because we're up there offering these folks a way to basically capitalize their assets. They're all very cash forward land rich. So all their equities tied up in land and there really aren't that many other buyers.

**Greg Dalton:** Kris Tompkins, anything similar happening [crosstalk]?

**Kristine Tompkins:** Oh, very similar especially down in Patagonia. In the central southern Patagonia, people are actually just walking off their land and abandoning their Estancias. But generally speaking, I think the circumstances are quite similar that as it is almost everywhere in the world, people are leaving their farms, their ranches. And often, we're working in very isolated places as well. And we often represent a buyer or the only buyer that somewhat - because people can't buy it to continue that land as a productive piece of land. So a lot of people are just trying to find a way out, especially in the Patagonia region where 10,000 acre ranch, 20,000 acre ranch could hold 11,000 sheep but today it can only hold 3,500 sheep or 2,000 sheep. So the economics of it are just - they're not there. And the kids don't want to be on the ranch anyway. It's very hard to find people to work on Estancias in Southern Patagonia.

**Greg Dalton:** There's a big push towards urbanization across the world. People leaving lands and other countries as well moving into the cities. There's also a growing population which - let's get to that issue, the system, the population pressure and resource constraints in terms of 9 billion people, a lot of the pressure is cutting down land to grow soy, other things to feed people. So let's talk about that pressure whether it's not - maybe not so much in Montana but certainly where you are, Kris Tompkins, to feed 9 billion people. What's happening down there?

**Kristine Tompkins:** Well, certainly in Argentina, from the Buenos Aires province, north, the conversation of grasslands and choco dry and wet forest, the conversion to soy is tremendous, it's fast. And there are legislations to try to slow it down but nobody pays attention to it.

I think Chile, if you look at central Chile north, you'll see seas of pine plantations and seas of now grapes. So the conversation of many different types of ecological systems is very, very fast, and it's happening all around the world. I mean, I think if you're working in the Amazon, no matter where you're working, there's no way you can protect enough land by simply curving it up to the side to address the rapidity of which it's being converted on the other side.

**Greg Dalton:** Whendee Silver, we talked a little bit - some people might say, "Well, personal choice to reduce carbon impact would be eat less meat, meatless Monday." So you might go to tofu burgers but then you're good as cutting down - that's causing demand for tofu to cut down the land that Kris is talking about. Is there any way out -

**Whendee Silver:** Yes. I mean, I think we've got a real problem with this. And we work with ranchers who are grazing beef. And in the Bay Area, people are really supportive of grass-fed meat products and grass-fed dairy product, which has been shown to be, in some ways, more sustainable use. But we can't meet the needs on our grasslands. We don't have enough grasslands in the world and they don't have the carrying capacity to fill what people want from a protein source. And there are some evidence that there are some people who say that we eat - especially in the developed world and especially in the U.S. that we eat way more protein than we need.

And so just cutting back on protein. You don't have to trade that hamburger for a soy burger. You

could trade that hamburger for something that's growing in your garden. Have a nice salad with lettuce and tomatoes or something that you can grow outside. I think we need to rethink what we actually need to eat and what we have gotten used to in the habit of eating. And maybe also eating less. I mean, when you think about some of the other problems that our society faces with obesity and with over-consumption. I think we do need - time has come for people to shift their mentality and their habits to utilizing less and realizing that they're having an impact much greater than they may realize on the environment.

So while I actually think that grazing lands play a very important role in climate change and mitigation, we have the potential to use these grazing lands and use cattle and livestock to help slow climate change. We also have to be reasonable in how we use that and think about our own personal footprint and impact. People just need to become more aware and think about their habits.

**Greg Dalton:** Kris Tompkins, do you think that that will happen not voluntarily but by crisis and necessity?

**Kristine Tompkins:** I do. It's not a very popular opinion.

**Greg Dalton:** True is that -

**Kristine Tompkins:** You're coming to the wrong girl [laughter]. I really believe that for reasons that still confound me since the late 70's, the discussion of population worldwide is off the table. It's very difficult for people to talk about human population levels. And I see it as a - I hate this description but it's a perfect storm, a rising population base, rising consumption levels against a falling natural resource base. And I think it absolutely leads you to the necessity to understand that there are limits to everything and it's across the board.

And until people really understand this or come to terms with it, the situation that we find ourselves in will only be exacerbated. And I believe at this point that the only thing that would really shift human behavior is a crisis. And I am not an over the cliff thinker but I believe that, generally, the human condition will not improve over the next century, necessarily, because of all these conflicts and pressures that we don't seem to be able to address.

**Greg Dalton:** We have an economic system premised on compounded quarterly growth, right?

**Kristine Tompkins:** Yes, we do.

**Greg Dalton:** And so there's population growth and there's compounded quarterly growth certainly for public corporations. You're on the board of Patagonia, a privately held corporation. Can you envision Patagonia without growth? I mean, in nature that's grow or die.

**Kristine Tompkins:** I think you have to. I think it's really a lack of imagination to imagine that you have to keep growing in the face of incredible evidence that it is impossible to do so. You can begin to take the market share of somebody else but eventually you're going to come up against a hard truth that we can't all grow, we can't all have whatever we want. And eventually civilization has to come to terms in our generation. And the ones short to follow have to come to terms with the fact that there are other ways of managing human societies because this one is not sustainable. That's what I think. (Applause)

**Greg Dalton:** Kristine Tompkins is Founder and President of the Conservacion Patagonica and former CEO of Patagonia Clothing Company. Other guests today are Pete Geddes, Managing



Director of the American Prairie Reserve in Montana, and Whendee Silver, Professor of Environmental Sciences at UC Berkeley. I'm Greg Dalton.

Let's talk a little bit about some off the founding – back to conservation. Pete Geddes, the Rockefellers, the melons – hat you're trying to do out there is trying to evoke some of the images of those families that have that vision and to put aside a great area of land for future generations to share. It may not solve the systemic problems that Kristine Tompkins is talking about but it can preserve an island for some.

**Pete Geddes:** Yes. I'm sure like many of you and your listeners, you came to love nature through experiences in national parks like I did with my family. And the great national parks of the United States, Yellowstone and Yosemite and Glacier and Grand Teton are all what we call [0:31:04] wilderness, and that's the wilderness that I initially fell in love with many, many years ago. Those areas were chosen largely for their geologic beauty and scenic beauty. The grasslands we're working, and I'd be curious, Kris, to hear your sort of evolution from [0:31:19] person to a grass person, we're literally just walked over and rolled over and you can still see evidence of that in Great Plains of Montana. Up place, as biome, as Whendee mentioned earlier that is globally significant but insignificant in terms of its conservation under protected area status.

So we view our project as an opportunity to write a sort of forgotten landscapes so that Rockefellers, of course, had a huge role in our western parks. And we hope that we can find another generation philanthropies and donors who are interested in getting into the ground floor of a Yellowstone-like place and an ecosystem that's incredibly beautiful is capable of holding a ton of biodiversity and is very unrepresented from a conservation perspective.

**Greg Dalton:** But your goal is not to create a national park, I mean we have Kris Tompkins; all of your land, set aside is a national park.

**Kristine Tompkins:** Eventually it all goes into a national park.

**Greg Dalton:** So Pete Geddes, why not do what lots of organizations, trust for public land, lots of open space trust do is hand the land over to government for stewardship. Of course, the national parks are all closed today. We realize that as we're recording this. But why not the National Park System? What's the deficiency in that model that you see?

**Pete Geddes:** That's an interesting question to contemplate whether or not the era or larger scale landscape conversation in the United States is over, whether it was this window that can burn so eloquently described in his series about the national parks, what were the conditions that made that such a unifying thing for the country. I don't know what the case is. That's an interesting sort of cocktail question to have and I'd love to have it but our view is that given the constraints on the federal government, we can, in a public-private partnership, again, we're a nonprofit organization buying and holding land, we place conservationist in some of our land but we're out to own properties so we can really turn it back into a wildlife habitat, that that public-private partnership is perhaps a model for achieving really big conservation going forward. I'm not talking about little Monticellos. I'm talking about 3.5 million acres of native prairie. And we just don't see the federal government or the state government taking that over any time soon. We're moving really, really fast. We have a 30-year project. We're a third of the way through it. And we're very ambitious. And doing this through private philanthropy allows us to move really quickly and not get caught up with – and I don't mean this in a pejorative sense, I think it's just a reality that bureaucracy of these things.

**Greg Dalton:** Whendee Silver, the University of California played a seminar role in the creation of

the National Parks System. And you're part of an effort to reclaim or bring forward that story.

**Whendee Silver:** Yes. The parks service is going to be 100 years old next year. And what a lot of people may not realize is that there was a meeting a year before the parks service was established at UC Berkeley to plan this out and to dream and have a vision of conservation at a national scale. And the next year that the parks service was established and the first two directors of the National Parks Service came from UC Berkeley. So Berkeley has a very proud history collaborating with the Parks Service in helping to lead the Parks Service in helping to envision the Parks Service. So next year, we're going to have a big celebration at Berkeley to bring people together to look at both the history and the future of the Parks Service and the role that it can play, I think, in our society.

**Greg Dalton:** And you're all invited. So Kris Tompkins, did you want to say something about the national parks as a destination as model for conservation?

**Kristine Tompkins:** Well, I would say that it really depends on where you're working. We don't say that national parks is the only way to secure long term protection for lands but in where we're working in Chile and Argentina, we think - if you look in terms of 100, 200 years out there that our best bet is to institutionalize that protection. And that and Chile and Argentina is represented by the creation of new national parks. Nothing in the future is a sure thing but where we work anyway, it's probably the best shot. And I think everybody, whether you work in Gabon or Montana, it just depends on where you're working what the circumstances are, and then place your bet and go for longevity the best you can.

**Greg Dalton:** Let's talk about fire. We've seen increasing number of fires, certainly in Colorado, California this year. Scientists say that we can expect more fire, intense fires, as climate change comes out as - Whendee Silver, how is that going to effect management of grasslands? Are they going to burn more frequently? Is that a bad carbon effect if grasslands go up in smoke?

**Whendee Silver:** Absolutely. Any time that you burn an ecosystem, you're releasing carbon back to the atmosphere. That black smoke that's coming off, a lot of that is carbon going back to the atmosphere. And you can take a grassland or a forest that may have taken decades or centuries to accumulate that carbon, and it can become like that back to the atmosphere in that fire. So an increase, especially an intense fire which is predicted for some areas where there are grasslands in the U.S., with climate change, with drying and increased temperatures and this increased storm events that bring lightning, lightning started fires, has a potential to decrease the amount of carbon storage.

Now, fire is also a natural part of a lot of ecosystems. And if we can manage ecosystems to allow those lower intensity fires to happen at a reasonable time scale, ideally manage them in such a way that they don't endanger structures and they don't endanger people, then we can lower the impact of those big intense storms. But there's a lot of debate and a lot of discussions as to what the impact of these big fires is going to be. And in some cases, it can actually shift an ecosystem out of a grassland completely and leave it so that it may be impossible for that system to return to its previous state, at least over the scale of decades to centuries.

**Greg Dalton:** Because some people would say that fire suppressions is a failed strategy.

**Whendee Silver:** I would agree with that. We spent our summer vacation in Yellowstone. We actually got up very early in the morning looking for wolves in most mornings. We did not find any, unfortunately, but we saw evidence now, 30 years later, I think it is, of the Yellowstone fire. And the Yellowstone fire burnt very intensely because fire had been left out of the equation. They have

drawn a line on the map and said, "This is a park and we're going to protect it. We're going to remove all of these things that is going to change these beautiful big trees and the things that people really go there for." But that's not a natural part of the environment. And so all the fire fuel built up and all it took was the right conditions, and it came through and was catastrophic, devastating fire, and has the potential, again, to shift that ecosystems. We may not get those trees again.

**Greg Dalton:** So Smokey Bear wasn't right? Is that what you're saying?

**Whendee Silver:** I hate to say it. I think Smokey was misguided [laughter].

**Greg Dalton:** Wow. Okay. Pete Geddes.

**Pete Geddes:** We like lots of fire, where we are, and the reason for that is fire, of course, is a natural part of the grass and ecosystems all over the world. And one of our management goals is to take a landscape where fire has been effectively extirpated for 150 years. A landscape that's dedicated right now to a very single-focus, and that's the production of protein through raising livestock. So it's a very homogenous landscape because when those are your management goals, you want to simplify things, you want to reduce variables.

So on our lands, we want it to look much more shaggy, heterogeneous, messed up. We want different age classes of grasses because different species depend on those different structures in the landscape, just like a forest only, our forest. So for example, long-billed curlews, a very endangered grassland bird, love it, hanging out on the prairie dog colonies, the dog towns because the grass is really clipped short. Herd is the same thing.

We have a very, very difficult job with fire because we have neighbors, and neighbors don't like us burning their grass or burning their fences. So we've been reintroducing fire very slowly on to our landscape because we have an obligation not to let it go crazy. But what we like about it is we just burn 1,000 acres a year ago. And our bison herd, we've got 300 bison heard up there. I spent most of last year on this burned area because of regeneration which has been absent, so intense and nutritious qualities of freshly green grass are just fantastic. So they're just mowing around on this big patch of burned area. So we're using it as a management tool. Not so concerned about the carbon ramification because these grasslands have burned over a long period of time. Indians burned them to move the game around. And we're using it to advance our wildlife restoration goals.

**Greg Dalton:** If you're just joining us on the radio, Pete Geddes is Managing Director of the American Prairie Reserve in Montana. Our other guests today at Climate One are Kristine Tompkins, Founder and President of the Conservacion Patagonica and former CEO of Patagonia, the clothing company, and Whendee Silver, Professor of Environmental Sciences at UC Berkeley. I'm Greg Dalton.

I'm going to ask you one question then we're going to go to our audience participation, starting with Kris Tompkins. How do you manage your own carbon footprint? What do you do in your life to reduce your personal carbon impact?

**Kristine Tompkins:** Very good question. We move around a lot, so that's not helping.

**Greg Dalton:** On planes.

**Kristine Tompkins:** Small or large, yes. Well, a lot of - in our work - mine personally or in our

work, either way?

**Greg Dalton:** Starting personally, yes.

**Kristine Tompkins:** Well, I think that we have a general philosophy in our family of low consumption. We try low personal consumption.

I think you see it more aptly in our work and the efforts toward the type of machinery we use, the type of management decisions we make on our farms and within the conservation areas but it's tough. We make no bones about it. I think we're caught up in a system that is not very easy to back off of your basic consumption levels unless you're a giant consumer by habit and trade. It's difficult.

**Greg Dalton:** What would be one specific next thing, your next carbon list, if you've already 1, 2, 3, what's number 4?

**Kristine Tompkins:** Well, I would fly less.

**Greg Dalton:** A lot of people say that here. Whendee Silver, what do you do to manage your personal carbon?

**Whendee Silver:** Well, I kind of feel I manage my personal carbon from two perspectives; one is I dedicate my life to trying to get carbon out of the atmosphere or just understand the mechanisms we can do that from a science perspective. But we do a lot at home too. I've become a firm supporter and believer that if all of us did what we could, it begin to add up and make a difference. And to be honest, I've learned a lot from my 13-year-old son who doesn't have the same consumption patterns having grown up in Berkeley that I grew up with in Southern California.

And so I've learned to use less. We had a big drought here in California a few years ago, if you all remember. And we used a lot less water, and our energy bills went down. And we realize "Well, we don't need to use all that water. We got by just fine." So we've changed those habits. We compost everything we can think of. And we try to reduce the amount of plastic we use. So those are our big steps now. We'll see what comes next.

**Greg Dalton:** Is that your car?

**Whendee Silver:** Oh, love one. As soon as I can, as soon as I, we have to use our cars until they're not capable of being used anymore except for parts because every time you buy a new car, you got a big carbon footprint from producing a new one. So the next time one of the cars finally dies, it will be electric or a bicycle, one of the other.

**Greg Dalton:** Pete Geddes.

**Pete Geddes:** I mentioned earlier, Montana is the size of Japan with 900,000 people. And my son plays Travel Youth Hockey so we drive our Suburban a lot in the winter on very bad roads.

**Greg Dalton:** And people [0:44:47] like to laugh about that. I was in Montana on a Saturday. And it's like "Yes, can I have a Suburban. Yes, I can see, definitely see how the—" part of the culture there. Let's go to our audience participation. Welcome to Climate One. Let's have your question. Welcome.

**John Gilbert:** Hi, there. John Gilbert from NRDC. Thank you for all of your work. Here in America

grasslands is 750 million acres of grazed ecosystems. And the majority of which are poorly managed. Actually ranching stewardship leaders will tell us 70 percent, 90 percent, they're always kind of the harshest critics from our experience. But as far as motivating change and taking advantage of this opportunity to improve management and ecosystem processes on this vast area of land, it's a huge behavioral issue. A lot of the - when I mentioned this to a representative of National Cattlemen they said, "We've learned all these great stuff in universities but then we have to go back and tell mom and dad that they've been doing it wrong, and that grandma and grandpa did it wrong."

So how do you see better incentivizing and driving these types of changes to improve management of livestock, which are the primary use of these grasslands?

**Greg Dalton:** Who would like to tackle that one? Whendee Silver and Pete Geddes.

**Whendee Silver:** I'll start. So that's a really good question, and I think you kind of answered in the beginning. And that I think everybody now is beginning to realize that we need to change management. And people are beginning to face conditions on their lands and in our lives that we've never faced before. The new climate, new rules. And we found that, at least here in California, people have been very open, and not even open, they've actually been pursuing new ideas and giving ideas to scientists but also lots of agencies that are involved. So I think that there's - that changes were in us, there's a sea change that's happening. I think we will see a lot of new approaches that are getting tried. And I think it's up to us to tell our government officials too that we want this incentivized.

**Greg Dalton:** Is that generational cultural change fast enough to diffuse the carbon bomb?

**Whendee Silver:** Good question. A lot of the ranchers that I'm working with are not the new generation. These are people who have watched their land for a long time. And the ones who are still in business, they're in business because they're innovators. They're looking for ways to keep their system productive. They're looking for ways to diversify. I mean, the cheese industry in this area has just grown dramatically because they're looking for ways to diversify. They're coming up with ways in which they can maintain this wonderful lifestyle and this wonderful land use that they have had for so long. So again, I think we need to really - if there's a weak point in here, it's helping these folks make these changes. It's giving them the right the technical and financial support that they need to move forward.

**Greg Dalton:** Pete Geddes.

**Pete Geddes:** Yes. If you take my assumption that is greatest for the grasslands is conversion to agricultural commodity production. At least in the northern plains of Montana where we worked, the ranchers have done a very good in managing the grass. There are also quite a bit of wildlife up there where you start to get into a rub as anything that is a big predator, of course, and then competition for grass. They haven't done such a great job but by in large, we try to tell at every opportunity, the ranchers who we're talking to and working with that "One of the reasons we're working here is because you guys have done a very good job stewarding this grass over time. It's still in a condition where we can bring the wildlife back."

**Greg Dalton:** Thank you for that question. Let's have our next question in Climate One. Yes, sir. Hi.

**Male Speaker 1:** Thank you. I really admire and appreciate your selfless effort in the conservation. And this is a question about the conservation at the model of conservation through philanthropy. If conservation only through philanthropy is that more \$1, one vote, and those individuals who can

support these efforts they're, in some sense, the least vulnerable to the impact and sometimes they're living thousands of miles away, and it also fits narrative of the western, the industrial elite come to save mother nature from the reckless industrializing hand of the developing country, and that narrative is particularly troubling compared to the colonial history that created much of the structural poverty in many parts of the world where now it's going through these industrialization. I wonder what's your thoughts on can we have a conservation model not through private elite philanthropy but through engaging local community, empowering and engaging those who are most affected by the degradation, by the climate change and those communities and protect nature at the same time.

**Greg Dalton:** Thank you. Kris Tompkins.

**Kristine Tompkins:** Well, let's start with the word elite because I think there are a lot of people involved in conservation at a lot of different levels. And in the United States for instance, there are thousands of local land trust who are working within their communities and at the edges of their communities, protecting key habitat whether it's wetlands or a particular forest or whatever it is. So conservation comes in all shapes and sizes. And a lot of large scale conservation that goes on, whether it's through the nature conservancy or some of our projects or all sorts of different groups, there are a lot of people who partner in those projects and they are not necessarily wealthy people. So it's a community of people who are concerned about habitat, wherever that may be.

The question of colonialism, it's always interesting to me. We're asked about this quite a bit. And I think one thing we have to think about is when a Canadian mining corporation goes into northern Chile and sucks the guts out of the highlands of northern Chile, that's considered appropriate or at least possible because that's the economic structure. But if you - you'll find critiques of someone else who is going in and not destroying the habitat because that falls outside the common way of thinking these days. I think also maybe at one small point it might have something to do with what you said is at least where we work, we've never bought any land that has anybody inside of it.

We work in very isolated places, extremely low human population areas. And we are extremely sensitive in being good neighbors and community involved and working shoulder to shoulder with those around us to see that what we're doing makes sense culturally, socially and economically for the people around. So I think that's how I would answer that, anyway.

**Greg Dalton:** Kris Tompkins is Founder of Conservacion Patagonica. Pete Geddes, your organization was founded by some wealthy people from Silicon Valley. They kind of swag it into Montana. And initially there were some resistance from the people in Montana about outsiders coming in. So answer that question and then we'll get to the next audience question.

**Pete Geddes:** Montana has a very long history of being very, very suspicious of outsiders. And this basically stems from our colonial past where raw resources were exported from the state by eastern money of interest. If you've ever been to the town of Butte, you will see the legacy of that. So folks are - and it makes for a very interesting political climate in Montana, which is much more, progressive in the way you guys understand it than you might think, but that's another story.

Everything that Kris said is absolutely true. One of the things that I really take away having been in conservation for a long time is the lessons that we started to learn in Africa in the mid 1980's and early 1990's, and that is when you draw a line on a map and protect an area and then put people with guns pointing out to protect it, you rob and exclude local communities from traditionally use of rights for those habitats, and that's a recipe for failure all the time. So that model of conservation does not work. We do much the same sort of things that Kris does. We just started a wildlife-friendly

beef company called Wild Sky. You can go on the web and get it, wildsky.org.

It's an attempt to provide economic benefit for our neighbors who are going to be in our area forever. When we get this all done, we're going to have people who are living on private ranches right around our boarder, and it's very important to us that we have good relationships with them. The last private end holding just came out of Grand Teton National Park, I think, this year.

But just to your final point, most conservation in the world is not done through - I mean, a lot is done through private philanthropy but it is by federal or the state whether that's the United States where you have this very advance model where Kris is working or we're in the developing world where there are protected areas but they suffer from all the sort of pathology one gets in developing countries sometimes.

**Greg Dalton:** Let's have our next audience question. Welcome to Climate One.

**Rick Redtoy:** Hi. Rick Redtoy from the Patagonia. The company where over the years I've worked with Kris and our company has also supported the American Pro Reserve over the years. We greatly admire their work but my question is actually for Whendee. And it is whether you or colleagues, Whendee, have worked to develop methodologies or I suppose even protocols or maybe mathematical algorithms that would measure the carbon sequestration of properly managed grasslands so that that carbon might be traded on markets including here in California with AB-32?

**Whendee Silver:** So that's an excellent question. And he really wasn't planted. We have never met before [laughter]. We are in the process of working with the environmental defense fund to put together - we have a draft protocol of looking at this idea of taking waste out of the waste stream, composting it and then using it as a way to grow more forage on range lands, save the soil and hold water but also sequester carbon. And so if this protocol goes through the stages that it needs to go through in the state of California, then ranchers would be able to use this to apply for carbon credits that people would pay.

And I don't think anybody's going to get rich off of this but it's certainly will help pay for managing these systems and maintaining these systems over time. And there are others of my colleagues that are also looking at other approaches, grazing approaches, other management approaches that would allow - that do sequester carbon on the landscape, and help those get, again, incorporated into our way of thinking whether it's through a carbon market or it's through an incentive system in the government. Yes, the scientific humanity is gearing up to try to come up with ways in which we can use our natural lands and the management that we really need to slow climate change.

**Greg Dalton:** Whendee Silver is a professor of environmental sciences at UC Berkeley. Let's have our next audience question.

**Paula Deheda:** Yes. My name is Paula Deheda. I was born here but my parents are both from Chile. I can tell you how deeply - I took a deep breath when actually I saw that Douglas Tompkins and the work you're doing was taking place in the south of Chile because I could see how they were cutting the forests. And you could see, literally, hills of chips, and the tractor would be on top of the hills of chips in Puerto Montt. And I would tell them the work that this Californian was doing was very important. And they were all - the Chileans were like "He's up to something. He's up to something. Nobody buys that much land just to protect it." And I said, "Yes, a Californian would do that." I had this argument many times. Actually, I'm very good friends with folks in Puerto Varas because I have family in Puerto Varas, Jose Antonio is a relative of mine.

**Greg Dalton:** Your question.

**Paula Deheda:** Yes. Actually – yes, right. Get to the question. One of the things – Chile is all agriculture and they don't compost. And there's practically no recycling. And one of the things that happens is that Chile wants to be 21<sup>st</sup> century. They want to be the United States idea of the 21<sup>st</sup> century in the 20<sup>th</sup> century, not what we're really working towards in the United States which is actually what they have which is local sustainable that they're losing as they try to become the McDonald's. And when you go to Chile, "Oh, my God. We have a McDonald's. And look, there's little signs too."

**Greg Dalton:** And your question.

**Paula Deheda:** So my question is, is that – is there a shift? Do you see a shift now through all your work? We're having an election. Are people realizing the importance of local sustainable, recycling and composting, all of this?

**Greg Dalton:** Thank you. Kris Tompkins.

**Kristine Tompkins:** Well, specific to recycling, I know that President Piñera's administration just put through something, some law, I don't know the extent of it, which I think is the first in the country. So yes, they're coming to it, perhaps later than some but earlier than others. In terms of conservation, Chile has changed a lot since we arrived 20 years ago. And I'm not at all suggesting that's because of us but you have many, many leaders including the President of Chile who have created large scale conservation areas. They may not want to donate them back to the government the way we do but they're there and they're taking it very seriously. I see Chile changing very, very quickly in some very positive ways.

**Greg Dalton:** We have to wrap up. So thank you. We can talk more offline. We have just a couple of minutes left here.

And I want to ask each of you as we close, starting with Kris Tompkins, how hopeful are you that the global economy will solve the carbon problem without a great deal of disruption? Are you hopeful? Do you think this is going to get –

**Kristine Tompkins:** Well, I'm hopeful, that's for sure. As a friend of ours [1:00:28] said once, he's not so optimistic about the 21<sup>st</sup> century but very optimistic about the 22<sup>nd</sup>. I think it's going to be an all hands on deck response to these issues. And certainly the structure of the global economy as it pertains to carbon markets and other areas are going to have to play a significant role. And I hope they do.

**Greg Dalton:** Whendee Silver, you teach undergraduate students at Berkeley. Are they hopeful? Are you hopeful?

**Whendee Silver:** I'm just a naturally optimistic person but I also feel that we're going to have a few bumps and bruises along the way. I think that there is a way forward. I do think that we will and we are developing strategies but there are going to be change. We have passed the point where we can go back. So I think once we embrace that and realize that now we need to look at what we can do and start doing it now instead of arguing about or planning. We need to embrace Montana, we need to embrace other countries and sit down at the table and say, "Well, what would work for you? What can we do?" And I think – I look at the students coming out of my classes in Berkeley and all that energy and all that enthusiasm. I do think that we can get there.



**Greg Dalton:** Pete Geddes, we might move to Montana. It sounds like you could use some people up there [laughter].

**Pete Geddes:** Bring your willies. Yes. I'm optimistic on two dimensions; one, that the American vision for big, broad landscapes is not diminished, and we can actually get that reignited to some extent. I'm very optimistic about that. Regarding the climate question, I'm a rational optimist in the title release book, which is, if you haven't read, I recommend highly. I think we're good problem solvers. You've heard people - my fellow panelists here. I think we're very optimistic people by nature, and I think that the only way one has to be. We shouldn't be Pollyannaish but I think we'll get this fixed.

**Greg Dalton:** We have to end it there. Thanks to our guests today. Pete Geddes, Managing Director of the American Prairie Reserve in Montana, Kris Tompkins, Founder and President of the Conservacion Patagonica and former CEO of Patagonia Inc., Whendee Silver, Professor of Environmental Sciences at UC Berkeley. I'm Greg Dalton. Free podcasts of this and other Climate One conversations are available in iTunes. Our Twitter handle is @climateone. Thank you all for joining us today.

[Applause]

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