

# Colorado Adaptation Episode

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## SUMMARY KEYWORDS

wildfire, colorado, state, adaptation, climate, resiliency, fire, watershed, mitigation, flood, community, area, resilience, impacts, home, flooding, climate adaptation, program, floods, boulder county

## SPEAKERS

Doug Parsons, Maya Machamer, Jim Webster, Ann Miller, Lori Hodges, Jessica Olson, Russ Schumacher

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### **D** Doug Parsons 00:00

Hi everyone this is America adapts the climate change podcast Hey adapters welcome back to a truly exciting episode. It's Rocky Mountain adaptation. We're gonna learn how Colorado responded to extreme weather events to develop some of the most ambitious local and state adaptation planning efforts in the country. I'll talk to the head of the Colorado State resilience office to learn the history of that new office and how they help Colorado communities adapt to climate change. We'll also get a primer on Colorado's climate with the state climatologist joining the podcast to explain the unique challenges of being a state climatologist their job responsibilities have changed drastically in the last couple of decades. We learn what restoring the landscape to a future condition means yes, restoring to a future condition. We'll also hear from local government and watershed groups and how they're integrating adaptation planning into their organization strategies. And we'll hear about some of their on the ground projects. It was fascinating hearing from Colorado adaptation planners and what they consider are the state's biggest climate impacts. Some said wildfires, others said flooding, and we'll hear how managing for one helps mitigate the other. And a common theme in these conversations is how the 2013 Floods was a huge driver in getting the state to start thinking about adaptation and bringing in the expertise and resources as a response. If you're in a nonprofit, local, state or federal agency trying to figure out what is a good approach to adaptation. You're going to learn a ton about that process from these innovative leaders in Colorado. This episode was generously sponsored by the Genesee foundation. Okay, let's take a journey to the Rocky Mountain State and learn how they are adapting to climate change. Hey, adapters Joining me is Dan Miller, and is the Colorado resiliency office director in the Colorado office of local affairs. Hi, and welcome to the podcast. Hi,

### **A** Ann Miller 01:58

thanks for having me.

### **D** Doug Parsons 02:00

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Well, we're starting off this episode around adaptation and Colorado and you're here to kick this off. We've got some great interviews coming up after you and people are going to learn all about what's happened in Colorado. But I think it's really interesting that what's happened there in Colorado, and I think you can take us through this journey. But I guess first off, what is the resiliency office? What do you guys do there? Yeah,

A

Ann Miller 02:19

the resiliency office, we're located in the Division of local government. It's in the department of local affairs. And what we do is work across local, state, federal and other partners to help communities in Colorado prepare for and recover and mitigate, hopefully, disasters. So we are looking to work across sectors so that our communities are prepared for whatever disruption comes their way. And we've experienced pandemics and wildfires most recently. So I think a lot of folks around the country are in a similar situation where learning adaptation and being prepared is on everybody's minds.

D

Doug Parsons 03:03

So how big is the office? How much staff do you have there? Are you all based there in Denver? Do you have people spread out throughout the state? Yeah, we

A

Ann Miller 03:10

have a small but mighty office, and we right now have four full time employees and permanent employees. However, we have tripled in size in the last year alone with different term limited our grant funding from working on a recent, our largest, most destructive wildfire and supporting the long term recovery efforts in the Marshall fire and Boulder County. And we're also work doing a lot of efforts across Colorado working on pandemic kind of economic recovery. And some have some really exciting work we're doing in rural Colorado on that.

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Doug Parsons 03:50

What do you consider the most pressing climate impacts? In Colorado? What are those? What keeps you busy?

A

Ann Miller 03:56

Yeah, yeah, according to, you know, our state hazard mitigation plan. You know, our top hazards are wildfires, drought, and floods. And then, of course, severe storms. So we get a lot of snow storms and hail in Colorado as well. In 2020, we experienced our three largest wildfires in our history. And at the end of last year in December 30, our most destructive wildfire, so we're definitely seeing the trends in frequency and severity of natural disasters in Colorado.

D

Doug Parsons 04:33

Doug Parsons 03:55

So just as a preview of the interviews that are coming up, I've obviously had some of these in there that was asking that question, what's the most the biggest impact climate impact in Colorado and there's disagreement and some of the people I interview and so I look forward just to kind of, you know, when you listen to it, get your opinion on how well people kind of interpret that. So it's been very interesting. You know, before we dig into that a little bit further to can you tell us how you ended up in that office, just professionally, how did you end up doing resiliency?

A

Ann Miller 04:59

Well, I We started working for the state of Colorado in 2013. April, in September, we had the 2013, Front Range floods. And we in state government all switched and had to focus on response and recovery efforts at that time I was working in the community development office. And so that's kind of how I got into disaster recovery. And then three and a half years ago, I started as the director of the Colorado resiliency office, I think like a lot of people that do this work, we don't necessarily plan to do it. And we, by circumstance, do learn about disaster recovery.

D

Doug Parsons 05:42

So you brought up the 2013 flood. And I think that's important part. That's a theme that I had with most of my interviews here. And I was actually there at a National Park Service meeting, when those rains started to happen. I barely made it to the airport. So I feel some affinity for what you guys went through. But how did that flood? Obviously, you came in, but it actually was a major catalyst for adaptation planning in the state, right?

A

Ann Miller 06:04

Yeah, it definitely was, I think so many of us were thrust into a disruption that had not been experienced on a scale and magnitude across 24 counties, and a large geographic area in the Front Range. And the destruction was at all levels from, you know, homes, destroyed, damaged infrastructure, our streams, you know, changing course, I learned a new term job or morphology, so lots of impacts. And we all had to come together and work across multiple agencies to get the job done. So resiliency became a necessity and how we thought about not only building back but building back better, and it's left a lasting impact on how we do business, especially some groups like the Department of Transportation where they had to rebuild, they now have a resiliency program. So they're kind of out there in front in terms of Colorado agencies, learning from that disaster.

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Doug Parsons 07:11

Alright, doesn't sound exciting, but a lot of people are interested how these sort of institutions start, how do you institutionalize adaptation planning? And so I guess politicians took an interest after these floods and such but that they created a pathway, I guess it was funding but

the actual establishment of the Office of resiliency. I mean, how long exactly have you guys been established?

A Ann Miller 07:30

Yeah, Governor Hickenlooper right after those 2013 Floods did start recovery in office and later was renamed to Recovery and Resiliency office in the governor's office. And then in 2017, the office moved over to the Department of local affairs, where in 2018, was institutionalized by statute with a bill that passed creating that office.

D Doug Parsons 07:56

So you'd mentioned post disaster recovery in Colorado, and let's talk a bit about the marshal fire. That is, my understanding is is taking up a lot more people's time is this post disaster phase for a lot of people?

A Ann Miller 08:09

Yeah, it has been incredible. The amount of collaboration after these this destructive fire, and unfortunately, Boulder County has where the marshal fire took place has a lot of experience in disaster recovery. So I think that's another example of how we have our carrying forward the lessons learned from the 2013, floods and other disasters. And we have marshaled resources, and collaborated such that the debris removal program is underway and are ready building permits are being pulled just you know, four months after the disaster, that's lightning record speed. And that speaks to the collaboration and resilience and the partnerships that we have from local, state, federal and all of the nonprofit partners that are supporting this recovery effort.

D Doug Parsons 09:11

So you have quite a bit of expertise in climate issues in the various Colorado universities. How is your office able to tap into that would be an example of how you're working with them?

A Ann Miller 09:21

Yeah, we do collaborate a lot across state government with our various educational institutions. And we do that a number of different ways. The state has a drought Task Force, and water availability task force that are formed by climate scientists. So we're consistently getting updates and projections on the best available data to help us plan for the future and future scenarios.

D Doug Parsons 09:51

So you obviously your staff, as you'd mentioned, do great work but you still limited staff, do you

find that the majority of Your adaptation work your resilience planning is focused on the built environment, or do you focus on the natural on Colorado's a big state a lot of public land is what's that focus area? What I guess keeps you busy in regards to those two? How do you focus your adaptation planning efforts?

A Ann Miller 10:16

Right, we have the Colorado resiliency framework that is our guiding document for how we work across state agencies. And it was a first of its kind and 2015. And then we updated it during the pandemic in 2020. But that's where we work across multiple sectors. So we have a six different priority areas, climate natural hazards is one of them. And each one of these areas from future ready workforce to ag and food security to housing stability, we're working across agencies so we can really leverage and align all of the amazing work that's going on. So while the CRO is a bit of a facilitator between agencies to have that greater impact, we may not be doing all that work, but certainly our Department of Natural Resources, our Colorado State Forest Service is out there, do we forest, wildfire mitigation, forest health work, watershed restoration after disasters, and we are able to leverage all of that, but our focus in the office we do also Economic Recovery and Resiliency. So that example of the impacts of the disruption of the pandemic on our communities and economies. That's where we're working on a lot of coordination now around all of the different state and federal funding that can help our communities solve some of those ongoing issues like affordable housing that really are those issues that do impact ability, communities, ability to be resilient to a disruption if they already have those chronic challenges. So we're doing economic recovery, we're doing disaster recovery. And we're trying to do that forward thinking resiliency planning with communities, so technical assistance with local governments and our partners.

D Doug Parsons 12:21

Okay, and thanks for kicking this off. I'm gonna go and we're having some interviews with people there in Colorado, but I'll see you at the end of the episode.

A Ann Miller 12:28

All right. Sounds good. Talk to you soon.

D Doug Parsons 12:35

Hey, adapters. Joining me is Dr. Russ Schumacher. Russ is an associate professor in the Department of Atmospheric Science at Colorado State University. And he also serves as a Colorado State Climatologist Hi, Ross, welcome to the show.

R Russ Schumacher 12:47

Thanks for having me.

D

Doug Parsons 12:48

All right. This is my first state climatologist on the podcast. Very exciting for me. But let's just start off what is the role of a state climatologist?

R

Russ Schumacher 12:57

Yeah, that's a good question. And actually, it varies a bit depending on what state you're in. So the history is that there, there was a federally funded state climatologists program prior to about the 1970s. And then that went away. And then each state was sort of left to do whatever they decided to do. So there's a couple of different models, actually, one is like we are here in Colorado, they set up an office for the state climatologist at the land grant university. And so we've been based here at Colorado State University in the Department of Atmospheric Science since 1974. And then a lot of other states have that sort of setup. But in some other states, it's a government position, like within the Department of Natural Resources or something along those lines. And so the role we have is partly, I think, traditionally, the role was archiving data, which you know, used to be all on paper records and things like that. And so that isn't as critical of a role as it used to be. But also just Yeah, keeping tabs on what's happening with the weather and climate in the state being a resource for people who need data, you know, whether that's state government agencies, or farmers and ranchers or just the public, whoever that might be. And then right kind of engaging with people around the state about what's happening with our weather and climate and trying to explain the different things that are going on. So are there actually climatologist in all 50 states? Not quite. I think Massachusetts might be our last holdout without a state climatologist, but it's almost all 50. Wow,

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Doug Parsons 14:35

Massachusetts. Okay. So the role of the Colorado Climate Center where you're based at so you explain a little bit about that. But you have a team there and you're just providing information, right?

R

Russ Schumacher 14:45

Yeah. So we talked about our mission as being threefold. So climate monitoring, some of that's collecting data ourselves. For example, we have an agricultural Weather Network weather stations and our office is also the home of program called cocoa Roz the Community Collaborative rain, hail and snow network where people take rainfall and snow measurements in their in their backyard or their school or their farm, whatever the case may be. But also then in that climate monitoring piece, getting data from all the usual government sources and, and networks and trying to, for example, monitor the status of the drought in Colorado. And then the second part is climate research, mostly related to things that are important here in Colorado, which lately has been drought and snow and other high impact weather, severe weather sorts of things. And then climate services is a third piece, which is being a resource for, you know, historical climate information, trying to put resources out on our website or on social media, giving lots of presentations around the state media interviews, you know, so on and so forth. Being a Yeah, being a resource and kind of a knowledge base for people in the state.

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Doug Parsons 15:59

Let's get a little bit of background, I wanted to ground people in like the climate of Colorado. And I know we're not going to drill down into the weeds there. But generally, what is the climate and when I think of Colorado, which is a state I love Boulder is my favorite city, United States, but you have the mountainous West, and then you've got the plains in the east, it's almost like your two different states there.

R

Russ Schumacher 16:16

Yeah, it's a very fascinating and challenging place to do this sort of work. So right, we have the eastern plains, you know, which is kind of westward extension for the Great Plains and tends to be pretty dry, but lots of thunderstorms in the summer time. And then going west to the mountains, which you know, get a lot of snow. But then we also have diverse sub regions. Within there, we have the San Luis Valley and southern Colorado, which is the high desert, only seven inches of rain per year and a lot of those places and then you don't you go not too far to the north or the West, and you're in mountain areas that get hundreds of inches of snow in the winter. And then there's valleys in the in western Colorado, two that are that are big agricultural areas as well. And so yeah, highly varied, very diverse. And you know, with, yeah, with a few hours of driving, you can go from anything to, you know, the desert to tons of snow to thunderstorms. Sometimes all of that's happening on a single day,

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Doug Parsons 17:19

when an event like a big theme of this episode, or the 2013 floods. And so when an event like the 2013 floods occur, or even the recent Marshal fire, how does that impact your office there?

R

Russ Schumacher 17:30

Yeah, so those are, of course, very high profile events. And we try to keep tabs on that as much as we can. So when the flood happened in 2013, I wasn't in this role yet. But the Colorado Climate Center put together a lot of resources, you know, trying to bring together partly it's bringing together data, right? Because it's for rainfall, sometimes you have all these different rain gauge networks and, and radar estimate, and it's trying to kind of bring all of that together to have sort of a long lasting resource that people can refer to. But of course, you know, they want some explanations or descriptions of what happened and why did this happen? And you know, how unusual is this and all of those sorts of things. And we at least try the best we can to be prepared to to answer those sorts of questions. And to you know, I think a lot of places experienced this, but it's been especially Stark here in Colorado, and in the last 20 years or so, yeah, swinging between these extreme droughts to you know, a very disruptive flood, like in 2013, or we had no in 2020, we had fires everywhere, big our worst fire year in state history. And then that set the stage for terrible flooding, last summer flash flooding in areas that close down the, you know, interstate 70, through the state and so forth. And so right, we're, you know, we're we try to understand the connections between all of these things, and we've had a lot of extremes to look at. And in the last several years, that it's a challenge. And it's difficult,

because these events are impacting people in serious ways in communities that you know, are very close to home. But it also is, you know, scientifically is a very exciting area to be studying weather and climate.

D

Doug Parsons 19:16

So I imagined so you weren't at the center when during the 2013 floods, but I imagine you were looking at the data and I'm just I bet people in your space just as the information started coming in, there must have been just what just happened here because it was the numbers were so big, right?

R

Russ Schumacher 19:31

Yeah, very much and that's right. So I mean, I was here work. I was here in Fort Collins and working at CSU at that time on in my professor role. I just wasn't in the state climatologist role yet. But yeah, that is a pretty accurate description of what happened. You know, I think the mental model that a lot of us had of flash floods here in Colorado is something like the Big Thompson Flood in 1976 a localized extremely intense thunderstorm over the mountains that then the rain fell into the canyon and you get, you know, sort of this wall of water thing, but only in a localized area. And I think what made the 2013 event so different was it was partly it was long lasting, it was like, almost a week of of really heavy rain. But also it was covering such a large area that it wasn't just one canyon that flooded. But instead, kind of the whole Northern Front Range here was seeing impacts.

D

Doug Parsons 20:27

So I was actually working for the National Park Service. And I was in the foothills of Fort Collins when that rain hit. So I have some affinity to this event. So I remember I remember the very heavy rain because I'm from Florida. That's what heavy rain is. But I guess for Colorado it was but it was, as we were leaving town. That's when everyone was like, okay, something big just happened here. I lived it. So yeah, it was very exciting. Yeah. So I've talked to people on the ground doing adaptation work, how is that becoming an issue for your office? Are people reaching out for you? The notion of like, we have to have more resilient landscapes and more resilient built environments? How has your office started to deal with the issue of resilience and adaptation?

R

Russ Schumacher 21:08

Yeah, I think so. And this is, you know, especially given the really intense droughts that we've had in the last 20 years, in really kind of across the state, but that affects people differently in different areas. That's certainly one that has been a big point of interest. Because right for, you know, whether you're talking about agriculture, or you're talking about water supply, when the drought happens, it has big impacts across the board there and also is a little different from other hazards in that you really don't know necessarily, when it's going to end, it's sort of this open ended thing that you know, unlike a flood or a tornado, where you you kind of know where the endpoint is, the drought can stretch out for a long time. And so, you know, I think



this is where a lot of questions come from, you know, for farmers and ranchers in Colorado is how can we make our farms our properties more resilient to drought? How can we, you know, make the most out of every drop of water that we get when it rains or from irrigation and so forth? And then that question is, you know, really front of mind right now, with the water crisis in the southwestern US, with the reservoirs being so low, like Powell and me that, you know, record lows, how do we use less water and get the most out of the water that we do have? And you know, whether that's for municipalities, people reducing water use for watering their lawns, or whatever the case might be, or, you know, whether it's for the actual water managers, trying to figure out how to deal with these situations is a challenge. And our offices are not always the ones that have the solutions. But it we at least can try to help people put some things in historical context of where did the current conditions stand compared to how things were in the past? What do projections point two for the future and that sort of thing?

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Doug Parsons 23:02

All right, for a lot of groups, downscaled modeling is a big issue. So you can have models for like the state of California, Maine, State of Colorado and say, Alright, there's gonna be less water, that might be more snow. But let's say you're watershed group, and you're trying to use models to actually do adaptation action plans, where you're actually making on the ground decisions. Can those sorts of groups engage with your office and get that information? Do you downscale at that level?

R

Russ Schumacher 23:27

Yeah, we do have quite a bit of that information. And we can also point people to other resources where that is the case of for example, right now, we're in the process of updating statewide Climate Change report. That was it was first done in 2008, and then updated in 2014. And now we're updating that again. Now that does try to include a lot of that information about partly, you know, what's been observed what changes have happened up to this point, but then also, you know, what are the scenarios that may play out? As we go forward in the future, there's, of course high confidence that the climate is changing, and it's going to continue warming as we go forward. The challenging thing is on the timescales that people are often interested in, right, like the say, the next five to 10 years, those projections can still be pretty uncertain, and challenging. You know, we know that the middle of the century is going to be warmer than the last 20 years were, for example, but we might not know you know, whether the next five or 10 years are going to be wet or dry. That part is a challenge, but we can at least kind of again, try to explain what some of the scenarios may look like and informed by the past but also by the the changes that are happening and try to provide that sort of information in a useful way. But I think where this really is best and it's requires more work and not claiming that we're particularly good at it, but we're trying to get better at it. The is the idea of CO production, right? It's what is the question or what is the end? information that you need as a watershed group, for example, which may not be, how does annual rainfall change, but it might be something very different than that. And we can hopefully work together to try to come up with what the key question is, and then hopefully at least provide some level of answer to that question that goes beyond right, simply, you know, how will the average temperature change, or the very broad brush kind of things that that maybe are easier to talk about, but aren't, you know, don't hit home, so to speak,

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**Doug Parsons 25:33**

I imagine someone in your position going back 2030 years ago that a lot of your responsibilities were about looking in the past, looking at the climate of the past of the state that you're in, to help make people make decisions about the future. But now it seems like you're turning around and so much of your focus is probably thinking about what's happening in the future. Right it would you can you just briefly describe that evolution. I'm sure that's been occurring for climatologist.

R

**Russ Schumacher 26:00**

Yep, I think that's describes it very well, part of it, is that right? 20 or 30 years ago, somebody doing this, you know, was probably having to sift through paper records, and just dealing with all the challenges of getting information to gather in the first place of even, you know, getting all of those weather observations and climate observations in one spot. And that was sort of a key role of a state climate office at that point. Now, you know, of course, everything is digital, and everything comes, you know, very rapidly through the internet. And so that part of the job is not as difficult as it used to be. And so it's actually quite easy now to grab the data from a location and look at five different datasets and characterize what happened in the past, the challenge very much has shifted to how is climate changing? How is it affecting us here? Now? What is that going to learn? What is it likely to look like in the future, and similarly, there's so much information out there, it's, you know, hopefully trying to take all of that information and make it somehow knowledge that's useful and usable for people. Because I think it's very easy. You know, if you're not looking at this stuff all the time, like we are, that's sort of our job. But for most people that's not their work, or their life is affected by weather and climate very much, but they're not sitting here looking at the data all day like we are. So that's I kind of see as our role is trying to make sense of that information and make it not so overwhelming to to understand what's happening, or what might happen in the future and hopefully translate it into something that can be usable and make sense and is relevant to whatever the impacts they might be seeing. Final question.

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**Doug Parsons 27:43**

And this relates to my listeners who are out there, let's say your watershed group or your city official, you're an urban planner, and what advice do you give them to engage with your office and start thinking about all that information that you have there? And it doesn't even have to be Colorado? Think a lot of other states that people there don't realize that they have a state climatologist and what how would you encourage them to reach out and work with you?

R

**Russ Schumacher 28:07**

Yeah, I mean, we're here as a resource. You know, we're getting email questions all the time and things like that, that we're happy to, to deal with. And you know, especially now that some in person things are ramping up again, we love to just get out and whether it's giving presentations or coming to community meetings or things like that we love to engage in in those sorts of things as well. Obviously, if it's a bigger project, you know, a research project or let's really dig down into the data, then sometimes we're able to do that sometimes we can just

direct people to the types of groups that do that sort of work. That's really how we see ourselves as as a resource. And we encourage people to reach out the the resources that each different state has for their state climate office varies quite a bit. Some are slightly bigger operations like we have some it's just a single person as the state climatologist, and sometimes those you know, that can be a challenging thing in terms of just the ability to respond to everything, but there are regional climate centers, there are so many different groups that are working on these sorts of things that that even if we ended up not being the the people to help or have the answers, we can hopefully direct those people towards the answers that they're looking for if it even if that comes from some other group or some other agency or whatever the case might be. Okay, Russ, this

**D** Doug Parsons 29:28

has been fantastic. Thanks for grounding us in what's happened in Colorado regarding the climate in the center and all the work that you guys are doing there. Thanks for coming on the podcast. Yeah, thanks

**R** Russ Schumacher 29:36

so much for having me.

**D** Doug Parsons 29:41

Hey, rafters joining me is Maya Makmur. Maya is the co founder and director of the boulder watershed collective. Hi, Maya, welcome to the show. Hi, Jake.

**M** Maya Machamer 29:49

Happy to be here.

**D** Doug Parsons 29:50

What is the boulder watershed collective?

**M** Maya Machamer 29:52

The Boulder watershed Collective is a nonprofit group that focuses on watershed restoration community engagement and climate adaptation and resiliency. And we got our start doing river restoration and mine reclamation after a large flood that we had here in Colorado. But a lot of our focus right now is obviously on wildfire planning and wildfire mitigation and a lot of intensive work with communities building and planning these projects and really doing a lot of education around wildfire and watersheds as well.

D

Doug Parsons 30:26

So I think you kind of revealed the answer there. But what would you consider the biggest climate impact in your region?

M

Maya Machamer 30:31

Yes. Well, wildfire, for sure is probably the one that is the most visible and impactful right now. But a lot of the wildfire issues that we're having here in Colorado right now is because of prolonged drought. So I think the two of those together is what we deal with the most here.

D

Doug Parsons 30:48

And so the I guess the nature of the wildfire season has changed how so?

M

Maya Machamer 30:53

Yes, we used to have a wildfire season actually. And I guess that's what's changed is right now. It's really appearing to be a year round phenomenon. On December 31 2021, we had the marshal fire, which was the most destructive fire in Colorado history. And that was really an urban fire. It started in grasslands and burned through suburban neighborhoods outside of Boulder. And then since then, so in March and April this year, we have had multiple grass fires, grass and forest fires in and around boulder. And so that's very atypical for our area, which typically saw wildfires that were more focused from like August through October, I would say. So now we have a year round fire season.

D

Doug Parsons 31:39

A lot of people don't connect these two, but is flooding in your area related to wildfires?

M

Maya Machamer 31:45

Mm hmm. So the big flood that we had in 2013 was not precipitated by a wildfire. But yes, we many of the wildfires that we've had in Colorado, especially since 2020. Actually, no, I'd say even you know, just in the last decade have been followed by severe flooding. And this is often because wildfires can create hydrophobic soils, so soils that are no longer able to absorb water. And so when we get heavy rains or precipitation in general, it just flows right off the slopes, the mountain slopes and really turns into flooding. And sometimes that flooding includes mudslides and debris flows, which can be really, really damaging to infrastructure and communities and the ecology as well.

D

Doug Parsons 32:36

Okay, so you had mentioned the 2013 flood. And that has been a common theme from a lot of

the conversations I'm having this episode. How did it impact your organization? What role did it play and other things that you're doing?

M

Maya Machamer 32:47

So our organization started in response to the 2013 floods. So the Colorado Water Conservation Board and the Department of local affairs at the state of Colorado decided that they wanted to have a community driven response to flood recovery. And so they helped smaller counties and cities develop local stakeholder driven watershed groups in drainage is that we're heavily affected by the flood. And so we were one of those areas. We started in formal panion, which is a tributary to Boulder Creek and four mile had had a 6000 acre fire in 2010, and had experienced debris flows and flooding in 2011. And then the 2013 flood came. And so even though it was a small watershed, it was it had really experienced a lot of damage. And so that's how we started as an organization. And we've grown from there. And we've really just been very responsive to the needs of the community and the watersheds that we're working in. And so that has really pushed us to explore different avenues. You know, in four mile Canyon, there was a lot of legacy gold and silver mining in the late 1800s and early 1900s. And so we had to get into mine reclamation in order to complete the river restoration that was needed. And that's, you know, mining history is very common in Boulder and the western United States and wildfire and flooding, both can worsen some of those legacy impacts. And so that's just one way we've been responsive to community needs. And I think the wildfire issue, you know, is similarly what the community and the ecology really needs right now.

D

Doug Parsons 34:23

So let's talk a bit about your resilience efforts. And so 2013 was this catalyst for the formation of your group. But let's talk about you specifically have an adaptation program Resilience Program. I think it's called a you just call it resiliency. But tell us a bit about that. Has that been there since the very beginning in our has it evolved as you've been going on?

M

Maya Machamer 34:43

Yes, that is our newest program area. And that grew out of our strategic planning process that we recently went through a couple of years ago. So no, it was not always part of the organization. Although I would say that we have always been doing work that is focused on resilience and is a method or many methods of adaptation as well, I think but we've only recently formalized that as a program area that we would like to focus on.

D

Doug Parsons 35:13

Okay, so what projects it's so it's a relatively new program, but do you have any existing projects that are part of that program or that you're planning to do?

M

Maya Machamer 35:21

One thing that we've done after the marshal fire is developed a living with fire events series

One thing that we've done after the marshfire is developed a living with fire events series that really focuses on adaptation and resilience. And this is another way that we're just integrating those concepts with relevant community needs relevant local needs. And so we've been having a lot of discussions with some experts from around the country on home survivability and wildfire, and climate issues related to wildfire, and really trying to take a hard look at the social and ecological aspects of adaptation that we as a community can move towards in order to be more resilient to wildfire, drought, and the issues that we're faced with locally. I guess another thing I'm maybe a more tangible way of looking at some adaptation aspects would be developing some community ambassadors for urban neighborhoods. So we've spent a lot of time focusing on wildfire mitigation and forest restoration, and planning for these things with communities who live in the forested watershed. But now we're really trying to refocus some of our efforts on those who live in the urban areas. And while this is something that I think California and other communities have dealt with in the Pacific Northwest, this is relatively new for Colorado, in really needing to think about community safety and wildfire preparedness in the urban areas.

D

Doug Parsons 36:53

Okay, so we can't spend that much time on it. But I think a lot of groups as they're thinking about adaptation, about resilience planning, not quite sure how to start your relatively small organization, and you put it as part of your strategic planning process, which could be an incredibly painful thing to do for a lot of organizations. What did that look like? I mean, did you bring in outside folks? Was it existing staff? What what do you remember from that process was it relatively easy,

M

Maya Machamer 37:18

it was actually a great process, we hired a facilitator. So you know, there was a little bit of money expended, but it was not too bad for a small nonprofit. And that was huge. She was amazing. And she really guided the process. And we have a wonderful board of directors who were very engaged in the process, and all our staff was as well. And so I think what happened and climate adaptation and resilience became a program area, is because we were kind of dancing around that topic with many different ideas for a long time. And it all just kind of coalesced in that. So a lot of the monitoring and data analysis or project development, or even the community engagement that we do, and the the social aspects of adaptation and resilience, you know, they were all part of our discussion and have been part of our discussion for so long. But we really just needed a way to a term to kind of package all of that. And so, climate adaptation and resilience really does encompass a lot of the work that we're already doing. But it also I think, guides us to thinking about it more specifically. And also just being much more intentional about actively shifting how we as a community are planning for and recovering from these weather events and associated disasters that we're having.

D

Doug Parsons 38:49

So what resources do you look to when you're doing adaptation, resilience planning? Has there been pretty useful ones? And where do you feel that there's gaps when you're kind of looking out there? You're like, Alright, no one's really doing this. And we could use this kind of information. What's that look like?

M

Maya Machamer 39:02

I think the biggest thing that we've relied upon so far is a lot of the expertise of our board members and the experience that they have had already working in this area. But also, there is a lot of good literature. Well, I don't know about a lot, but there is a lot there is literature that you can use to kind of conceptually help develop an adaptation and resilience program. I think the difficulty for us, I think, is operationalizing. That and really figuring out yeah, what that means, as kind of tangible projects. And I feel like we still have a long way to go in really making that a robust program.

D

Doug Parsons 39:44

What about the role of the state there's a new red wall, relatively new office of resiliency within the state of Colorado? Have they played any role in the work that you're doing? Yeah, actually,

M

Maya Machamer 39:54

I'm glad you mentioned that because there is a resiliency framework that came out of the development of that office. And that has been a good guide and helping to develop adaptation projects or maybe even just framing helping to frame the the ideas of how to develop a program like that. And the intersectional ways that different sectors come into play with that type of with adaptation planning. I think that's one of the biggest things to keep in mind with adaptation is that there really is this intersectional ism across sectors that you have to think about and integrate when you're developing projects or programs?

D

Doug Parsons 40:35

And do you feel because Boulder is a very unique area? I've been there many times I love Boulder, but the issue of environmental justice, because you know, some of these groups are more disproportionately impacted than others. Is that an issue that you're having to deal with in the region that you're working in?

M

Maya Machamer 40:51

Yeah, that's a really good question, because Boulder is overwhelmingly white and upper middle class. And so it is difficult to see, I think environmental justice issues as easily as it is to see in other parts of the United States or even other parts of Colorado. But I would say that it still exists here. And sometimes that comes more in the form of economic economic differences. And, for example, some people, you know, if you live in a river corridor, you're more prone to flooding, and sometimes in the mountains anyway, some of the less expensive housing is along the river corridors. And so those people are more prone to flooding. And similarly, some of the mobile home parks that we have are also built right next to the river. And so there are

definitely environmental justice issues that exist here. But they're not visibly in front of people's faces. And so I think it's an issue that takes much more digging and much better communication to the larger community to really understand what that means for us locally.

D

Doug Parsons 42:04

What advice would you give other watershed groups, you know, especially smaller watershed groups that are looking to ramp up their adaptation work?

M

Maya Machamer 42:11

That's a good question, too, I would say to really just reach out and talk to other agencies. And even if they're bigger agencies, like the Nature Conservancy, I think, really reaching out to have those discussions initially and get feedback and ideas and do some brainstorming with people who have already, you know, decided to tackle some of this is super helpful. And I also find a lot of inspiration and a lot of support in building those relationships with people in agencies who have already done some of this work, man, I just find that like a great way to get started.

D

Doug Parsons 42:49

And you guys have your own podcast, right? We do have a podcast. Yes. Give it a plug here. Yeah,

M

Maya Machamer 42:55

we have a podcast called a wild watershed. And you can find that on our website at Boulder watershed collective.com. And we are discussing issues and ideas and that are pertinent to our watershed, but also might be an issue in other watersheds across Colorado or across the West. And so some of these are mining, Legacy mining and mining history, wildfire, ecology, all sorts of different ideas that and interviews with people and our forest program manager Nate spearheads that. And it's been a great, really fun project.

D

Doug Parsons 43:35

Cool. I'll have links to it in my show notes. Alright, Maya, this has been a pleasure talking to you. I love the boulder area and you guys are doing some innovative work and I think other organizations could learn from what you're doing. But thanks for coming on the podcast.

M

Maya Machamer 43:47

Thank you. It's been great talking with you.



**D** Doug Parsons 43:51  
Hey, adapters. Joining me is Jim Webster. Jim is the wildfire Partners Program Coordinator for Boulder County. Hi, Jim, welcome to the show.

**J** Jim Webster 43:58  
Thanks for having me.

**D** Doug Parsons 43:59  
What do you do there with Boulder County.

**J** Jim Webster 44:01  
So I coordinate our wildfire mitigation and climate adaptation effort. We help people prepare for wildfires.

**D** Doug Parsons 44:08  
Okay, so how long have you worked there? And I guess how long have you lived in that area? And how long have you worked with Boulder County,

**J** Jim Webster 44:14  
lived here about 25 years and worked for the county about 12 years.

**D** Doug Parsons 44:18  
Let's just jump in what is wildfire partners?

**J** Jim Webster 44:21  
Wildfire Partners is a program to help homeowners prepare for wildfire. We offer technical assistance and financial assistance so people prepare before a fire happens.

**D** Doug Parsons 44:33  
So you are working with individual homeowners and give us some examples of that. What does that mean? What's a typical experience for you as you're working with an individual homeowner.

J Jim Webster 44:43

So to prepare for wildfire, homeowners need to create defensible space they need to harden their homes. They need to look at their insurance coverage to make sure they're not underinsured in terms of emergency preparedness. They have to prepare to evacuate and that's fine. family members and pets to receive notifications. And to have it to go back. We also talked about working with neighbors and community members. So preparation for wildfire starts with your home and looks at your property and those risks. We look at how homes ignite, most homes ignite through embers. And so we're looking at hardening structures, so they don't ignite to reduce that ignition potential of a home. So that preparation is critical before fires, and then it also helps firefighters have a better chance of defending and saving a home if it's been mitigated in advance.

D Doug Parsons 45:37

Okay, so there's basically a checklist of things that you're doing with homeowners, but is that part of a actual certification process?

J Jim Webster 45:43

Right, so the program includes an on site assessment. So we have wildfire mitigation specialist professionals who understand the science of mitigation, so their former fire chief's former district foresters, PhD, so a wildfire mitigation specialist conducts an on site assessment with the homeowner, the homeowner actively participates in this assessment. And it really understands how to live with fire, how to prepare learns about fire behavior, and they we look at all the vulnerabilities of homes. So we go through a 50 question assessment, where we're taking pictures of the specific vulnerabilities of a home and then developing an action plan customized action plan for that specific homeowner. So during that assessment, the homeowner learns about wildfire, how to live with fire, how to repair and they end up with a report with pictures and checklist items, items that need to be mitigated vulnerabilities specific vulnerabilities of that home, and then the homeowner will work to mitigate their property to go through that checklist, whether they have one item or a dozen, no work to harden their structures, and work to create defensible space, but out of address markers so people can find the home. So they go through their mitigation items. And if they complete that checklist, we'll come back and do an inspection. And then we'll recognize that mitigation where the welfare partner certificate and a yard sign that certificate homeowners can provide to the realtors upload it to the MLS listing, if they're selling the home, they can provide it to their insurance company as proof mitigation and that yard sign out in front of their home and alerts first responders that the home has been mitigated. The yard sign comes with a sticker, like a license plate, a sticker where the date, so the date that that home was certified, and then people continue to maintain their mitigation. One key aspect of mitigation is not a one time event that requires ongoing maintenance. So we'll come back in future years to recertify. When people join wildfire partners, it's just not a one time event they join for as long as they are in their home and they'll continue to prepare their home for wildfire on a regular basis.

D Doug Parsons 47:54

Doug Parsons 48:15

I'm guessing it with a lot of homeowners it's about how proactive that particular homeowner is, is this part of your processes they have to take the initiative to reach out to you? Or is there there ways that you're reaching more homeowners who might not even think that this is out there? How do you deal with them?

J Jim Webster 48:09

Right. So we do have an application process that anybody can go online and apply for they can call our hotline and apply. So we do a lot of outreach within the community. We've been here for. This is our ninth year with over 3000 participants. So we're well known in the community with the yard signs and the neighbors the neighbors referral. But we are active on social media and traditional media. And so we're well known we have over 40 partner organizations that are supporting it state, federal agencies, local fire districts, the local hardware stores, the realtors, the insurance companies and small businesses. It's really a partnership of all members in the community helping folks prepare, we get the word out about the program in lots of different ways.

D Doug Parsons 48:52

So there's obviously very tangible benefits if they go through this list and get certified. But you'd mentioned that they can contact their own insurance companies. Have you heard that they actually get a discount or they get a reduced rate on their insurance because they've done such a thing.

J Jim Webster 49:07

So there's no discounts associated with love our partner certificate, but it does enable people to retain or obtain insurance. So it's an insurer ability issue, which is important, but there's no direct discount, but it allows people to obtain and maintain their insurance coverage.

D Doug Parsons 49:24

Okay, great. Can you tell us a bit you guys had a pretty traumatic event there recently the marshal fire how's that keeping you busy that the fires happening? There's just a tremendous amount of work post fire. What does that mean for you?

J Jim Webster 49:37

Right people when they've evacuated their home, or they have friends who've evacuated or someone who's lost their home, there's a great deal of focus within the community from neighbors helping neighbors, local media and local businesses, Boulder County. Currently with all our recent fires, people are aware of the risk associated with fire and the need to prepare in advance so we You have a very active and motivated community now. And that often happens right after a fire when it's fresh. And people are thinking about that often very traumatic event

of having to evacuate, and not knowing whether or not when they return to the home whether the home will still be standing. So there's a great deal of interest in how best to prepare for wildfire. But that's a message for everyone. Because just because the last fire was in Boulder County doesn't mean the next fire will be here as well. It could happen somewhere else. So it's a message for everyone to prepare for wildfire.

**D** Doug Parsons 50:33

Okay, so I'm sort of teeing you up here. And we've been talking about wildfire. But what would you consider if this whole episode is about climate adaptation? Colorado, what would be the most important adaptation issue in Colorado? What would you say it is

**J** Jim Webster 50:47

for us, we need to adapt and prepare for his preacher wildfires. We're seeing larger fires occurring throughout the year. And we're going to continue to see fires within Colorado as the climate warms. And so we need to prepare, learn to live with fire and adapt, Fire Adapted Colorado, we're creating fire adapted communities. And so across the state, including in Boulder County, we're working to create fire adapted communities because that's our future individuals need to learn how to adapt to fire to prepare, and local governments state. It is our future. Here in Colorado, we live in a system where fires and natural occurrence are not going to eliminate fire. So we have to learn to live with it to adapt to a new normal. We have climate driven wildfires here in the West in Colorado. So we've got to adapt to this new era of climate driven wildfires by taking action in advance.

**D** Doug Parsons 51:39

So when you're dealing with a homeowner, you're getting down into the specifics of what they can do at that individual level. But do you ever get a chance to talk about climate change and climate adaptation with the public there in Boulder?

**J** Jim Webster 51:52

Yeah, we're doing that every day. It's part of wildfire mitigation and climate adaptation and climate go hand in hand together. In our recent Marshall fire, people recognize the impact of climate had on that fire. We have high wind days drought. So we're talking about our future as today with with climate impacts and being prepared for wildfire. So wildfire partners and all our mitigation programs go hand in hand with a discussion of climate adaptation.

**D** Doug Parsons 52:19

So have you found it relatively easy, and I would imagine they're in Boulder County that the public really it's easy for them to connect the dots between what they're seeing with these wildfires and climate change.

J Jim Webster 52:29

That's certainly the case it motivates people to take action and prepare, because they've been directly impacted by these fires.

D Doug Parsons 52:38

We had a short previous discussion and you went to the National Adaptation forum in Wisconsin. That was the last one that they've held that they're going to hold another one this year in Baltimore. What topic did you not see enough of

J Jim Webster 52:51

there were very few discussions about wildfire. There was one session that I was involved in, but poster after poster speaker after speaker focused on other important climate adaptation issues, sea level rise flooding, but here in the West, one of our major concerns is wildfire. So wildfire mitigation specialists are people who are prepared for wildfire need to be brought into the adaptation space adaptation includes preparing for wildfires. They're not two separate issues. And so we need to work together across silos to build a bigger tent. So the adaptation world, and I think it will, I think future sessions will increase and have more and more wildfire professionals talking about the need to adapt and prepare for wildfire as part of climate adaptation.

D Doug Parsons 53:37

You're a very busy man, wildfires keeping you very busy there in Boulder County, what's next for you what's going to be the next six months.

J Jim Webster 53:44

So we're developing new programs to look at the need for preparing for wildfire on the plains. Historically, we've been working in forested communities, people think of forest fires as our biggest risk, but we also have grassland fires. So we have a lot of people living in grassland systems traditionally burn. So we'll be looking at how to bring wildfire preparedness into the plains. It's just not about cutting trees, a lot of people think wildfire, they think forest, we've got to cut down our forest. And we need to start with our built infrastructure and hardening structures, retrofitting structures, and that includes structures in the grassland. So we'll be looking to expand our programs that last 30 years we've been focusing on forested ecosystems, and we'll be looking at people who live in the grasslands and plains and addressing those risks as well. Well, Jim,

D Doug Parsons 54:35

thank you for coming on the podcast and thank you for what you're doing there in Boulder County. Thanks so much. Hey, adapters joining me is Laurie Hodges. Laurie is the Director of

county. Thanks so much. My, whoever joining me is Laurie Hodges. Laurie is the Director of the Office of Emergency Management for Larimer County, Colorado. Hi, Laurie, welcome to the show.

L Lori Hodges 54:51

Hi, thanks for having me. I appreciate it.

D Doug Parsons 54:52

First off, what is your specific role within the county?

L Lori Hodges 54:55

So I am the Director for emergency management as you said so I am in charge of Creating and maintaining the program for disasters and emergencies. So we do preparedness. We do a response, obviously providing assistance to those in the field. We are in charge of recovery here in the county as well as our mitigation programs.

D Doug Parsons 55:13

Tell us a little bit about the county so people can visualize where's it at how many people are in the county.

L Lori Hodges 55:19

Larimer County is in northern Colorado. So our northern border is Wyoming. And we're right in the center of Colorado as well. We have both urban and rural environments. We have both mountains and plains. So we have a very diverse county, there's about I think it's about 370,000 people, mostly in Fort Collins, Loveland, and Estes Park areas, those are three of our bigger municipalities within the county, we have a lot like I mentioned mountainous area, we have the Rocky Mountain National Park on the west side. So definitely have a lot of natural areas throughout our county as well as those urban environments.

D Doug Parsons 55:52

It really is a spectacular area. I've been there quite a few times. And yeah, it must be beautiful for you every day there.

L Lori Hodges 55:57

Yeah, it's a nice little playground.

**D** Doug Parsons 55:59

Okay, we're going to talk about some big issues right now. But then we'll get down to some specific on the ground stuff that you're doing there. But what are just some of the major climate issues that you're dealing with there at the county level?

**L** Lori Hodges 56:10

Right now, what we're dealing with is mainly the climate adaptation phase, especially in emergency management, which is how do we adapt to the different hazards that we have? Our two biggest hazards are wildfire and flooding. And as you know, both our fires and our fire seasons have gotten longer, and the fires themselves are a little bit more complex. And then we also have three major river systems going through our county. So floods are always a hazard. And we've seen with a changing climate, we've seen our rain events with much more intense rain in shorter durations that are causing flooding issues. So that's what we're dealing with in our Office of Emergency Management right now is how do we adapt to those hazards changing and what those changes mean for us with emergency and disaster management?

**D** Doug Parsons 56:55

So you recently met with some US senators to talk about wildfire. But did climate change come up in those discussions?

**L** Lori Hodges 57:02

Yes, climate change is on the minds of the representatives that we have, which is Senator Bennet, Senator Hickenlooper, and then Congressman Neguse. And they are very well aware of our changing climate, not just from the hazard perspective, but overall, but when we met, we talked about really how our wildfire season has changed drastically. And what that means for us with regard to being able to manage those fires, whether it's suppressing the fire, or whether it's recovering from that fire, because whenever you have a large scale wildfire, we almost always have flooding that follows because the ash tends to come down in in smaller rain events than normal.

**D** Doug Parsons 57:39

Alright, tell us a bit about your adaptation planning. So are you using within your office the language of climate adaptation, climate resilience? Or is it just I guess, existing languages that you're addressing those? How does that work at, I guess, the county level there?

**L** Lori Hodges 57:54

Well, in the Emergency Management realm, climate adaptation is mitigation for us. But in the climate, world, mitigation means something very different. So when I talk about mitigation, I am talking about adapting or increasing the risk overall. So that could be where we work with

our engineering department on upgrading our culverts and our bridges so that they can handle more of a water flow. It could be community events, where we're talking about chipping programs, or decreasing the amount of fuels that are in a fire area. Those are mitigation. But in the climate world, those are considered climate adaptation. So that's where our language is different. And then we also work with our we have a new climate office in Larimer County and a manager for climate efforts. And so we do work with her as well on the climate adaptation goals that the county would like to be able to implement in the next several years.

D

Doug Parsons 58:44

Does your office in particular have its own adaptation plan or you're just working with other parts of the county government on something like that,

L

Lori Hodges 58:51

or office, one of our representatives, Steve's that cater, he works in our office, he is a representative on the climate smart plan. And the I don't know if it's called the Climate Action Plan, but the planning from the county wide perspective, he's on that overall group. So he provides that input there.

D

Doug Parsons 59:05

Okay, so I want to step back again to and you've had an interesting role in some of the climate planning even at the statewide level. But let's first start off let's talk about the 2013 floods, for I was actually there when those rains start to come down. But that has been a catalyst for a lot of resilience and adaptation planning, right?

L

Lori Hodges 59:23

Correct. Yeah, within seven days, we had a year's worth of rainfall. So it was definitely an extreme event. It was targeted to certain populations in Boulder, Larimer County, we were kind of the heart of the storm, but it did impact over 17 counties because our water becomes their water. Whatever flows downhill from us, it's going to be going further east. So yeah, that event did start the conversation for some resiliency work trying to figure out how do we deal with extreme events? And how do we better mitigate or adapt to those events so that we have less risk to our public and to our infrastructure?

D

Doug Parsons 59:59

And I think A lot of other states and counties and other government entities are always interested in how things get started. And so one of the things that kind of came out of those actions is this resilience collaborative. Can you tell us a bit about what that was and what its role was?



L Lori Hodges 1:00:13

Yeah, right after the 2013 flood in that same year, we had some pretty major wildfires. And then the year before we had had the Hyde Park wildfire in Larimer County, so we had a few big disaster years. So a group of people got together older kind of started this off, where we got together to start talking about Resiliency and Recovery. And we wanted it to be a peer exchange, where the counties themselves we're working with state leaders and our federal leaders are delegation, as well as our federal delegation, to work on policy level issues, legislative issues, and planning issues regarding these disasters, so that the next time something like that happened, people would be better prepared for what might be coming. So the group started meeting, they set a bunch of overall goals. And then we really dove down into these strategies and these action items that we were able to take to our legislators, to our policy folks, and to our planners, to try to really change things for the future to make things better. And then that group continued meeting until really COVID. I think COVID is what stopped us from meeting for a while. But now there's a peer exchange because of that collaborative. The Colorado Resiliency and Recovery office was born, which is now the Colorado resiliency office. And so now they have a peer exchange that they do monthly. So it's kind of transitioned into that over the last several years.

D Doug Parsons 1:01:32

Now. You were there early on as the statewide initiative kind of got started. But you're back in Larimer County doing your work there. Is there integration? Is there a communication with what that state resilience office is doing and the work that you're doing?

L Lori Hodges 1:01:45

Yes, we have. We do a lot of resilience work in Larimer County. We started in 2015, with some new research that we had about how to build social capital, how to improve outcomes for community members. And we implemented that here in Larimer County. And through the work that we did in the collaborative, and the office creation at the state level, we've been a partner with the Colorado resiliency office really, since it started to try to build resiliency in our community, and then also to provide some input statewide on what people can do to just make their communities more safe and have less impacts overall.

D Doug Parsons 1:02:20

Okay. And you'd mentioned earlier that wildfires and flooding are two of the major issues that you're dealing with that you're adapting to people outside of Colorado, we've heard a lot about wildfires. And I know earlier on, you'd mentioned wildfires and flooding are two of the major issues that you're thinking about with climate adaptation. But what does it mean for you to be dealing, let's say with wildfires,


L Lori Hodges 1:02:39

what it means for me in my position is I work a lot with our legislature on the barriers that exist and the challenges that exist to being able to respond and recover from wildfire. So we work

and the challenges that exist to being able to respond and recover from wildfire. So we work with FEMA, but we work mainly with our legislative bodies, both at the state and the federal level, to try to make sure that they understand the impacts in the West, and how these fires are really changing our environment, and how the flooding always follows after fire. So we're really trying to get them to see a holistic approach to these disasters and emergencies, instead of seeing them as these one offs. So that's a lot of my time is spent really on that policy and legislative level to try to reduce those barriers and challenges. Otherwise, a lot of what we do is in the mitigation realm, which is climate adaptation, which is looking at how that fire has impacted the landscape overall. And now what changes do we need to make so as I mentioned before our engineering department is it went through and did an assessment of all of our culverts and our bridges. And they're in the process of upgrading those, they did that after High Park. And during the 2013. Flood, we had less impacts because of that. So that's just one action. And then we work with all of our partners, nonprofit partners, or volunteer partners, or watersheds throughout the area to help with community engagement and to get them working in the area. So that those impacts again, are lessened overall.

 **D** Doug Parsons 1:03:58

Okay, so there is a lot of public land where you live, but there's also significant private land, and how do you considered landscape approaches to adaptation? If you really aren't able to work that closely with the private landowners or are you

 **L** Lori Hodges 1:04:12

private land is a really tricky thing, because obviously, we want to respect that it's private land, when we get funding into the county, that's public funding. So it usually needs to be spent on public projects. So when we're working with the private landowners, you know, you could be going down a road and you could want to do a landscape mitigation project. And you have one homeowner who doesn't want you to do anything. And that could really impact the entire project as a whole. So we have talked with our state partners as well as our legislators about the need for more grant programs that really address landscape mitigation for wildfires where we can go across multiple different ownership levels of land, and really get a good benefit from that mitigation instead of having a parcel here and a parcel there where maybe we do some tree thinning, because in the grand scheme that it's not gonna do as much as if we can create a firebreak along a long stretch of property. So the state has a new program. It's called the coast swap program. But it's really about developing these grant programs that can go across land ownership, to really make a difference in Hazard Mitigation

 **D** Doug Parsons 1:05:18

for being relatively new. It seems like a relatively sophisticated office doing a lot of these adaptation actions. So for people listening to this people in the county level, in the city level, what sort of advice would you give them? Because a lot of places are just getting started around adaptation planning? What sort of basic advice would you give them on how to get started?

 **L** Lori Hodges 1:05:27

L Lori Hodges 1:05:57

Oh, the first thing is, don't wait till you have the disaster, because that's what always happens. That's what gets people motivated. So and it's really hard sometimes to get your policymakers to understand why you spend money now, before disaster, but you really do save taxpayer dollars if we start this work before the disaster occurs. And then you're much better suited when the disaster happens to have less of those impacts. So that would be one thing is, is to start now, but really try to craft those recommendations to policymakers to really have them see how it is a benefit both financially as well as a community wide. The other thing too, is there's a lot of emergency management programs that don't put a lot of emphasis on mitigation, or recovery. And I do think that that's a detriment to their programs, because if we aren't looking at how to minimize the risk, and when we do have those disasters, and they will come obviously, those impacts are much greater than they would be if we were able to do some mitigation work. And then the third thing is, is to really look at those partnerships. We can't do everything as a county, we're constrained by, you know, our laws that we have are constrained on private lands. So by having those partnerships, like we have with the watersheds, with nonprofit partners, like wildfire, and restoration volunteers, Team Rubicon, those types of folks, that allows us to do a lot of work in that landscape scale, project area, both on private land as well as on public lands. And then obviously, the public lands is a big piece where we have really good partnerships with US Forest Service, we don't have BLM land Bureau of Land Management, but there's a lot to do so. And then we have Rocky Mountain National Park. So having those partnerships is really key.

D Doug Parsons 1:07:11

Okay, Laurie, that is really interesting. You guys are doing some great work. I hope other counties, other cities can learn from what you're doing. And thanks for coming on the podcast.

L Lori Hodges 1:07:19

All right, thank you very much.

D Doug Parsons 1:07:22

Hey, adapters. Joining me is Jessica Olson. Jessica is executive director of the left hand watershed Center. Hi, Jessica, welcome to the podcast.

J Jessica Olson 1:07:30

Hi, thanks for having me.

D Doug Parsons 1:07:32

Let's get people grounded. First, what is the left hand watershed center?

J Jessica Olson 1:07:36

Sure, we're a nonprofit watershed coalition that works to protect and restore watersheds for people and the environment using a collaborative and science based approach. And we really do this by building resilience into our watersheds, so that we can adapt to fire flood and drought.

D Doug Parsons 1:07:54

So the left hand watershed, I'm pretty familiar with the boulder area, but how does that all work? Kind of geographically speaking, if you could describe that?

J Jessica Olson 1:08:02

Yeah, sure. So left hand watershed is in the heart of Boulder County. And it encompasses what is the larger st frame watershed. So st. Brain watershed includes left hand Creek follow the same brain, creeks and Boulder Creek, which eventually feeds into the South Platte. And we really started as the heart of our watershed being in left hand watershed, because we had a Captain Jack mine related cleanup activities in the center of that watershed. And it affected water quality throughout the entire system. So our organization was founded to remediate the mine related reclamation areas in the upper portion of the watershed. And then since then, we've really expanded to include services outside of lefthand watershed. So we work across the county doing science and collaboration related to improving watershed health for everybody that lives here.

D Doug Parsons 1:09:02

So how big is your organization? How many people on staff, we have six staff members, I want to just jump into some of the work that you're doing. And we're going to talk we're gonna have some case studies on some of the work related to flooding. But I really want to kind of set the stage here too, is how did the 2013 Floods affect what your organization is doing?

J Jessica Olson 1:09:20

Yeah, that's a great question. It was really transformative for our organization. So prior to the flood, we were pretty small nonprofit really focused on the mind related reclamation work and had only a a half time staff member. And the organization budget was only \$20,000 per year. And so when I arrived, we were really focused on the flood related recovery work. And so what that really did was provide an opportunity for our organization to grow and expand our focus. It was transformative in that way. Yeah.

D Doug Parsons 1:09:57

Did you have your own personal variance with the flood.

J Jessica Olson 1:10:01

I didn't I came from California, I've always worked in watershed planning. And I've done a lot of restoration in a variety of ecosystems, from alkali salt marshes to vernal pools to tidal marsh, wetland restoration, all the way up to the forest. And so it was exciting to move to a new place and, and really tackle the problems that we were facing here in Colorado and my new home state. In a previous conversation,

D Doug Parsons 1:10:31

you shared some of the case study work. And I want to talk about that. And people can see the images that you shared with me, but I'll have links that in my show notes, so people want to really dig around, because it's really some before and after, there's some fantastic work that you're doing. So let's talk about that. Let's talk about one of your specific projects. What are you doing there? And what are you hoping to accomplish with that with regarding flooding?

J Jessica Olson 1:10:51

Yeah, so what's exciting about the flood, just to kind of go back on one of your questions is, is that so historically, here in Colorado, our river systems were really very much focused on being a water delivery system. Because we have these what are called Working rivers, we have a really large focus on making sure that our water can be delivered effectively to our agricultural water users, as well as our municipal water users. When the flood happened, everybody in the community was suddenly very much aware of the fact that our rivers are wild. And we were able to understand what a movil fan is. So in areas where we previously had a very channelized system, suddenly they were huge depositional reaches where sediment accumulated water spread out. Unfortunately, homes were flooded, roads were washed away. But what became evident in that is that it's the river is is alive, and it needs room to be able to, to move and breathe and function appropriately. And so what we had with the flood was an opportunity to, to adapt and to rebuild our river systems in a way that can continue to provide those key water delivery systems, but also accommodate pockets where we can allow for deposition to happen, it became apparent to us where we can have these transport reaches or areas that sediment can float through like areas where we have bridges. And then these pocket areas where we can actually allow sediment to deposit. So much of our restoration work was really focused on really enhancing those areas and opportunities for sediment deposition. And one of those projects I shared with you was called our stage zero river restoration project site. So I can tell you a little bit more about that, in regards to what the benefits are, if you'd like,

D Doug Parsons 1:12:59

Yeah, let's talk about that. And I want to bring up some themes on how you do your restoration work. But let's just describe that stage zero project itself. Sure,

J Jessica Olson 1:13:08

if you're a real geomorphology nerd, there's something called a stream evolution model. And

basically, what this depicts is, it's a conceptual understanding of how a river can change over time in terms of the geomorphic conditions, where you can imagine stage zero being that kind of initial stage prior to disturbance, where we have a multi threaded channel. And then you can imagine there's very, there's a numerous stages that go from the multi threaded channel to a single threaded channel. And so what we're trying to do with frustration is, is actually try to restore it back to that stage zero, with the context of the future conditions that we know we have in the fact that we have these land use changes that have altered our system forever. But what's exciting about the stage zero restoration is that scientists know that there's ecological and resilience benefits to that type of restoration. And so we set up this project actually as an experiment, comparing it to a more traditional, single thread restoration site that was just downstream. And we've been collecting data with our scientists to understand the actual benefits and in terms of the ecological benefits and the resilience benefits, so that we can see if we're able to improve our adaption to flood fire and drought. So those benefits include kind of increasing the connection to groundwater. So because we have a multi threaded channel, we're able to connect to groundwater a bit more easily, which kind of allows some benefits of if a fire were to come through which which happens seemingly every year. This can actually help slow down the fire, but it also provides this connectivity to the floodplain which allows more access during a flood event. We know that there's also versity of habitats and species that come along with that, and versus a single threat child that just has kind of a very uniform form. And then we also know that it reduces downstream maintenance activities for our water users. So because we're trapping sediment in these areas, we're able to provide cleaner water downstream. And so we we actually test the sediment in stream sediment that's within the water column to see if that is improving. Lastly, it protects communities in that we're providing these spaces for flood and deposition to happen upstream of infrastructure upstream of homes, which increases that community protection element.

D

Doug Parsons 1:15:41

Okay, we in a previous conversation, I thought this is really interesting. And I'm sure it's it with an ecological restoration literature. But this notion of restoring to a future condition, typically you think, Oh, well, we want to restore it to a historic condition. But that really isn't possible anymore. What do you mean by restoring to a future condition?

J

Jessica Olson 1:15:56

Yeah, so that's what's so exciting about restoration is that it's getting a new definition. And we really have so folks like Richard Hobbs, and Katie, suiting here at CU Boulder, they really use this notion of restoring to the future because we can no longer restored back to a historic point in time, because it's, it's actually not appropriate. We have new climatic conditions that we're we're working with them. We also know that land use changes have really altered our entire ecosystem. For example, left hand Creek prior to European colonization, would have been a seasonal Creek, so it wouldn't even run year round. And the fact that we actually take water from the same brain and put it into the left chain and creek for water users, is because of a historic water law case. And so the conditions that are have changed forever, and we're working within an entirely different system than we have previously.

D

Doug Parsons 1:16:57

So there's a lot of interest in recruiting beavers to play a role in river restoration or even wildfire management. And you're not necessarily doing the beaver relocation. But beavers do influence what you're doing there, right?

J Jessica Olson 1:17:13

Yeah, yeah, there they do. It's an area, this area in Legend Creek was historically did have beavers prior to the flood. And what we do is actually we sort of recreate what's called a beaver dam analog, which allows for this sort of ponding effect that a beaver would create as well. And so we know that these beavers are these amazing ecosystem engineers that allow that can sort of create these ponding systems reconnect to the, to the groundwater and allow for water spread out and allow for this ecological geomorphic complexity, what we're doing is we're kind of acting as the beavers and creating these ponds in a variety of places within this landscape. And so it really helps to build that resilience into our system. Additionally, we created an off channel pond for a native species, because in Colorado, here, we have primarily non native trout species that are in our stream systems. And those actually eat the the species that are the native species, which are plains top, middle and Red Belly darters. And so what we have to do is create these off channel plans to allow for some of that habitat to exist. And what's interesting with climate change, we're seeing the thermal band shifting up into the mountains. And so previously, the red bellied geese in the plains top minnows, ideal habitat would have been more in the plains environment. And so what we're what the scientists are saying is, we need to actually create that habitat in these transition areas to accommodate the species and with thermal bands shifting up the mountain. So that is something we incorporated in this project as well.

D Doug Parsons 1:18:58

Alright, I want to pivot a little bit here. And I want to talk about climate adaptation. And so is this something that is just sort of a project area or it's a focus area for your organization? Or is it something that's it's bigger? How do you, I guess, see yourselves as doing climate adaptation work?

J Jessica Olson 1:19:14

Yeah, I think this is a common this is a theme throughout all of our work in that we're really trying to develop a proactive response to our changing climate and the increase of flood fire and drought. And so what that means, like, for example, when you think about the mega fires we've been having, these are happening on such a huge scale, that we have to be able to match the scale of our solutions to the scale of the problem. So what that looks like on the ground is we're developing these landscapes scale forest restoration plans that cross boundaries and are larger than anybody's ever seen in the intermountain west. And it's an exciting place to be in that, we're also seeing our funders understand that that's what has to happen. And they're adapting the funding resources, so that we're able to actually accomplish this from using federal funding, state funding and funding from our local governments. So they're all understanding that we have to scale up this restoration solution in order to tackle this climate change problem in this increase of fires that we're having on a very large scale.

**D** Doug Parsons 1:20:33

Now, you don't necessarily have a large staff there. But do you find that you need all your staff members to be conversant or actually have some skills in the area of adaptation?

**J** Jessica Olson 1:20:43

Yeah, so we have a staff of scientists, and every day, we are talking about these challenges and opportunities. It's an exciting field to be in. And we really, you know, focus on hiring folks that have a very solid science background. So we have everybody has master's degrees, or PhDs in ecology, or in related watershed science, watershed planning fields,

**D** Doug Parsons 1:21:09

let's say, well, you're hiring someone, though, will you look for that specific experience, sort of understanding adaptation? Or if you just feel that they've got a science background, that they're gonna have their own kind of previous exposure? Because I guess what I'm getting at too, is a lot of organizations just might hire. So you're the adaptation person, but they're not they might not be integrating it sort of organizationally, and do find that the people just pick it up as you bring them on? Or do you see that look for that experience?

**J** Jessica Olson 1:21:33

We do look for the experience. And I think having an aptitude for understanding the latest science, is it something that we're we really strongly look for. So for example, our recent forest program manager hire really had a strong understanding of how climate is changing the upper elevation mountain areas. And that's what she's studying for her thesis, another PhD candidate we just hired, he understands how disturbance and fragmentation affects our systems on a landscape scale. And he can understand what that means in terms of the climate changing. So it's, it's definitely a theme that runs through the course of our work and as really a critical component to to having, you know, competent staff that can know what to look for in terms of the literature and have the aptitude to learn and identify solutions as we go.

**D** Doug Parsons 1:22:34

Do you feel as an organization that you work with the state, the state in Colorado is more recently doing adaptation? There's an office of resiliency? And is it a group that you're partnering with? Or it's since your watershed focused? I mean, are you able to integrate with what's going on more broadly, in adaptation around the state?

**J** Jessica Olson 1:22:54

Yes, I think so. So we primarily work with the Colorado Water Conservation Board, and with Chris Sturm, who's running that program, and he's been really proactive, and in developing new solutions for our watersheds, including what he's calling fire ready watersheds. And so he's



thinking about things in terms of a landscape scale, as we have increasing fires, how can we prepare our watersheds to be able to become resilient and allow for clean water to, you know, continue to occur for communities. And so he's really focusing on funding these projects that like I just described, where we can have sediment capture happen in these critical places upstream of infrastructure, and allow for fires to slow down using these beaver dam and alarms and allowing for geomorphic processes to occur, the areas that are really critical in the headwaters, and in the middle portions of our watershed prior to getting to the infrastructure. So we're seeing that in terms of the funding selections that he's making in terms of the technical assistance that they're providing. And it's been super helpful.

D

Doug Parsons 1:24:07

Okay, my listeners want to learn more about what you're doing or even want to reach out to you because they want to learn about what you're doing there. What would you recommend?

J

Jessica Olson 1:24:14

Oh, yeah, for sure, they can contact me directly, you can jump on our website and join the mailing list. That's watershed dot center. Very easy. And, you know, we're always happy to invite folks to participate in our activities. We have educational workshops around forest restoration with many of those opportunities right now. We also have some stewardship activities, Earth Day event coming up. So lots of ways to engage.

D

Doug Parsons 1:24:42

Just got it was a pleasure chatting with you, and really interesting work that you're doing there. And thanks for all that you're doing. Yeah,

J

Jessica Olson 1:24:47

thank you all for the opportunity.

D

Doug Parsons 1:24:54

Hi, and welcome back. Well, we just heard from some of the local efforts at adaptation planning and I wanted to wrap things up with View. So what are some recent legislative actions related to resilience happening in Colorado? Well, we

A

Ann Miller 1:25:05

just ended our state legislative session recently. And couple that I'll highlight that our office will be working on is a disaster rebuild the resilient rebuilding effort, and a bill that passed that has a lot of components. But one of them, our agency will be working on a resilient rebuild grant and loan program. So we're excited about that and feel like that's pretty unique. And when

another bill that passed was around creating a resilient microbead program in rural Colorado, so it's almost a pilot program. With that. We'll also be partnering with the Colorado Energy Office on a grid resiliency roadmap initiative to to get a better understanding of what are the needs across Colorado for grid resiliency and reliability and disruptions. So those are just a few. But there are so many other adaptation efforts and bills across different agencies as well.

**D** Doug Parsons 1:26:10

Do you get to stay connected with other adaptation efforts in other states? Or maybe the federal government is doing something? How do you do? Are you really just focused on Colorado? How do you kind of keep your finger and learning from other areas,

**A** Ann Miller 1:26:23

we do a lot of networking nationally. And some examples are the US climate Alliance resiliency Working Group and that's with different state agencies doing this work. So it's really helpful to learn from each other George Town Climate Center is also they have a state resiliency policy group, American Society of adaptation professionals, the American Planning Association, they have a natural hazards and disaster recovery division and a sustainable communities division. So we do a lot of networking. And because Colorado was out there in front, in terms of resiliency and creating a resiliency office, we do a lot of speaking with groups to share the lessons learned and are on efforts in other places. Okay,

**D** Doug Parsons 1:27:13

so related to that, let's say your local community, a local city in Colorado, and you want it to ramp up your resilience efforts. What advice would you give them to get started?

**A** Ann Miller 1:27:22

Well, we would point them to our CCO resiliency.com website and point out the toolkits we have there that are meant to help guide them step by step through the process, whether they want to do pre disaster recovery plans, a resilience plan or a post disaster recovery planning process. So we've got a lot of toolkits there. We also provide technical assistance, so we would be able to perhaps hold some workshops, provide them some advice and guidance and getting started and connect them to resources.

**D** Doug Parsons 1:27:58

Okay, great. In a previous conversation, you said, Don't let disasters drive your adaptation response. What did you mean by this?

**A** Ann Miller 1:28:06

Yeah, you don't have to wait for a disaster to get started on resiliency planning. In fact, it's much more resilient if you're anticipating what your risk of vulnerabilities are now and planning for different scenarios for the future.

D

Doug Parsons 1:28:22

And so for those who want to get into the opticians basically want to become an adaptation professional in Colorado and even potentially your office. Let's say you expand what educational professional background, I have younger listeners to what would you recommend they pursue to be in a position that they could get a job in your office? Well, it's

A

Ann Miller 1:28:40

interesting, we have quite a variety of backgrounds amongst our staff team now, from Urban Planning and Policy, from public health, emergency management and natural resources, because resiliency is systems work and looking at the interconnections about communities being prepared for disruptions and being able to adapt and thrive. That really, it is about having a kind of systems holistic background and problem solving skills and some creativity. So it's there's not one size that prepares you for this work.

D

Doug Parsons 1:29:24

All right, yeah. That's a great message. Okay, last question. What's your favorite spot in Colorado and why?

A

Ann Miller 1:29:32

Oh, my. Well, I'll focus on one that I'm going to actually this weekend and that's Glenwood Springs. So Glenwood Springs has some lovely hot springs hiking. I am a little nervous though, because one of those fires that I talked about in 2020 is in the canyon, Glenwood Canyon and they are experiencing some post fire debris Floyd read Stan is supposed to rain this weekend. So anyway, but it nonetheless is a beautiful area of Colorado. And there's so many it's so hard to choose. But I that came to mind since I am heading that way

D

Doug Parsons 1:30:10

soon. All right, fantastic. And thanks for contributing to this episode. I hope people have learned a ton about what's going on in Colorado. You guys are just doing innovative work there. Thanks for coming on the podcast. Thank you Okay, adapters, that is a wrap. Thanks to all my expert guests for joining me on the podcast and sharing their stories. As you heard, Colorado has responded to the 2013 floods and then some I really enjoyed hearing how groups and government agencies were bringing adaptation into their strategic planning as they shared, they didn't have some previous knowledge on the best way to do this lots of trial and error and learning what works best for their communities. And Miller in the Colorado office of resiliency is doing some amazing work with obviously limited staff. I think the demands on her office are

going to increase exponentially in the years ahead. On the one hand, they need to be a resource for local communities in Colorado, but there's also need to help other Colorado State agencies get their head around adaptation planning. Each state agency shouldn't just wing it. They should learn from the experiences of those who've been doing it for a while. And I really found it fascinating. Those who thought wildfire was the biggest climate related threat. And those who thought flooding was Colorado has been in the news of late due to an unusual wildfire season. Well, seasons in the catastrophic Marshal fire last winter, it looks like there are opportunities for wildfire mitigation through effective flood control. Hopefully those who work on either issue will coordinate their efforts. This was an unusual episode for me. The sponsors gave me significant leeway on what story I should tell it needed to focus on Colorado where the foundation is based. But that was it. Typically for sponsored episodes, a sponsor has specific content they want covered and most of the guests they would like me to interview. In this episode, I could do anything with Colorado as the theme. So I spent some time figuring out the adaptation space in Colorado, I have connected with people from all over the world with his podcast, but I didn't actually have many Colorado connections. So I spent a couple of months connecting and chatting with experts there and getting a sense of what story I might want to cover. What kept coming up where those 2013 floods and seeing that direct line between those floods and the creation of the Colorado office of resiliency felt like a great storyline to cover at the beginning I was leaning more toward an academic approach. But after a few conversations, I was able to find a narrative with on the ground practitioners that would do the Rocky Mountain State justice. Needless to say, I just scratched the surface. I didn't get to connect with people on the western side of the state. bolter was well represented in this episode because Boulder has and is always doing amazing work, and others can learn from their proactive experiences. I love boulder. I couldn't have done this episode without the brainstorming supportive and Miller, who you heard from in this episode. Also want to thank Megan Holcomb, who was there connected me at the very beginning. And thanks to Gary Safa Khan from Boulder County for brainstorming with me, he was the source of most of my guests in this episode. Thanks, Gary. Again, this episode would not have been possible without the generous support of the Genesee foundation. I greatly appreciate the foundation support to tell these amazing stories of Colorado adaptation. Thank you. On that note, what's your climate adaptation story? Do people that you engage with understand what it is climate adaptation? Are you finding that webinars and white papers really aren't resonating in ways that promote your work? Well consider telling your story and podcast. If you're interested in highlighting your adaptation story, consider sponsoring a whole episode of America daps sponsoring podcast allows you to focus on the work you're doing and sharing with climate professionals from around the world. I go on location record the sponsored podcast which allows you a wider diversity of guests to participate you will work with me to identify these experts that represent the amazing work that you're doing. Some of my partners in this process have been NRDC University of Pennsylvania, Wharton, Harvard World Wildlife Fund, UCLA, and some corporate clients, it's a chance to share your story with all my listeners who represent the most influential people in the adaptation space. Most projects have communications written to them consider budgeting in a podcast, you have a grant, you have a communication budget, consider a podcast podcasts have a long shelf life, much more so than a white paper or conference presentation. Many groups work into their communication strategies. This episode was funded by a foundation. If you work for foundation, maybe you want to highlight the adaptation and resilient work of your foundation or the grantees that you're funding. There is no better platform than this podcast to get the word out on adaptation to some of the most influential and active adaptation professionals in the world. I stand by that statement. Previous sponsors have used the podcast to communicate with their own members, board members and even funders. My previous sponsors have found the process actually pretty fun since there's a lot of creativity involved. Putting a podcast together is a lot more exciting and satisfying than putting

a paper together. Please reach out. Let's have a conversation so you can learn more. And I love hearing from you. I mean it just say hi, let me know what you thought of the episode and maybe you have ideas for future episodes. It is the highlight of my week here. learning from you. I'd like to know what you guys are up to how you work in the space. I'm at America dabs@gmail.com Send me an email. Please take the time to do it. All right adapters Keep up the great work. I'll see you next time.