

**Water, Under Pressure: The Uncertain Future of Colorado's Most Valuable Resource
Episode 5: "Searching for Solutions"
Presented by the Institute for Science & Policy at the Denver Museum of Nature &
Science along with House of Pod**

Sounds: water splashing and children playing

KRISTAN UHLENBROCK (narration): It's June 2022. My bare feet are sinking into cool, wet sand. I'm standing in a shallow creek. It's wide and meanders like a ribbon along the base of the largest sand dunes in North America. If the San Luis Valley has a crown jewel, these mounds of sand are it.

KRISTAN (on scene): It looks like a beach, tucked up against the Saharan desert, tucked up against a set of 14,000 snowcapped peaks. Kids digging into the sand, building sand castles. Someone with a boogie board. Lots of laughter people sunbathing.

KRISTAN (narration): I stop to talk to two middle schoolers who are here on vacation.

KRISTAN (on scene): How would you describe it? What do you see around you?

CHILD 1: It just looks like a big vat of sand that just kind of appeared like magically. And then there's like a little valley next to it. It's kind of weird.

CHILD 2: Like around, it's just mountains. All that like, it's Colorado. And then there's sand. It doesn't feel like Colorado

KRISTAN (narration): The Great Sand Dunes National Park is an anomaly.

ANDREW VALDEZ: All of North America is basically moving towards the west, because the Atlantic Ocean is opening up. So we're moving away from Europe, at about a centimeter per year. But in the San Luis Valley, the western half moves one to two millimeters faster towards the west than the eastern half.

KRISTAN (narration): This is Andrew Valdez, the resident geologist for the National Park.

ANDREW: I've been here for close to 30 years, it's a very fun place to work. Because it's an ever-changing resource, and lots of interesting issues to work on.

KRISTAN (narration): Andrew has been in the Valley his entire life. He is a quintessential geologist.

ANDREW: I grew up around the mountains and, I was always curious about how they formed. And whenever we do activities, like fishing, like I'd get bored, and start busting

rocks looking for crystals. So I think I was just naturally suited to be a geologist. The earth is a very interesting place.

KRISTAN (narration): As he describes how the San Luis Valley was formed, I find myself more and more in awe. These are truly exceptional conditions. As one side of the valley moves west. The other side is resisting ever so slightly.

ANDREW: Pretty much the entire valley and all the landforms surrounding it, are the result of rifting. And rifting is a geologic process for the Earth's crust is breaking apart.

KRISTAN (narration): Andrew explains that the rift between the mountain ranges created a giant V, which became Lake Alamosa millions of years ago. Eventually, the Lake overflowed and sediments, including the bluish clay material we looked at in Heather's office, trapped groundwater and helped create the aquifer system. At around the same time, the wind and the water flowing down from the mountains began moving sand.

ANDREW: So we think there's been a dune environment here for, you know, close to 400,000 years. But the dunes you see today, you know, aren't 400,000 years old, because that sand is 400 feet below the surface. People typically think of dunes, you know, just have wind being important dunes, but in this case, water plays a very important role. It's streamflow that brings the sandy material from the surrounding mountains out into the center of the valley.

KRISTAN (narration): This unique confluence of water, sand, and topography is how and why the sand dunes exist. In 1932, President Hoover designated the area as a national monument. Then in the 1990s – as trans-basin water diversions became a strong possibility – local communities advocated for greater protection. Proposals for transporting and diverting water ended up in Colorado Supreme Court. And San Luis Valley residents helped to facilitate a sale of the Baca Ranch to the Department of the Interior, ensuring that water rights for the park would be protected. In 2004, the Great Sand Dunes National Park was created.

ANDREW: The National Park Service is fortunate enough to have in stream flow rights on many of the streams within the park. And so these are a non-consumptive water right. And basically, it just, it just protects natural flow in the stream. So it's a water right that prevents other people from coming to claim the water and remove the water from the stream.

KRISTAN (narration): The Park presents a unique situation for any water transfers in this part of the Valley. While there has always been some tension between federal versus state versus local control. Ultimately that federal designation will trump any state law. So for any future trans-basin diversions, they would have to prove it wouldn't harm the Park's water rights.

Sometimes, water issues in Colorado feel insurmountable. To some, there isn't enough water. To others, it feels like certain regions are hoarding it. Urban areas are pitted against farmers. Laws that were created over a century ago are meant to help discern what is fair, beneficial, and right. But they don't necessarily take into account many aspects of our life in the 21st century, from climate change to significant population growth.

The current legal system of prior appropriation ends up being a complicated web of water rights. Some think the law is working like it should, while others think it's inadequate to adapt to our current pressures and values. And yet, these pressures are causing people to change their behaviors. Farmers are switching from barley to potatoes. Community members are advocating for conservation. Housing developers are building homes around low-water technology. Green lawns are becoming a thing of the past.

In this series, we've investigated these pressures, and how they shape the management of water in Colorado. But where do we go from here? And how do we change the relationship we've had with water historically, to better reflect the realities of our future? Because we should all care about where our water comes from, where it goes, what it's used for, and the true cost to use it.

*Sounds: Theme Music
Flowing through San Luis
Water in our veins
The lifeblood of our culture
Aquaifers and rains*

KRISTAN (narration): My name is Kristan Uhlenbrock. And from the Institute for Science and Policy, this is our final episode of Water, Under Pressure.

*Sounds: Theme music continues
We are all Colorado
Our future to choose
With water on the table
There's so much to lose*

KRISTAN (narration): In 2021, when COVID relief funds were deposited into state and local coffers, Douglas County, a fast-growing part of the Denver metro area, had to decide how to spend that money. One of their top priorities: water. They considered the RWR proposal, and after many months of discussions and community meetings and expert testimony, the county commissioners voted on the proposal. 2-1 against it. The reasons are myriad. One major hurdle is that the proposal is on a shaky legal foundation.

KEVIN REIN: Water court is a very interesting aspect of what we do with water in Colorado.

KRISTAN (narration): This is Kevin Rein, the State Engineer for the Colorado Division of Water Resources. He spends a lot of time in water court. His job is to make sure people are in compliance with all the laws and regulations.

KEVIN: We didn't have actual dedicated water courts until 1969. Those courts were formed through the Water Right Determination and Administration Act.

KRISTAN (narration): He spends a lot of time in water court.

KEVIN: There's a water court in each of our seven water divisions specifically in Greeley, Pueblo, Alamosa, Durango, Montrose, Glenwood Springs and Steamboat Springs where the seven major river systems are.

KRISTAN (narration): The courts have district judges appointed by the Supreme Court. And this is where the rubber meets the road when it comes to water transactions and decisions.

KEVIN: Practically speaking, the role that water court serves to a large degree for water rights is decreeing a water right. It is a document or a statement from a court that validates the ownership of water right, and the priority date and the uses and the amounts. -

KRISTAN (narration): The courts are also where conflicts surface. When the Douglas County legal counsel reviewed the RWR proposal, some of the biggest concerns were that it would not make it through water court.

CLEAVE SIMPSON: There are at least 26 flaws, some of them very fatal flaws that they're going to have to overcome before Douglas County pursues it,

KRISTAN (narration): This is Cleave Simpson, Colorado State Senator and general manager for the Rio Grande Water Conservation District in the Valley.

CLEAVE: But it sounded like the commissioners were willing to invest time, resources and staff to work with the proponents to see if they couldn't close that gap and reduce some of those barriers and fatal flaws. So more to come.

KRISTAN (narration): New trans-basin water diversions aren't as common in recent years. Because water is in short supply across the state and both basins need to consider the move a "win-win." That means Douglas County would need to be fully onboard. And the people of the Valley would need to support the deal as well. That's currently not the case. At least, not right now.

CLEAVE: But it's not going away. The kind of money you're talking about in this space is just phenomenal. And a lot of my motivation to run for office, not, not singularly, but a

lot of what drove me was water and how this state, not just this basin, but this state deals with, again, declining supplies, and exponentially growing demand and the value, the monetary value of water is just going to continue to skyrocket. And it'll put more and more pressure on the Rio Grande basin, the Colorado River, the Arkansas, the South Platte, we're all going to feel this. And we need to be very thoughtful and engaged about, you know how this unfolds over the next 20 years.

KRISTAN (narration): Although the RWR proposal was voted down, as of September 2022, the Douglas County Commissioners and RWR were discussing the proposal behind closed doors. And RWR is still looking to purchase more water rights in the Valley. As for Douglas County, they still intend to use their COVID relief funds to secure water for their residents. And what seems like the most likely is support for the proposal from Parker Water, which we learned about last episode.

Sounds: click from computer and Ron Redd, "The original plan was the traditional - buy the farms, dry them up, and bring the water in.... but we started hearing and listening to the farmers out there and what best works for them."

KRISTAN (narration): So between the water courts upholding the law. The Colorado Water Plan which is currently in the process of a major update. And more avenues for communities to have a voice in water decisions, it seems as though there are important checks and balances on how we use water in this state. But some contend that our existing rules and systems need even more of an update. Because going through water court is expensive and time-consuming. And if we actually want to improve our water shortage, we need to be focusing on the root issues. How we value it. How we want to innovate around it. And how we plan for the future. A future with greater population pressure and climate change.

BRAD UDALL: We all have a responsibility to figure out how to get these greenhouse gas emissions down. And it just been disturbing to me how many people in the water community won't make this connection, won't talk about dealing with or pleading with higher level decision makers at the federal government level at the state level, to do something about the core cause of these major problems.

KRISTAN (narration): This is Brad Udall, a senior water and climate scientist for Colorado State University. We heard from him in an earlier episode.

Sounds: click from computer and Brad Udall, "We're right now in a place where 19th Century Water Law is in a direct collision with 20th Century infrastructure and 21st Century population growth and climate change."

KRISTAN (narration): Brad says he made a promise to not give any more water talks without addressing climate change.

BRAD: The reasons why warming causes flow loss, is it's warmer on any given day, the growing seasons are longer so earlier springs, later falls. You have an atmosphere that can hold more moisture in there as sort of supportive of, of sucking up more moisture, plants need to use more because it's warmer and more evaporation occurs from a water body.

KRISTAN (narration): All of these impacts are to be expected with a changing climate. But it's not as simple as *just* warming...

BRAD: The whole precipitation regime has shifted downward. And if you want to get worried about climate change, reducing river flows, it's one thing to worry about higher temperatures which sort of nickel and dime away water supplies, it's a whole other deal to talk about these precipitation declines, which are a direct hit at River flows. If you want to ask me which one worries me the most, it's these precipitation declines.

KRISTAN (narration): This is why Brad is ringing the alarm on climate change. Because we're feeling the effects today, not to mention the significant amount of warming baked into the system for years to come. So I asked Brad if there *are* adaptations or solutions to help with the situation *now*.

BRAD: The State of Colorado and other states actually fund quite a bit of cloud seeding.

KRISTAN (narration): Cloud seeding is something that I hear brought up in response to the precipitation challenge Brad was describing. In essence, it's putting particles, like silver iodide, into the atmosphere, which creates the conditions for freezing water vapor to easily attach to them. Stimulating clouds to produce snow. Colorado has had a program since the 1970s. But Brad doesn't see it as a silver bullet solution.

BRAD: The problem with cloud seeding is you actually have to have moisture in clouds to have it even have a chance of success. So if you have, you know, a dry winter, cloud seeding ain't gonna do you any good. It can work but it's going to nibble at the edges. It's like many of these solutions where, you know, maybe they are 2% solution or 3% solution. You know, cheap by all means do it. But don't think that it's going to save the day.

KRISTAN (narration): What Brad thinks is a more fitting solution to the problem is to reevaluate our relationship to water, in light of climate change.

BRAD: The Australians in 2000 had a really big drought. It lasted about 2010. They called it their Millennium drought. Some of us have borrowed that term here in the American West. Our Millennium drought continues now at 23 years. And the Australians rethought their whole water system. And they actually came up with this new set of priorities for how water should be used. And what they said was, first important use of

water is critical human water needs. The second use is the environment. And then the third use is everything else, which includes ag and whatever.

And, you know, we're at the process now, where I think there is a possibility to sort of rethink the order of values, and how we want to use water, maybe that's the order we come up with, I don't know. But I think we have this opportunity to rethink. And so we should completely embrace it and use it because they don't come along very long, right.

KRISTAN (narration): Brad cautions us to not to rely on the way things have always been done. Because that hasn't been working. So we should value water based on today's pressures and demands.

KRISTAN (narration): Even if policy doesn't lead to a change, a decreasing water supply will force it.

CLEAVE: The water supplies here, I think are gonna get tighter and tighter.

KRISTAN (narration): I'm visiting with Cleave at his farm.

CLEAVE: I don't know that I can keep doing what I've been doing forever. And it's that definition of insanity. You know, I can do the same thing over and over again and expect a different result. Farmers including me are notorious for "next year is going to be better next year, it'd be better." But the track record is it's not.

KRISTAN (narration): Cleave's water rights *should* mean that he receives water through July 4th. But now, they barely get him to June. When there isn't enough water, people with more junior water rights don't receive their full allotment. So he's looking for ways to maximize his water.

CLEAVE: My irrigation systems I've invested in upgrades in efficiencies and the center pivot sprinklers are much more efficient, or much more efficient than flood irrigation.

KRISTAN (narration): Sometimes farmers are making big investments to reduce their water consumption, like overhauling their irrigation. Other times it's smaller things like sprinkler nozzles that can be controlled by your phone and turned off when the winds are too high.

CLEAVE: The list just goes on and on about, you know, finding gains in efficiency to help with that. But that's the water security and the imbalance here is not going to be solved by efficiencies, I think it's part of the equation, the other part is different crop types.

I'm always looking for an alternative. And I actually have a field 50 acres this year of hemp, but hemp for fiber, not for the CBD oil that everybody's been chasing for the last five or six years, this is a first attempt, I have a contract to raise it and grow it, cut it and

bale it and deliver it to a to a vendor here locally that has a decortication machine to turn it into fiber and he has contracts to deliver fiber and heard. So I'm always hopeful there's an alternative to what I've been doing.

KRISTAN (narration): Cleave tells me that if he had the capital, he'd maybe consider investing in vertical farming or greenhouses. Not only is he thinking about what he grows but how he grows it.

CLEAVE: Do you ever reach that point that goes, I can probably be more profitable on 50 acres than I am on 300. I have an abundance of land. And I have water, but limited water and start trying to think about, again, transforming. That's again, hard to imagine, but I think we're being pushed into some sort of transformation.

KRISTAN (narration): To Cleave, the writing is on the wall.

CLEAVE: You can't argue that it's getting drier here.

KRISTAN (narration): So he's trying to come up with new ideas to help *others* change their practices too.

CLEAVE: What if I could convince other folks which is really where this conversation started. What if I could go to you as a producer and say, particularly in the aquifer circumstance, you've got, more than 10 years now of metered withdrawals, we know how much you've withdrawn over the 10 years. What if you agree, if you got compensated for it at the right amount, would you agree to limit it to 50%?

KRISTAN (narration): Cleave's idea is to establish a matrix where the health of the aquifer is mapped alongside a farmer's historical use of water. So if the water supply is low, then farmers couldn't pump as much. And, *importantly*, they should be compensated for that reduction.

CLEAVE: And that's where I would like to get to some point in time is being able, where do you find funding to help producers survive when things get really tight, because short of doing that, right now we pay people to fallow to just not produce.

KRISTAN (narration): So what does innovation look like here in the Valley? Where farmers still farm, but water is used sustainably. Where there is balance? Cleave sees a world where things need to change but is worried it's not enough.

CLEAVE: Even I'm not transformational, I think about trying little things. But it's interesting, again, the academia folks, I talk to them about are we reaching that point where it's either transformational change, or this just ceases to exist.

KRISTAN (narration): Conserving water can be difficult because of the "use it or lose it" system. But to get to a sustainable water supply, farmers conserving water seems

essential. And while there are programs out there to support farmers by compensating them and making it temporary and voluntary to conserve, they don't seem to be at scale enough to be that transformational change that Cleave is talking about. In addition to conservation, there are others who are working to make every drop count, including how we care for the water in our rivers.

Sounds: Birds chirping

EMMA REESOR: we really work hard to make the water go as far as it can in the San Luis Valley, because it affects everyone and everyone depends on it.

KRISTAN (narration): This is Emma Reesor, the Executive Director of the Rio Grande Headwaters Restoration Project. We're staring down at the Rio Grande River as it winds its way towards the town of Alamosa.

EMMA: Where we're standing here, there was a sheer-cut bank, 12 foot drop, where there was no vegetation. And every year, the river would erode that bank, and lots of dirt and sediment would be added to the river system. And that impacts water quality. So all that sediment going into the river is not good for fish, but it also impacts the downstream geomorphology of the river.

KRISTAN (narration): For the past 20 years, the restoration project has been shoring up the river bank, planting vegetation, and finding ways for the river to reclaim its natural path.

EMMA: There was a recognition in the 1990s that the river wasn't functioning as it had historically.

KRISTAN (narration): The farmers, ranchers, and water districts sponsored a study to look at the river in a section that had been heavily impacted by human development and agriculture. The result was a list of recommendations to not just manage the river, but improve it.

EMMA: If you have a healthy and functioning ecosystem, the best thing you can do is to conserve it. That's absolutely critical. And so the conservation work that's been done in the valley is, is so important to the health of the river, where restoration comes in is when the system has been degraded. And there's a need for to restore ecosystem function and habitat. And so they really go hand in hand here.

KRISTAN (narration): Emma points out places all along the river where restoration work has been completed. New grasses and plants dot shorelines, holding new sedimentation in place. We discuss her vision for the future. And it's not too far off from what Cleave described.

EMMA: Like the ideal future and 25 years is we have, we still have a dynamic and thriving agricultural economy. Maybe it's not as big, there's maybe there's not as many acres in production, but there's more value added crops or, or a diversity of crops that maybe we haven't explored. And then within our communities we have river access is something that is accessible to everyone. And that there's infrastructure to support that, that people continue to, to love the river and grow to love it even more and, and really come around to supporting it. And I think we're well on the way to doing that. And I really see the future is as bright as long as we continue to, to work together and, and find those opportunities for partnership.

KRISTAN (narration): Ideas abound for how to manage this dwindling vital resource – whether it's restoring a river or adopting a new innovation in agriculture or updating our legal frameworks. And if we can put all these solutions on the table and do so in a way that brings people into the discussions and bridges divides, then it seems as though we can make some progress towards a future that works for the greatest amount of people, the economy, the environment, and our water.

KRISTAN (narration): In 1852, Hispanic settlers hand-dug a ditch off of a tributary of the Rio Grande River to feed their new compound of homes. And this ditch, the San Luis People's Ditch, which became Colorado's first water right. These ditches are commonly called acequias. But acequias in the Valley are more than just ditches, they are a different way of governing water.

Sounds: Water flowing

CINDY MEDINA: So it's a gravity fed ditch, that it's little canals. It's like a canals that carry water from the mountains and the rains and it goes to the fields and the orchards and the gardens here in the San Luis Valley.

KRISTAN (narration): This is Cindy Medina, we spoke with her earlier in the series.

Sounds: click from computer and Cindy Medina, "Water is our liquid gold. And it's becoming more and more so."

KRISTAN (narration): She's a fourth-generation resident of the Valley. She's also a Waterkeeper, which makes her part of a global network of advocates working on protecting local watersheds.

CINDY: It's an ancient, it's very ancient, it's at least 400 years old and older.

KRISTAN (narration): She's telling me about the history of acequias.

CINDY: The Moors took it to Spain, Spain took it to the Spaniards took it to Mexico. And of course, it came up to northern Mexico, which is Colorado now. And it's just a dirt ditch, you look at it. And it's a dirt, dirt ditch that just flows. It's just gravity flow, and it just moves right along. And most of them are the same size, like the one that's around my house, maybe five to six feet wide.

KRISTAN (narration): Like her family before her, Cindy helps manage the acequia that runs past her house. And she must do so through a community mindset and work with her neighbors.

CINDY: Everybody, if they want to, they can come to the meetings, they can have the say, if something isn't working properly, they can call the ditch rider and say, I did not get my water, I don't know what's going on. So everybody has a voice. And so that's, again, it goes back as working as a community to get the acequia ready for the water.

KRISTAN (narration): There are even some acequias that have bylaws preventing them from selling to an outside buyer.

Cindy: And then it's operated as the community and just like any communities, you have sides and everything, you know, again, I don't want to make look like a perfect scenario. Because whenever you have water, you will have disputes but you have to have a way to deal with these disputes. And I think as a community and talking and coming together is the best way to deal with those problems and to solve those problems. But yeah, they it has been referred to as a water democracy. I think that's why it's so special, and why it's so effective.

KRISTAN (narration): This egalitarian approach to managing water has many looking at acequias for how to do things better. Acequias are like the seams that connect people together through water. For as long as Cindy can remember, the acequias have been a part of her life. Even when she hears it now flowing past her window, she remembers her childhood.

CINDY: Going to bed and sliding my window open and hearing the acequias flowing through the ditch around the house and falling asleep with the sound of that flowing water. It's kinda like, you know, listening to the waves of the ocean crashing of the ocean. It's just a great way to fall asleep. It just brought so much hope and peacefulness and I guess a connection to something much bigger than myself.

KRISTAN (narration): When I started this podcast season, I knew that water would be a complex web of law, science, and people and emotions. And that I might end up with more questions than answers. But what I did find out was that instead of getting captured by complexities and feeling powerless, we can untangle the issues to find small and big ways to make a difference.

We can start by building trust between communities to reduce conflict. We can acknowledge the legacy of the system that got us here as not bad but a product of our times and needs. And we need to be listening to the facts on the ground and adapting to the changing realities. But the biggest idea I heard was that we all need to rethink how we value our water today and not forget the people who put food on our tables. We have an amazing challenge in front of us. To address the tensions and tradeoffs as we work to balance water between farms and growing cities and other uses. But that's going to require us to listen to people's stories. To make hard decisions. To recognize the pressure that water is under. Because maybe this pressure is good, maybe water under pressure forces us to change.

CREDITS

KRISTAN (narration): Water, Under Pressure is a production of the Institute for Science and Policy at the Denver Museum of Nature and Science, and in partnership with House of Pod. Episodes are hosted and written by me, Kristan Uhlenbrock and producer Cat Jaffee, with the help of producer Ann Marie Awad, Nicole Delaney, and Kate Long.

Our theme music is by Alex Paul of Birds of Play. Our episode composition is by Jesse Boynton with tracks from Epidemic Sounds. For a full list of credits check out the show notes.

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