UP IN THE AIR

THE WEST IS IN HISTORIC DROUGHT. CAN WE MAKE IT RAIN?

BY JOHN D. SUTTER

Twelve minutes and 13 seconds.

That's how long it takes to walk from the pre-drought shoreline of Utah's Great Salt Lake to where the water is now. To get there, I trek across a plain of brittle, salty pancakes that clink together like wind chimes as you step; through a maze of hundreds of bird carcasses that appear to be almost melting into the sand; and, eventually, to the edge of the water.

On a recent summer morning, this stroll feels more like a funeral procession. Perhaps that's because, in February 2022, when I was living in Utah, I attended an actual wake for the Great Salt Lake in this very spot, at a moment when it was near a record low. A number of poets read their work to the lake that day, facing the water and not the crowd. One poem, titled "1,237 Steps," by Chloe Skidmore, sticks with me years later because it counts the unnatural steps from the lake's past to present: 1,237 steps to the water from the former shoreline.

"Imagine your ankles covered in water," she writes.

I find that difficult these days.

Yet someone who has no trouble imagining a healthier lake is my walking companion, Augustus Doricko, a 25-year-old with a sandy blonde mullet and white sneakers that belie the dusty environment. Doricko is CEO and founder of a company called Rainmaker, which, true to name, aims to cure Utah and the rest of the American West of the scourge of drought.

TO SAY THE STAKES OF CONTROLLING THE WEATHER ARE HIGH WOULD BE AN UNDERSTATEMENT. WATER IS LIFE. WHAT IS THE ABSENCE OF IT?

Come back to the Great Salt Lake in 10 years, he tells me with uncanny certainty. All of this will be water. "I think that there is a way to actually restore the Great Salt Lake and, potentially, more than that," he says, to create "conditions that are more green and lush than they were before."

No need to mourn.

Just get to work.

"It's like big-league 'Twisters,'" he says of his company.

They plan to make it rain.

HUMANS HAVE BEEN trying to tease water out of the sky for centuries — typically turning to the heavens first. Greeks and Romans prayed to their gods. Greeks also dipped the branches of oak trees — seen as holy — into water, hoping to induce divine rain, according to a 1954 World Meteorological Organization report on the prospects of cloud



ILLUSTRATION BY NASH WEERASEKERA

SNOWPACK IS WHERE THE WEST STORES MUCH OF ITS WATER, AND THAT SNOW IS BECOMING FAR LESS ABUNDANT. SNOWPACK IN THE SIERRA NEVADA IS EXPECTED TO DECLINE UP TO 65 PERCENT BY THE END OF THE CENTURY.

seeding. In Indigenous North American traditions, "rainmakers" were people who tried to spawn rain, sometimes by ceremoniously holding up offerings of water — others by dancing to crack open the clouds.

To say the stakes of controlling the weather are high would be an understatement.

Water is life. The absence of it?

"If he fails, the prophet is shot dead, because (people waiting for rain) are so incredulous of his divine power that they reckon him an enemy of the state," Irishman James Adair, who is credited with popularizing the term "rain-maker," writes in 1775 of Native American people. Failed rainmakers, he writes, were blamed for "bringing desolating famine upon the beloved people."

It's possible we're even thirstier for water today.

Water shortages have only gotten worse as humans continue to burn fossil fuels and heat up the planet, making droughts more intense and more likely. The American West is in the worst drought in 1,200 years, and recent research indicates it may continue not just for years but for decades. Snowpack is where the West stores much of its water, and that snow is becoming far less abundant. In California, snowpack in the Sierra Nevada is expected to decline 48 to 65 percent by the end of the century. The Colorado River, which peters out before it reaches the ocean most days, and supplies water for seven states in the region, could see warmer temperatures, drought and overdrawing sap its flow by nearly half over the same time frame.

The Great Salt Lake, meanwhile, is seen as yet another ominous bellwether. A 2023 report from Brigham Young University estimates that, if overuse and drought trends continue, the Great Salt Lake would be on track to disappear in five years. (Record snowfall following the report's release may have shifted timelines, but the trend remains, and the water deficit continues.)

It's in this context that efforts to control the weather take on new appeal.

THE WORK OF Rainmaker is happening in an un-air-conditioned warehouse in the aptly named Bountiful, Utah, north of Salt Lake City. Inside, you'll find tattooed workers occasionally calling each other "bro" and wearing company T-shirts. A giant American flag hangs on the wall, and an ATV carries fuel canisters in and out of the space. The place does feel like a set out of the movie "Twisters," which features a ragtag team aiming to alter the weather.

Rainmaker's director of operations, Parker Cardwell, and Jared Smith, who manages the Utah location — colleagues of Doricko — bring out a stout metal canister. Inside is a key to Rainmaker's plans: a yellow-green powder that will be "injected" into clouds in an attempt to generate precipitation.

The compound is silver iodide. (Cardwell says it is "10 times safer than table salt.") In a process called cloud seeding, the company uses various types of machinery — mobile cannons on the ground and drones in the sky — to spread the powder into the chilly parts of a winter storm. The silver iodide acts as a "seed" around which ice crystals can form — a process the cloud-seeding industry refers to as "nucleation," as if a baby storm cell were being born. Once one droplet crystallizes, other droplets become attracted to it and freeze as well. If all goes to plan, these droplets begin to fall to the ground as snow. It's not about creating clouds — much less creating water — just teasing snow out of winter storms that are already passing through.

The company, while insisting it's apolitical and that water is a bipartisan issue, has religious underpinnings and conservative roots. Doricko founded a right-wing student group at the University of California, Berkeley, according to the student newspaper, and is a Peter Thiel fellow — a stamp of approval from the PayPal co-founder who has been called President Donald Trump's ally in Silicon Valley.

Rainmaker, headquartered in El Segundo, just south of the Los Angeles International Airport, has been raising tens of millions of dollars from investors. They estimate they can boost a storm's precipitation between 5 and 15 percent and are bringing in radars and other technology in an effort to prove it both to investors and the public.

Doricko describes the process as tapping into atmospheric rivers.

That's the meteorological term for water essentially flowing across the sky in the form of clouds. Doricko says that whatever water is flowing down the Colorado River at any given moment, multiply that by 1,000 and you'll get the amount of water in a single atmospheric river flowing across the sky. NOAA estimates that the average atmospheric river has closer to 30 times more water than the Colorado, with the largest ones containing several hundred times more. You couldn't tap into all of that, Doricko says, but even a small fraction would make a difference — especially considering that at least 20 atmospheric rivers are estimated to flow across the West per year.

He calls them the "new Colorado Rivers of the sky."

ACCESSING THESE ATMOSPHERIC rivers isn't an especially new venture.

Early cloud-seeding programs in the United States started in the 1950s and picked up in the 1970s — aiming to tap the "barrels of water" floating in the sky, according to a WMO report. The first such program was in Utah, according to Jonathan Jennings, a meteorologist who manages the Utah program as part of the Division of Water Resources. That program is state-funded and continues to this day. Others, such as one in Texas, are paid for by local water districts.

I meet Jennings in a conference room at the Utah Department of Natural Resources, an office building that's wrapped in images of Utah's iconic landscapes — including the towering Wasatch Mountains coated in their world-famous snow.

Jennings has the chill buzz-cut air of a high school soccer coach. He moved to Utah from West Texas, where he managed a summertime cloud-seeding program. Now his focus is winter. Other states in the Colorado River Basin pay states like Utah, Colorado and Wyoming to seed clouds and generate winter snowpack, given that so much usable water in the West comes from snow, he tells me. Utah's program is the best-funded at the state level. In 2023, the state Legislature allocated a one-time $12 million payment and $5 million per year to support cloud seeding.

The threat of the Great Salt Lake drying up helped push that investment, he says. Historically, the state flew piloted aircraft into storms to seed the clouds and also launched cloud-seeding chemicals from the ground. Utah now contracts with Rainmaker to carry out its cloud-seeding efforts; its drone program is a new addition, aiming to improve safety and efficacy.

IT'S NOT ABOUT CREATING CLOUDS — MUCH LESS CREATING WATER — JUST TEASING SNOW OUT OF WINTER STORMS THAT ARE ALREADY PASSING THROUGH.

For a long time, it was entirely unclear if cloud seeding was at all effective. Practitioners like Jennings swore by the technology, but it was haunted by a vaguely snake-oil-salesman vibe.

Make it rain? By flying planes into clouds and spraying chemicals? Sure.

That started to change, Jennings tells me, with the release of a report in 2019.

In cloud-seeding land, the report goes by a single name: "SNOWIE," which is short, roughly, if you ignore one word, for "Seeded and Natural Orographic Wintertime Clouds: The Idaho Experiment." That study, published in the Bulletin of the American Meteorological Society, showed for the first time that cloud seeding with silver iodide from an airplane did result in ice crystallization and the generation of snow. The paper describes "unambiguous seeding signatures" in the clouds. The cloud-seeding airplanes used in the study flew back-and-forth patterns over Idaho, perpendicular to the wind. As the wind blew the cloud-seeding materials around, a zigzagging pattern of crystallization became visible on radar imagery.

The experiment, which took place over an area of about 20 square miles, generated enough precipitation to fill 285 Olympic swimming pools, says Sarah Tessendorf, a scientist at the National Center for Atmospheric Research and lead author on SNOWIE. While this is "not a negligible amount" of water, it's still "a rather small augmentation to the natural cloud process," she says. "It's not transforming a cloud from nothing to a flood. We're giving it a little extra squeeze."

Many questions are unanswered, and it's notoriously difficult to measure the efficacy of cloud seeding after a given storm or to predict how much can be squeezed out of a cloud.

Still, SNOWIE was enough to contribute to Doricko's decision to start Rainmaker.

I ask him to describe the company's culture.

He hesitates at first.

"We like the taste of blood in our mouth," he says. "And that sounds psychotic, and it's deliberately a little bit (psychotic) because it acts as, like, a good filter for talent."

"DO YOU KNOW who David Koresh is?"

I'd asked Jennings, the Utah meteorologist, what he thought of Doricko when they first met. Jennings' reference to the leader of a religious cult who died — along with more than 70 of his followers in Waco, Texas — during a 1993 standoff with the FBI, took me totally by surprise.

"When (Doricko) first reached out to me, this was February of '24," Jennings tells me. "So, I looked up their website, which had a link to his Twitter page. I opened it up and here's this guy with this huge mullet with a jean jacket on and a Jesus T-shirt underneath.

"I'm like, 'Oh crap, this is David Koresh!'" he says. "'This is a cloud-seeding cult.' I was very skeptical going into that first meeting with them." (Jennings says he quickly changed his mind about Doricko and now sees him as an inspirational leader and strategic thinker. "He just has this aura — leadership," Jennings tells me. "You can feel it come off him.")

Doricko has said in interviews and social media posts that it's worthwhile to "control the weather" — and that he's on a mission from God to do it. (In one example from last year, Doricko responded to then-Transportation Secretary Pete Buttigieg's post about extreme weather and the threat it poses to supply chains by writing, "We should just control the weather then.") One of Rainmaker's software systems is named Prophet. Its proprietary radars and drones, the basis for its claim to the future of cloud seeding (given that they seek to prove its efficacy), carry the names Eden and Elijah, respectively — Eden because the company aims to recreate the "Edenic conditions" that preceded this era of drought, Doricko tells me; Elijah, because of a Bible verse he likes from 1 Kings. "As surely as the Lord lives," he recalls, "no rain or dew will fall during the next few years unless I command it."

He's a fan of citing Bible verses like that.

"The real motivating principle behind all this is from Genesis 1: 26–28," Doricko tells me. "In Genesis, one of the first commands that God gives us — prior to the fall, prior to sin, like it was a good thing for us to do — was to take dominion over and steward the Earth, the seas and the skies, right? And when I read that, I was really struck. I was thinking about what company to build. I was struck by the fact that the skies, we have no dominion or stewardship over whatsoever. And if it's just a physics problem to mitigate droughts, mitigate hail, mitigate severe weather and flooding, and we're not doing that, then we're actually, like, abdicating that God-given responsibility to be good stewards of the planet and of the creation that he gave us.

"So cloud seeding — Rainmaker — is, I hope, a work of faith."

If farmers and ranchers tame the land, he aims to tame the skies.

Why conserve water if you can summon it?

"It always seems to be a choice either between human well-being and quality of life and the environment," he tells me. "And I think that there should be a vision for the symbiosis of those things. I want Utah to grow and have more energy and more farming and more people living in it — while having a more full lake. And that's what I think we'll see."

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THIS CONTROL-THE-WEATHER, "UNLESS I command it" attitude rubs plenty of people the wrong way. Rainmaker staff are used to being asked why they're "playing god." When you throw in some unsubstantiated conspiracy theories, you have a thunderous backlash to cloud seeding brewing.

Some of the critique comes from a confusion over what cloud seeding is, Jennings says. People conflate the idea of airplane contrails — the water-vapor ribbons that follow commercial jets on clear days — with cloud-seeding efforts, which do not create those patterns in the sky.

These are folks who rant, without evidence, about "chemtrails" being used by the government to control the weather and people's minds. Robert F. Kennedy Jr., the secretary of the U.S. Department of Health and Human Services, has been accused of helping to spread this conspiracy theory by insinuating that the government is using planes to spray chemicals.

Others fear the government could induce weather disasters. This summer, some conservative lawmakers claimed without evidence that cloud seeding was used to prompt the deadly floods in Texas. "We must end the dangerous and deadly practice of weather modification and geoengineering," U.S. Rep. Marjorie Taylor Greene, R-Ga., wrote on social media.

"I'm big on God and just letting him work his magic, not people trying to play God," Tim Burchett, a Republican representative from Tennessee, told the conservative news channel Real America's Voice.

Doricko defended cloud seeding on CNN, saying that cloud seeding could not possibly have produced the amount of rainfall that caused so much damage and death in Texas.

Opposition comes from other parts of the political spectrum, too. Some environmentalists and tribal governments oppose cloud seeding over concerns about the safety of silver iodide, that yellow-green chemical used by Rainmaker and others. A U.S. Government Accountability Office report in 2024 found the use of silver iodide at current levels does not pose a documented risk to human health or the environment; however, the agency report continues, "it is not known whether more widespread use of silver iodide would have an effect."

At least eight other states — California, Colorado, Idaho, Nevada, New Mexico, North Dakota, Texas and Wyoming — operate cloud-seeding programs, according to that same Government Accountability Office report. Yet 10 states now ban or are considering banning the practice. That includes Florida and Tennessee, which passed bans this year and last, respectively.

The backlash has turned threatening in some cases.

Jennings started receiving death threats in February after the Division of Water Resources posted a link on its Facebook page to a blog explaining the science of cloud seeding — part of a series meant to dispel myths that the practice is part of the "chemtrail" conspiracy. The Facebook post erupted, and threatening messages started rushing in.

"Three thousand comments and probably a dozen death threats later, we finally decided to end our social media engagement," Jennings tells me.

The day the death threats started, Jennings says he threw his phone in his home basement and shut the door, hoping to avoid the onslaught of GIFs of shotguns and other meme-ish threats. He discovered that someone had posted his address online and commenters were suggesting they take revenge, with one writing, he says, that "I was this devil and I needed to be dealt with."

This was a Saturday.

"That Sunday I was at Scheels buying a pistol," he says.

CONFESSION: I HAVE a talent for drought-busting.

Colleagues used to tease me about it when I was a producer at CNN.

There were at least two or three instances where I showed up to a major drought — places where it hadn't rained in weeks or months — only to, seemingly, bring the rain with me.

The starkest example: I'd flown to the Texas Panhandle in 2011 to follow a rancher as he gave up on the cattle business and sold his entire herd because it hadn't been raining enough to grow hay and keep the cattle alive. Before dawn, I drove out to meet the rancher. Rain pattered the windshield. Locals stood outside letting the water hit their faces. "Like manna from heaven," one of them said.

The rancher didn't end up selling the herd.

I love that story. The moment the drought breaks is more memorable than the slow and desolate years without water. But the reality is that those "manna" moments are few and far between in today's world. We must learn to survive megadroughts like the one wreaking havoc on the West; and deadly floods, like those seen in Texas. We've known for a long time that eliminating fossil fuel pollution will make things better. To date, however, the world continues to emit more heat-trapping pollution each year.

While I'm visiting Rainmaker and Utah, the entirety of the state is listed as experiencing moderate to severe drought, according to the U.S. Drought Monitor. The night before I meet Doricko at the dusty expanse of the Great Salt Lake, however, I'm lying in bed as I hear it: the low rumble of thunder. I have to walk outside to be sure I'm not just hearing things. Sure enough, the ground is wet.

THE MOMENT THE DROUGHT BREAKS IS MORE MEMORABLE THAN THE SLOW AND DESOLATE YEARS WITHOUT WATER.

The next day, a dense gray bed of clouds hangs in the sky. A Rainmaker employee tells me that, if it were winter, this would be a great day to seed the clouds and make snow. The clouds are there. They just need to be told it's time to rain. And maybe we have the power to tell them?

It feels nice to believe that. It's more difficult to look clear-eyed at the fact that Utah, and much of the world, really, is vastly overspending its water budget in these drier times. A recent paper suggests a 35 percent reduction in water use — most from agriculture — is needed to bring the Great Salt Lake back to health. Doing that involves painful choices. The promise of Rainmaker is that you don't have to choose. You just use technology to command the sky to produce water when and where you need it.

Before leaving the warehouse, I look for Doricko to say goodbye. I find him outside, on the phone, sitting in some gravel and smoking a cigarette beneath the shade of a tree. The tree's harsh shadow catches my eye because the light had been so flat earlier, dimmed by clouds.

I look up to find a sky that's now blue and blazing hot.

The clouds have vanished.