RAIN CHECK

In Southern Arizona, a single monsoon storm can dump up to 10 percent of the ecosystem's annual rainfall. For ranchers such as Josiah Austin, check dams are a way of slowing down that water and allowing it to soak back into the ground. It's a system that's good for both the soil and the local wildlife, but it's nothing new – prehistoric cultures were doing the same thing hundreds of years ago.

BY TOM ZOELLNER • PHOTOGRAPHS BY BRUCE D. TAUBERT

JOSIAH AUSTIN STANDS at the edge of a nameless rivulet on his ranch in the foothills of the Chiricahua Mountains. He points south. "You see those?" he says. "They go on and on and on."

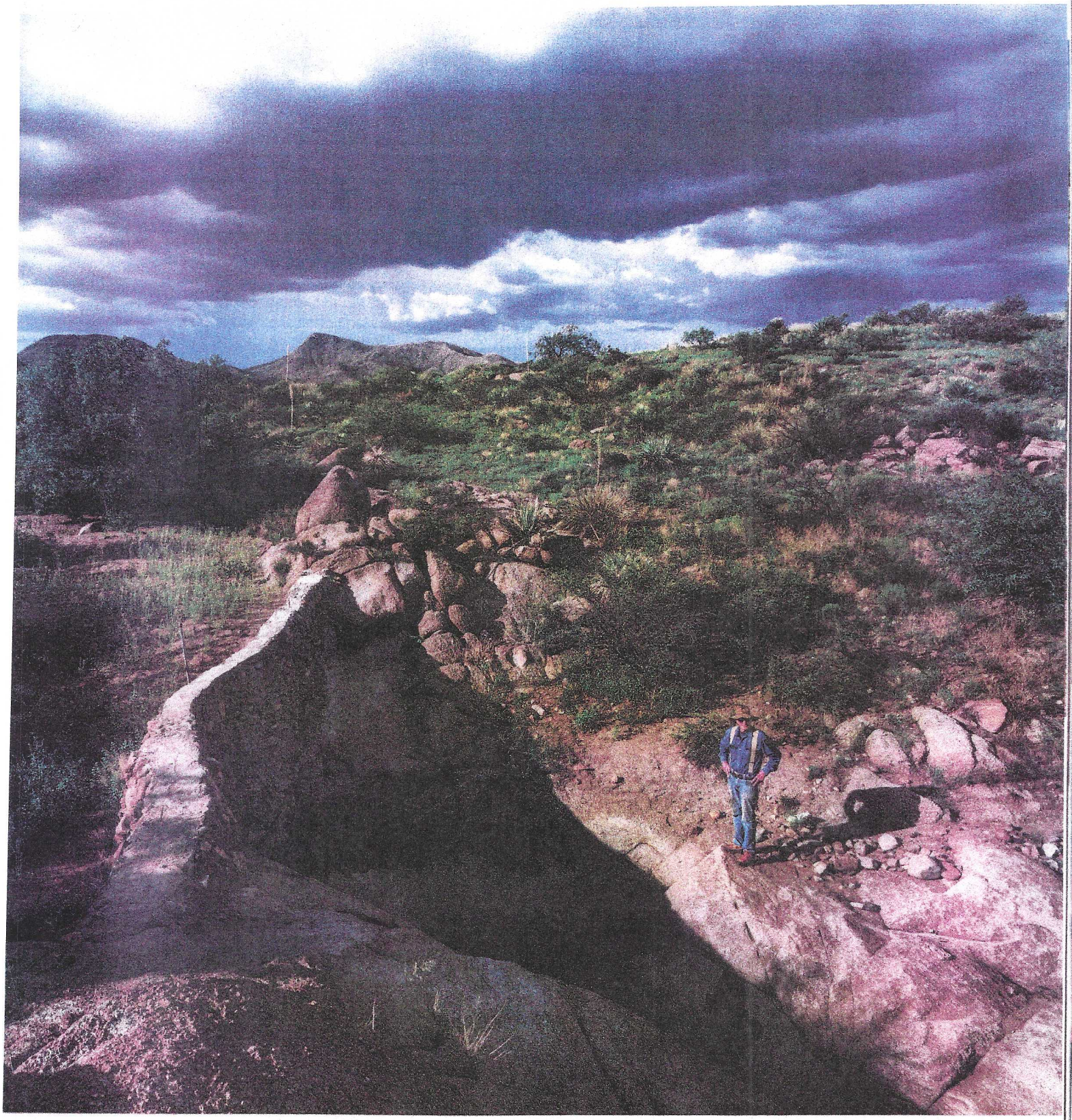
A closer look reveals what he's talking about: a series of earthen humps in the dry arroyo, all covered in lovegrass and looking almost like a natural feature of the landscape. But they're not. Austin and his hired hands built these obstructions with shovels and sweat many years ago, just like they erected more than 3,000 other primitive water-catching features in the various washes of Austin's Cienega Ranch over the past 30 years.

Austin likes to call these barriers "plugs," but the formal hydrological term is "check dams." They're meant not to impound rainwater and snowmelt, but to slow it down and let it pool for a few hours or days. Instead of washing away into a faraway drainage, the water soaks back into the ground and replenishes the subterranean water table. Check dams create more fertile soil and improve the habitat for wildlife.

"Out here, we can get 10 percent of our annual rainfall during one half-hour monsoon [storm]," Austin says. "That causes more harm than good. We want to get that water back in the ground."

His prolific use of these simple water retention features — made of various combinations of dirt, piled-up rocks and mortar — has turned his combined 60,000 acres into a showpiece of the upper Sulphur Springs Valley, as well as a mecca for wildlife researchers customarily granted access to study rare endangered species, such as Chiricahua leopard frogs and Yaqui and Gila topminnows. Those and other animals flourish in the ranch's arid upland prairie, which is spiked here and there with agaves, prickly pear cactuses, four-wing saltbushes and kangaroo rat mounds.

What amounts to a privately held nature preserve exists alongside a working cow-calf operation that employs a rotating crew of cowboys — up to 20 at



Josiah Austin, owner of the Cienega Ranch in Southeastern Arizona, stands below one of the many check dams he and his employees have constructed on the ranch. In this instance, water retained by the dam has allowed Arizona ash trees and other vegetation to flourish above it.

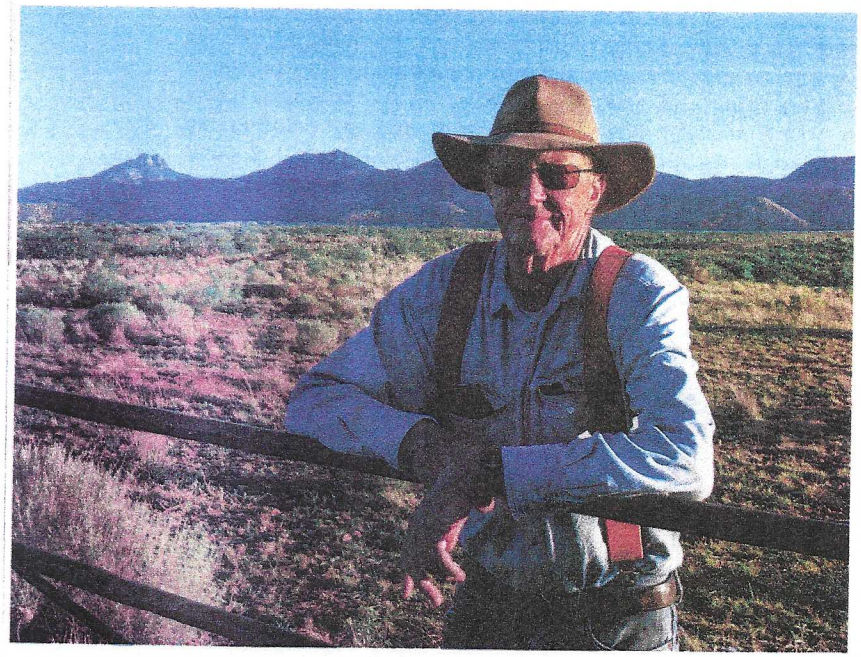
a time during roundups. Angus cows graze here before shipment to Willcox, then a rail journey to a feedlot outside Liberal, Kansas. It's not a stretch to say their grass diet is superior here because of the moisture locked into the soil. Austin kicks a patch of dirt under one of his earthen berms to reveal moist, mocha-colored ground less than an inch below the surface, even though it hasn't rained out here in at least a week. That wetness might otherwise have drained into the sink of nearby Willcox Playa and disappeared.

Austin's use of check dams is an extension of what Native people in the Southwest were doing hundreds of years ago. For example, archaeologists have found check dams in the washes of Saguaro National Park, perhaps erected there by the ancestors of the Tohono O'odham people to capture precious water for immediate planting after rainstorms.

"What Josiah is doing is adapting old-time techniques for use in modern conditions," says Joaquin Murrieta-Saldivar, the cultural ecologist director of the Tucson-based Watershed Management Group. He visited the ranch to inspect the structures and says he came away impressed: "It's very cost-effective, and everyone should be doing this."

But Austin says he didn't start putting up berms, rock piles and masonry plugs because he had any expert knowledge of Indigenous hydrological practices. As he tells it, it was an accident. Shortly after he bought his first cattle property in Cochise County in 1982, he demolished a concrete patio in front of one of its houses and disposed of the chunks in a nearby depression that had an erosion problem. After a rainstorm a few weeks later, he saw that the shattered concrete debris had stopped the soil from disappearing — and that the retained water had created a delightful patch of new grass. "I thought, *If this works, why don't I build a few more out of rocks?*" he recalls. "I kept building and building and building. I was too stupid to stop."

One of his hired men, Juan Valencia, proved a quick study in the craftsmanship of instant dams — he needed only leather gloves, a shovel and a crowbar. ("But really, the best tool is a strong back," Austin says.) Valencia has since died, but the structures all over the ranch are his monuments. Austin stands near an "S"-shaped wall across one arroyo and points to the oval of water 10 feet below. It's fed by an outflow pipe, a feature of one of the more elaborate check dams on the ranch. Dead cottonwoods in this creek bed sprang back to life a few months after Valencia's work. "We're standing right now on top of a big pile of silt," Austin says. "It acts as a sponge for water. The quail love it in here." Other animals do, too.



The standard Arizona ranch practice is to rent a bulldozer and pile a ring of earth at the bottom of a wash to impound water in a pond. Such ponds are called "tanks," and they can be seen all over the state. When coated in clay, they can last for decades, cradling still pools of coffee-colored muck and studded with hardened meadow muffins at the edges. What Austin does instead is build dozens of modest upstream dams that are uncoated with clay, deliberately leaky and resembling a series of railroad ties buried in the ground, a bit like the downhill portion of a roller coaster. You might also call it a Champagne tower for rainwater.

This isn't to say Austin placed every dam perfectly. Plugging a wash the right way takes a combination of geology, architecture and luck. A few of Austin's creations fell apart after the first rainstorm. A few others changed the flow of the surface water for the worse and had to be removed. "Sometimes they work, and sometimes they don't work," Austin says. "You're going to make mistakes. This is one gigantic project of trial and error. But if you do it right, you're going to see the benefits for 100 or 200 years."

LANDSCAPE DESIGNERS have taken note of check dams as low-cost, low-tech solutions to water shortages, and the structures have become part of formal practice in rural and urban settings. The potential problem of creating a mosquito breeding ground can be mitigated with the right amount of leakiness in the structure, says Kirk Diamond, an assistant professor of landscape architecture at the University of Arizona. If done right, the water shouldn't be standing for more than 72 hours, which means check dams are one of the rare forms of construction in which imperfect assembly is a virtue. "It's not a full-on block," Diamond says. "You're 'checking' that water a little bit."

You don't need to be a big-time cattle rancher to use check dams, Murrieta-Saldivar says. If you have a house in the city, simply create a shallow depression near a downspout from the roof gutters and arrange some rocks around it to keep the water from sheeting off after a monsoon storm. "We call them 'rain gardens,'" Murrieta-Saldivar says. "You can BYOB — build your own basin." And with Southwestern rainstorms growing less frequent and more intense, these efforts help put more of the moisture back into the desert ground

OPPOSITE PAGE: The Dos Cabezas Mountains loom over the ranch, where Austin has been raising cattle and building check dams for three decades.

ABOVE: A Cienega Ranch cowboy moves cattle from the range to the stables. Up to 20 cowboys work at the ranch during roundups.

instead of onto the asphalt and concrete.

Outside groups have noticed and appreciated Austin's innovations, as well as his departure from the common practice of slamming the door on government officials who utter the potentially expensive phrase "endangered species." Last year, Austin won a stewardship award from the Association of Fish & Wildlife Agencies for blending "a fully operational cattle company with ecological restoration and wildlife conservation efforts." He was inducted into the Arizona Outdoor Hall of Fame by the Arizona Game and Fish Department in 2020. Part of what endeared him to those groups was his willingness to reintroduce black-tailed prairie dogs on the property.

"You see that bare spot out there?" he says from the driver's seat of one of the Can-Am four-wheelers he keeps on the ranch. He pilots the vehicle to a patch of ground riddled with more holes than a miniature golf course. A few prairie dogs stand at attention in statuesque poses — seemingly unafraid, as if used to Austin's presence — while others poke their heads up from the holes and sniff the air. Most ranchers curse these rodents as enemies and vandals, and it used to be said that their holes were leg-breakers that would cripple a horse. But the real reason for the hatred is their appetite for grass. Austin shrugs: "I've got land enough that I can sacrifice 5 or so acres of it."

Nearby is a watering trough made from a gigantic tire sliced in half, a castoff from one of the ore-hauling trucks at the Sierrita copper mine south of Tucson. It's set in a concrete platform and full of clear water. Inside it, Austin has affixed a concrete plank, an escape ramp for use by whatever desperate rodent, bird, bat or javelina is unfortunate enough to fall inside. There are nearly 100 of these

stations all over the property, enough to ensure that a cow, mule deer, quail or other animal doesn't have to walk more than a half-mile in any direction to find a drink. They're kept full by the well water coursing through the half-million feet of polyurethane pipe buried in shallow trenches across the ranch. Should one spring a leak, the location becomes apparent via the irregular tufts of grass sprouting above the defect.

All the pipelined water emerges from wells powered mostly by solar pumps not connected to the power grid.

A shallow pool on the ranch mirrors the colors of sunrise. By managing the area's infrequent rainfall, Austin has made the ranch a haven for numerous plant and animal species.

There's only one working old-fashioned windmill on the Cienega Ranch; Austin keeps it standing for sentimental reasons. Another conservation measure might not seem so obvious: Austin goes to great lengths to thin the ranks of mesquite trees, which are native to the region but also are water hogs.

Austin is even more ruthless when it comes to salt cedars, the invasive shrubs also called tamarisks. Annoying to hikers and feared by ranchers, they're not just thirsty; they're also highly flammable and offer little support for wildlife. At the first sign of a salt cedar sprouting up, Austin chops it down and seeds herbicide in the soil around it. Otherwise, he'd soon have a forest of them denuding the grasslands. "They'll just take over," he says.

THE COWBOY LIFE is in Austin's bloodline. He's a direct descendant of Moses Austin, the Virginia lead baron of the 1790s whose son, Stephen F. Austin, went on to lead colonization efforts in what then was Spanish Texas. Most of the family stayed back East, but the lure of wide-open spaces kept calling. Josiah's grandfather left home to work as a hand on the XIT Ranch, a Texas Panhandle spread so big that it covered parts of 10 counties and featured at least 300 windmills. But few ever get rich herding cattle unless they own them. The elder Austin found better work with the railroad, then discovered a more lucrative trade in the Pennsylvania lumber business.

Austin grew up in Maryland, on a picturesque farm. His father worked for a paper company by day and farmed by evening. As a young man growing up in the 1960s, Austin looked around for a purpose and found one — or so he thought at the time — by joining the U.S. Army and spending two years as a helicopter crew chief and door gunner in Vietnam. He then went to the University of Denver under the GI Bill, studied finance and spent his early career working in that field for firms such as Manufacturers Hanover Corp.

But the open skies of the West kept calling him. In the early 1980s, he started plowing his earnings into grazing land in Mexico, Montana and Southern Arizona. He built somewhere near 20,000 loose-rock dam structures on Cochise County's massive El Coronado Ranch, which he no longer owns. He now devotes most of his time to two spreads on either side of the western Chiricahuas: the HYL, on the north slope, and the Cienega, on the south. The latter's name means "marshland" in Spanish — a happy coincidence, because Austin didn't name it. That came from the Riggs family, who migrated here from Texas in the 1870s.

Austin bought much of his property from the Riggses' descendants, many of whom still live and ranch in the upper Sulphur Springs Valley, where the aura of the 19th century is all around. In most places, it's possible to look out onto the grassy expanse and not see a trace of modernity. The metate depressions where Apache women ground corn by hand can still be seen in some of the exposed granite reefs. The Butterfield Overland Mail stagecoach passed through here. And just to the east is where the Army's Lieutenant Isaiah Moore hanged several relatives of the Apache leader Cochise at the end of the 1861 Bascom Affair, a complicated incident that triggered a quarter-century of hostilities. The historic spot used to be on Austin's ranch, but he recently deeded it to the Trust for Public Land.

An old Western maxim has it that the only time a rancher makes money is when he sells the ranch. It's a marginal business at best, suited for gamblers, and no sane investor would buy a spread that won't soon be in the path of an oncoming housing subdivision. "But I get incredible dividends," Austin says. "Those sunrises and sunsets. I'm up every morning before the sun comes up. I don't have time to be bored."

Walking around the Cienega Ranch with Austin is like attending a field survey with an experienced wildlife biologist. "This is a silverleaf nightshade," he says, squatting next to a weed topped with a purple flower. "It's similar to a tomato plant. The bees 'buzz-pollinate' this one. They land and they vibrate, and the pollen is funneled out by their vibrations."

Around a nearby mudhole framed by coyote tracks, he points out squiggling fairy shrimp, a crustacean species that can go into a kind of hibernation called diapause for several decades. When Austin creates a new check dam, they usually appear in swarms. Add them to the hovering bees and spadefoot tadpoles, and it amounts to a miniature metropolis of life swirling around this temporary puddle. The ranch, the valley and the mountains are so big around it, yet everything seems concentrated down to this round, brown chalice in the ground.

"I don't think I have all the answers," Austin says. "But I'm doing what's right for this land. You start small, and you see what incredible results you get. These dams opened my eyes to the incredible treasure of the Chihuahuan Desert." AH