

GREEN FIRE TIMES

News & Views from the Sustainable Southwest



NEW MEXICO WILDFIRES - IMPACTS & RECOVERY

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Green Fire Times is a platform for regional, community-based voices—useful information for residents, businesspeople, students and visitors—anyone interested in the history and spirit of New Mexico and the Southwest. GFT's small, dedicated staff and multitude of contributors generate articles documenting the interrelationship of community, culture, the environment and the regional economy. The sustainability of our region affects all of us, and requires people from all backgrounds working together to create solutions. One of the unique aspects of GFT is that it provides multicultural perspectives that link green, cutting-edge innovations with time-honored traditions.

Storytelling is at the heart of community health. We have an opportunity to change the story going forward, which can lead to positive transformational change. GFT shares inspiring stories of hope and community action. By helping our communities discover who they once were and what they can become, a more positive future can be created.

Of course, it is an extremely challenging time to continue to produce a free, quality, independent publication. Production costs have greatly increased. Many local and regional publications have folded or have been bought up by corporate entities. Fortunately, a growing number of publications are receiving boosts from nonprofits that are devoted to protecting journalism. GFT is owned by Southwest Learning Centers, Inc. (est. 1973), a nonprofit educational organization. SWLC provides a mentorship program for some of GFT's writers, aspiring journalists and documentarians.

Green Fire Times is struggling to survive. We also need funding to upgrade our online archive and make 13 years of articles more accessible to community members, students and researchers. Don't assume that someone else will help. Please consider making a tax-deductible donation through our website, or send a check made out to Southwest Learning Centers (with a notation 'for GFT') to P.O. Box 8627, Santa Fe, N.M. 87504-8627. Also, please advertise! The print edition—currently published every other month, while our website is updated more frequently—is widely distributed from Albuquerque to Taos and beyond. For a rate sheet, visit GREENFIRETIMES.COM.

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CONTENTS

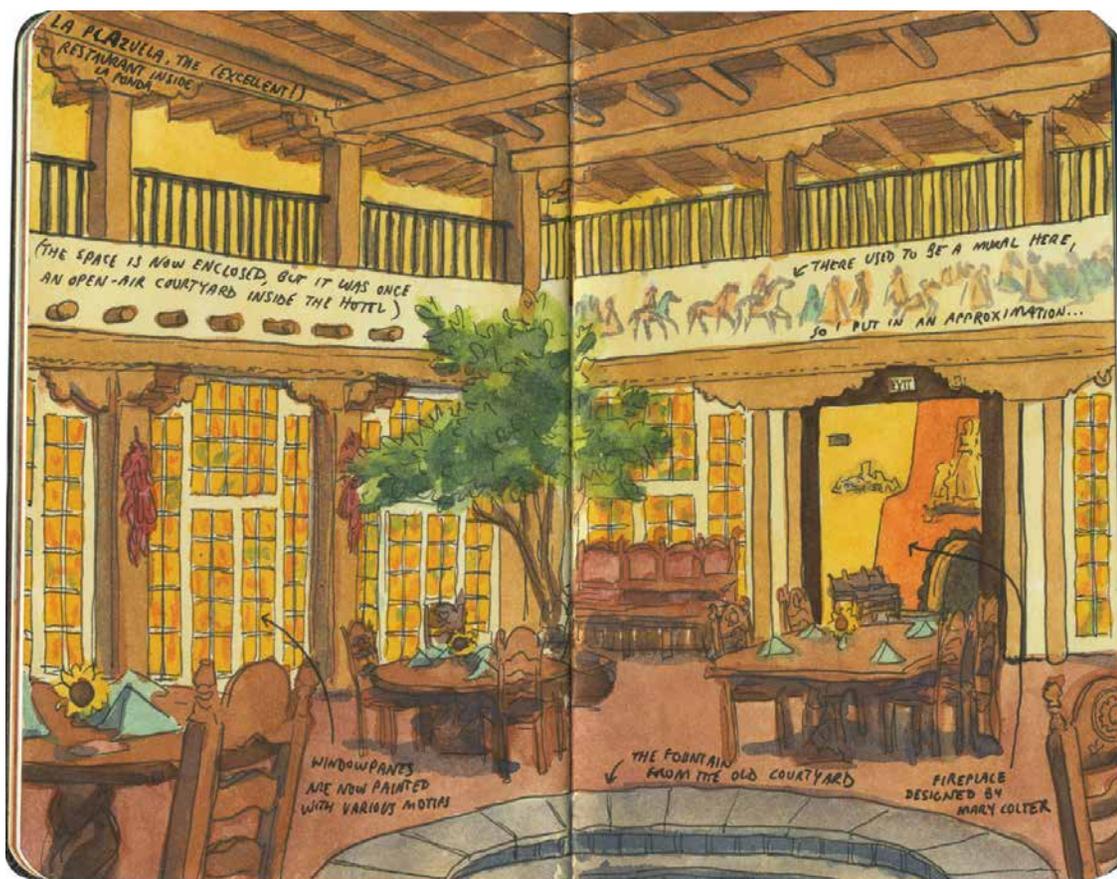
- PROJECTS OF RESILIENCE IN THE SOUTHWEST – ALAN AFFELDT / 4
FRED HARVEY AND MARY JANE COULTER – CHANDLER O’LEARY / 7
TERRA 2022 CONFERENCE – MARK CHALOM / 8
NEW MEXICO’S MEGAFIRES MARK A TURNING POINT – WILLIAM DEBUYS / 11
FEAR & LOATHING (PART 2) NEW MEXICO WILDFIRES: THE GIFT THAT KEEPS GIVING – CHARLES CURTIN / 14
FARMING AND THE TRIALS OF JOB – MARK WINNE / 17
THE SANGRE DE CRISTO MOUNTAIN INITIATIVE: AN AUDACIOUS COMMONSENSE PROPOSAL – CHARLES CURTIN / 19
OP-ED: HILARIO ROMERO – CLIMATE EXTREMES AND DROUGHT PLAN FOR BURNING IN NEW MEXICO’S FORESTS / 22
USING HEMPCRETE FOR BUILDING EMERGENCY SHELTERS – ARNIE VALDEZ / 22
MOVING HEMPCRETE FORWARD – ALEX SEXSMITH, ROBIN ELKIN / 23
CARBON POSITIVE: DESIGN STRATEGIES THAT WORK – EDWARD MAZRIA / 24
BOOK PROFILES: BUILD BEYOND ZERO BY BRUCE KING AND CHRIS MAGWOOD; CLEAN ENERGY: A PRACTICAL PATH TO ZERO-CARBON BUILDINGS BY CHARLES ELEY / 25
PLANNING 2050 – KATHERINE MORTIMER / 26
BUILDING COMMUNITY RESILIENCE WITH PARTICIPATORY MAPPING – AMY BELL / 27
VALLE DEL ORO NATIONAL WILDLIFE REFUGE HEADQUARTERS & VISITOR CENTER / 32
HISTORIC WHEAT AND CORN MILLING ON THE SANGRE DE CRISTO LAND GRANT – MARÍA MONDRAGÓN-VALDEZ / 34
NEW MEXICO’S FARMING PROBLEM HAS A REGENERATIVE SOLUTION – CHILI YAZZIE / 35
THE BIOLOGICAL AND SOCIAL FOUNDATIONS OF FOOD SECURITY – AMANDA BRAMBLE / 35
NEWSBITES / 18, 26, 27, 28, 37
WHAT’S GOING ON / 37

GREEN FIRE TIMES

News & Views from the Sustainable Southwest



*Northern New Mexico wildfire
© Seth Roffman*



*La Plazuela Restaurant at La Fonda in Santa Fe; La Fonda's lobby.
Sketchbook watercolor illustrations © Chandler O'Leary*

Projects of Resilience in the Southwest

Building Communities by Creating Special Places

BY ALLAN AFFELDT

In this article I advocate for the social importance of architectural beauty and community memory. Such investments make communities stronger and healthier, both economically and culturally. The sense of place in many communities is inextricably bound up with historic downtowns and historic architecture, but the importance of historic preservation in community planning and revitalization is often overlooked—largely because it is notoriously difficult to finance and reuse historic properties.

I start with three premises; things we know but too often forget to our great peril when considering investments in our communities:

- 1) Humans are social and need public, communal, interactive places to thrive.
- 2) Downtowns were historically important, not just for shopping and entertainment, but also as social places to see and be seen, to meet and work together.
- 3) Churches, hotels, social clubs, schools, restaurants and employment were primary meeting places for hundreds of years. Much of this social order broke down in the Industrial Revolution and accelerated as jobs became transitory and people moved much more often. Downtowns—with their hotels, clubs, restaurants and work—lost much of their social function, with the void filled by churches for some, online meeting for many, and increasing alienation for nearly everyone.

Sociologists have argued that for a healthy existence, we need three places: home, work and social. Starbucks famously became a social venue—a “third place”—as much as a provider of coffee. Their business plan set out to create meeting places, and thereby drive food and beverage sales. In the words of Starbucks CEO Howard Schultz, “Providing the world with a warm and welcoming third place may just be our most important role and responsibility... I’ve never thought of the third place as just a physical environment. For me, the third place has always been a feeling, an emotion, an aspiration that all people can come together and be uplifted as a result of a sense of belonging. This is the cornerstone of our business.”

This seems to have worked for Starbucks as a business, but does a generic meeting place satisfy our need for meaning, or our need for beauty? Instead, it functions more as a place to be *among* other people but not interacting *with* them.

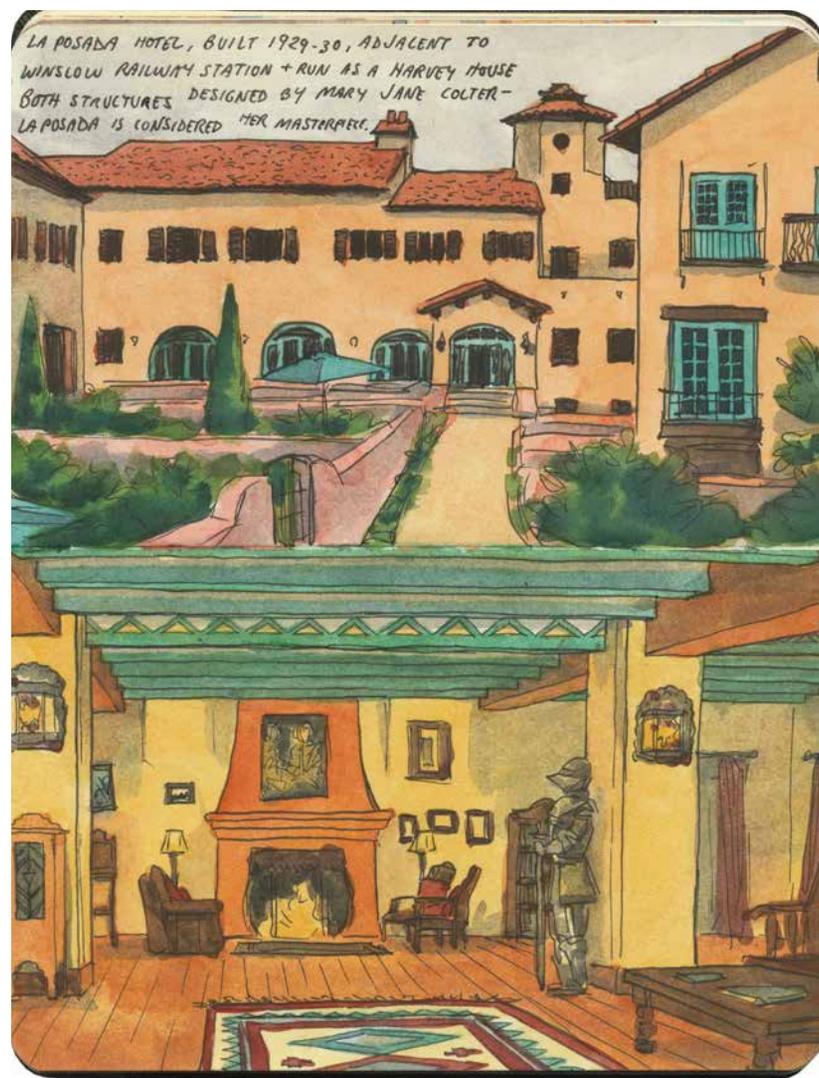
In Santa Fe, there is a growing need for more housing that must somehow be met. But “more” can also destroy. In Flagstaff, every new building is five stories, lot line to lot line, crammed with apartments, owned by investment trusts. Traffic patterns have been destroyed. Historic building patterns and scale have been lost. Few if any community spaces are created. New construction without consideration for interactive social needs does not create community or solve our collective challenges. Theaster Gates wrote: “In my city, Chicago, I have seen firsthand what happened when a focus on housing fails to account for our human thirst for beauty, for the sublime, the emotionally enriching, the spiritual. If we build homes without culture, without a social agenda, we’re simply creating new kinds of problems...” What *does* help address our social and community needs is the resurrection or repurposing of important buildings in historic downtowns.

A COUPLE OF CASE STUDIES

La Posada Hotel – Winslow, Arizona

The May 6, 1930 edition of the *Winslow Daily Mail* proudly announced the opening of La Posada and described the grand hacienda-style building as “unique in every detail.” Not only was Winslow gaining a new hotel, but also a first class Fred Harvey restaurant and a base for the famous Harvey Car Detours. The hotel became the center of Winslow’s social life. But in the 1950s, the Interstate highway system bypassed downtowns all over the country. Commerce moved to freeway offramps and downtowns withered.

La Posada was only open 27 years. Mary Colter, architect and designer, had hand-picked or designed all the furnishings. When La Posada closed in 1957, the Fred Harvey Company



La Posada Hotel in Winslow, Arizona was designed by renowned architect, Mary Jane Coulter. Paintings © Chandler O’Leary

loaded everything that could be removed into box cars and sent them to Albuquerque for sale at auction. Mary was then 89 years old and living in Santa Fe. She was heartbroken. When asked about the hotel’s demise she said, “Now I know there is such a thing as living too long!”

What was downtown Winslow like when I moved there in 1997? Virtually abandoned. Nearly all the buildings were boarded up. There was no tourism, and nobody wanted La Posada. The Santa Fe Railroad had gutted the building and turned it into offices in the 1960s. When the offices became obsolete, they decided to abandon La Posada and tear it down—as they had done with the Alvarado in Albuquerque and so many other once-grand buildings. The National Trust for Historic Preservation put La Posada on its endangered list in 1994 as one of the most important buildings in the country, about to be lost.

I purchased the hotel and 20 acres for \$158,000 in 1997. This was the appraised value of the land. The building was considered a liability, of no value. Over the last 20 years we invested about \$12 million to restore the 70,000-square-foot hotel and its surrounding 20 acres. At first no one thought the building could be restored, so no one would give us a loan. We reinvested everything we earned. Aside from grants totaling around \$2.5 million, the funds all came from our guests, a couple of friends, personal debt and lots of sweat equity!

Our first phase of restoration was mostly archaeology and discovery—undoing the unsympathetic work of the 1960s, reopening windows and doors, removing drop-ceilings and 40 years of HVAC and office cubicles. The Santa Fe Railroad had converted the beautiful ballroom into a meeting room, covering the painted ceilings with acoustic tile, sealing windows shut, filling in arches with stucco walls. Today, the beautiful floors and ceilings have been restored, handcrafted sconces light the columns, the fireplace has been rebuilt and many original furnishings have been returned.



Original reception area, La Posada Hotel, Winslow, Arizona

La Posada's lunch counter had been converted into the railroad's dispatch center. This we turned into the famous Turquoise Room restaurant, which opened in 2000 under the watchful eye of Chef John Sharpe. In 2009, it was selected as one of the top restaurants in the entire United States.

Colter's only landscape plan was for La Posada, but the Depression made it impossible to carry out her plans. Her original drawings were lost for decades—but in 1997, a BNSF employee discovered them on microfilm, and we have used them to inspire our new gardens. Simultaneous with restoration work, we had to get the hotel on a firm financial footing. By 2005, the hotel was



The Castañeda Hotel in Las Vegas, NM was the earliest Mission Revival-style Harvey House. Built in 1898, it closed in 1948. After renovation by a crew of 50 local artisans, it reopened in 2019.

successful enough to match a Transportation Enhancement (TT) grant to re-imagine the entire north grounds along Route 66. New gardens are underway in the east grounds. Recently, we restored and added to the depot to create a museum dedicated to the history, arts and cultural highway of the Santa Fe Railway and Route 66 through the Southwest.

Historic Hotels in Las Vegas, New Mexico

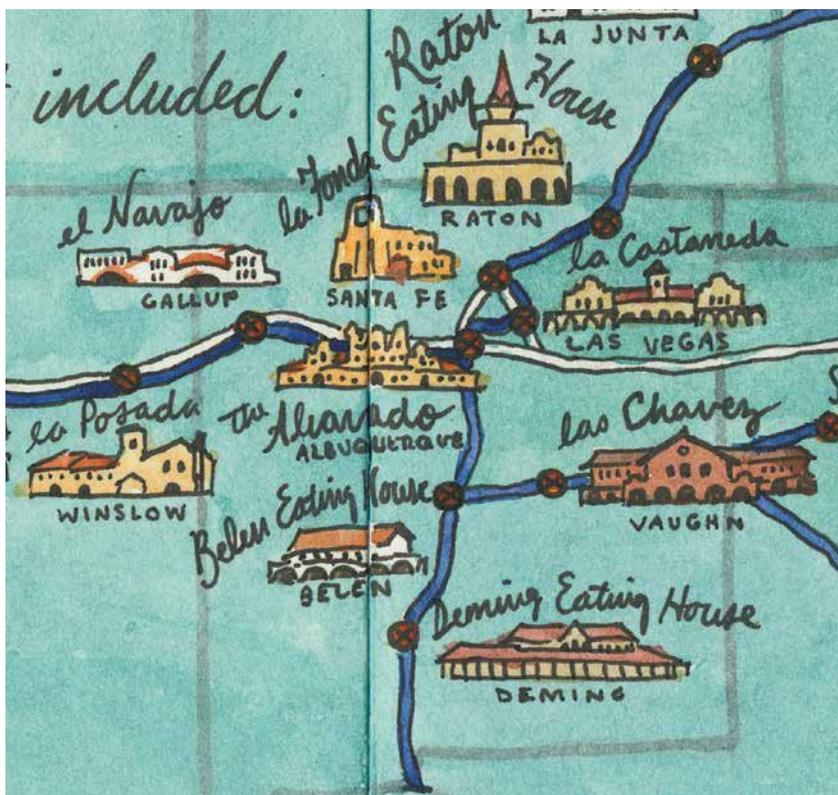
In 2000, when my wife, Tina Mion, and I came to Las Vegas, New Mexico, there was little tourism or new investment anywhere in the city. Las Vegas was the only city with two Fred Harvey hotels—the Queen Anne-style Montezuma Hot Springs resort on the edge of town, and the Mission Revival Castañeda next to the depot. The Castañeda opened in 1898 and was Fred Harvey's first trackside hotel in the Southwest. In 1899 it hosted the Rough Riders reunion after the Spanish-American War; there are photos of Teddy Roosevelt on the Castañeda arcade. Like many railroad hotels, the Castañeda closed after WWII. When we arrived, it was mostly abandoned—just a sketchy bar, with the building and neighborhood falling down around it.

In 2014 we purchased the ruins of the Castañeda for \$450,000. The community and much of New Mexico celebrated our planned restoration. With the help of historic and new markets, tax credits and a team of 50 local artisans, we spent more than \$5 million restoring the hotel. We reopened it in 2019, with a national story on CBS's Good Morning America. The beautiful saloon and restaurant are helmed by Sean Sinclair—voted best chef in Greater New Mexico.

The Plaza Hotel in Las Vegas—known as the Belle of the Southwest when it opened in 1882—was failing in 2014, so we purchased and restored that too. Boosted by these efforts and many others, the city is experiencing a renaissance. The Las Vegas Community Foundation recently raised \$1 million for community revival. There has been a change in the community's self-image, and Las Vegas' history and authenticity have been widely promoted by the media. The city recently has the added challenge of recovering from impacts of COVID-19 and the biggest



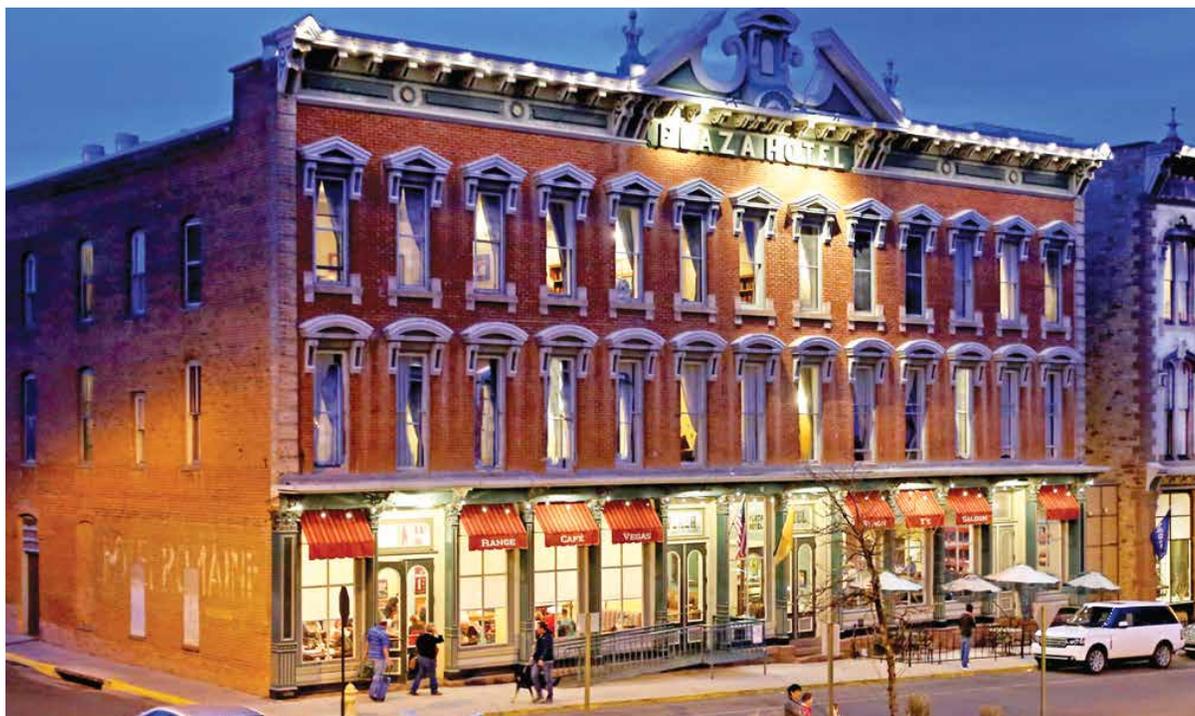
Colonel Theodore Roosevelt at the Castañeda Hotel for the first Rough Riders reunion, 1899. Palace of the Governors Photo Archives



Detail from "Fred Harvey and his chain of Harvey Houses" map © Chandler O'Leary. Harvey had 84 establishments throughout the Southwest. He contracted with the Atchison, Topeka & Santa Fe Railway to create the first restaurant chain in America. His hotels and eateries dotted the AT&SF line, much of which parallels Route 66.

railroad towns of the Southwest together, we hope to give people an authentic experience of the great railroad era at the turn of the last century. A sense of place through historic rehabilitation of important structures connects and grounds us through time and can be the essential catalyst to revitalizing historic communities.

We all make choices for our communities. In Santa Fe, for example, we still have the Midtown Campus; Albuquerque still has the historic railyards; Clovis still has an abandoned Harvey House!—all unique opportunities for catalytic historic-based and future-focused projects. All of these need and deserve a practical, beautiful, community-creating path forward. But they also need a way to pay for and operate improvements—without a sound business model that inspires and meets community needs, these places will fail again. Without a visionary effort—and soon!—these places will fail too, either being torn down or converted to meaningless and content-less commercial spaces. Will we have the courage and wisdom to repurpose, reimagine and save our important places of beauty and memory, the foundations of our community resilience, or do we let them slip away forever? ■



The renovated Plaza Hotel in Las Vegas, New Mexico

forest fire in New Mexico history. For two months, firefighters were housed at the Plaza Hotel and 10,000 free meals were served at the Castañeda for evacuees and first responders—a true community effort with many restaurants and citizens taking part.

Meanwhile, we also purchased and restored several other buildings, including Frank Springer's mansion in Las Vegas, N.M. and the fabled Legal Tender saloon—the oldest building in Lamy, just 15 miles from the Santa Fe Plaza. After we reopened Legal Tender Lamy in 2019, George R.R. Martin and friends, purchased the Lamy depot and rebuilt the train from Lamy to Santa Fe to run as Sky Railway. In Lamy, too a renaissance is underway.

What Does It All Mean?

By resurrecting the key buildings and tying these

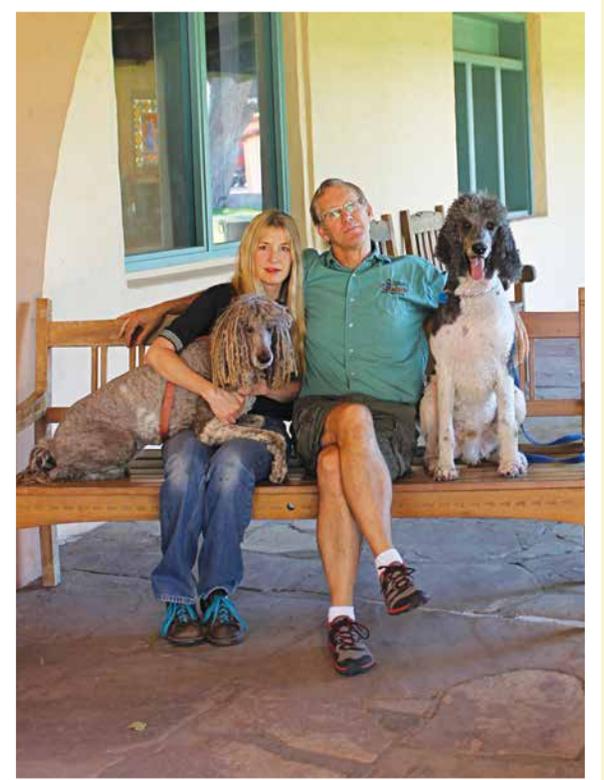


New Mexico Department of Tourism photo featuring the Plaza Hotel in Las Vegas

ALLAN AFFELDT

Entrepreneur Allan Affeldt's visionary projects are designed around a love for history and architecture in overlooked towns. Employing local craftsmen, Affeldt restores abandoned buildings that once stood as magnificent symbols of America's railroad era. In the process, he has helped revitalize communities.

Affeldt was twice elected mayor of Winslow, Arizona. He has served on many non-profit boards and worked in international conflict resolution. Affeldt and his artist wife, Tina Mion, whose paintings are in the National Portrait Gallery and several museum collections, collaborate on many projects. They also founded the Winslow Arts Trust, built the Winslow Art Museum and have donated objects ranging from the legendary 1930's Hubbell Rug to a 1950 Santa Fe Railway dome railcar.



Alan Affeldt, Tina Mion and friends



© Chandler O'Leary

FRED HARVEY AND MARY JANE COULTER

BY CHANDLER O'LEARY

Fred Harvey contracted with the Atchison, Topeka & Santa Fe Railway to create the first restaurant chain in America. His hotels and eateries dotted the AT&SF line, much of which parallels Route 66. Each of Fred Harvey's 84 establishments throughout the Southwest was thoughtfully designed to be at once beautiful, well-made, reflective of its natural surroundings and sensitive to its area's cultural heritage. One person we have to thank for much of that: Mary Jane Coulter.

That's right: Fred Harvey's right-hand man was a woman. And it's Mary Jane Coulter's style and sensibility that come through in the most memorable Harvey Houses. She is the one who created much of that unified "look" that we associate with the American Southwest. And that's because she did her research—she looked at all the different regional architectural styles of the various Native cultures of the region and blended them with the popular architectural styles of the day: Arts & Crafts, Mission and various revivals of European and even North African traditions.

Coulter went one step further, and did something that was way ahead of her time: She actually hired Native artists and craftspeople to complete many of the details on and in her buildings. She worked most often with Hopi painter Fred Kabotie, who contributed elements like the murals at the Painted Desert Inn and various interior details at Hopi House. In working with artists like Kabotie, Colter's buildings have an authenticity to them that, along with their craftsmanship, elevated them way above your average tourist trap. ■

Chandler O'Leary graduated with a degree in illustration from Rhode Island School of Design. She works in Washington state as a writer, illustrator and lettering artist. She travels frequently and has been recording her travels in sketchbooks for over 20 years. Her next book will be published by Sasquatch Books in March 2023. Her work can be found at [HTTPS://CHANDLEROLEARY.COM](https://chandleroleary.com).

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TERRA 2022 CONFERENCE

International Earth-building Gathering in Santa Fe

BY MARK CHALOM



In June, I was fortunate to attend TERRA 2022, the 13th World Congress on Earthen Architectural Heritage, organized by the Getty Conservation Institute, National Park Service and University of Pennsylvania Stuart Weitzman School of Design, under the aegis of the International Scientific Committee on Earthen Architectural Heritage (ICOMOS). The opening reception, held in Santa Fe on the historic plaza of the Palace of the Governors, was a true New Mexico event, complete with a welcoming Pueblo Prayer and Pueblo dancers and local traditional foods. It was a big hit with out-of-town guests.

The focus of Terra 2022 was historic earthen architectural heritage sites around the world— some, thousands of years old. Professionals—archaeologists, conservators, preservationists, architects, engineers, scientists and administrators—discussed the science, preservation and restoration of these structures and a complex mix of concerns and approaches appropriate to unique situations. They evaluated what led to successful projects. It was clear that one factor that helped make these projects successful was a community's investment and the development of local pride.

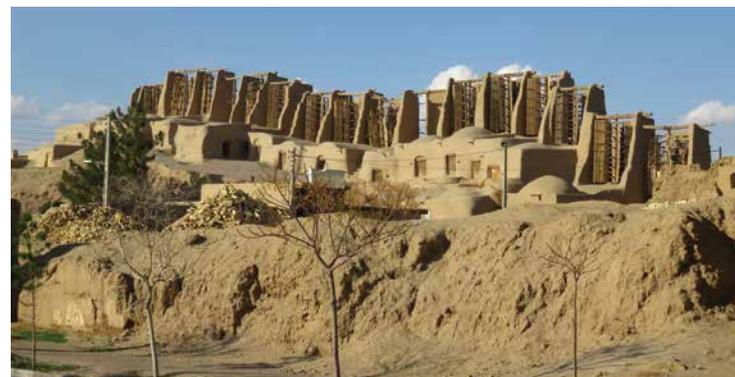
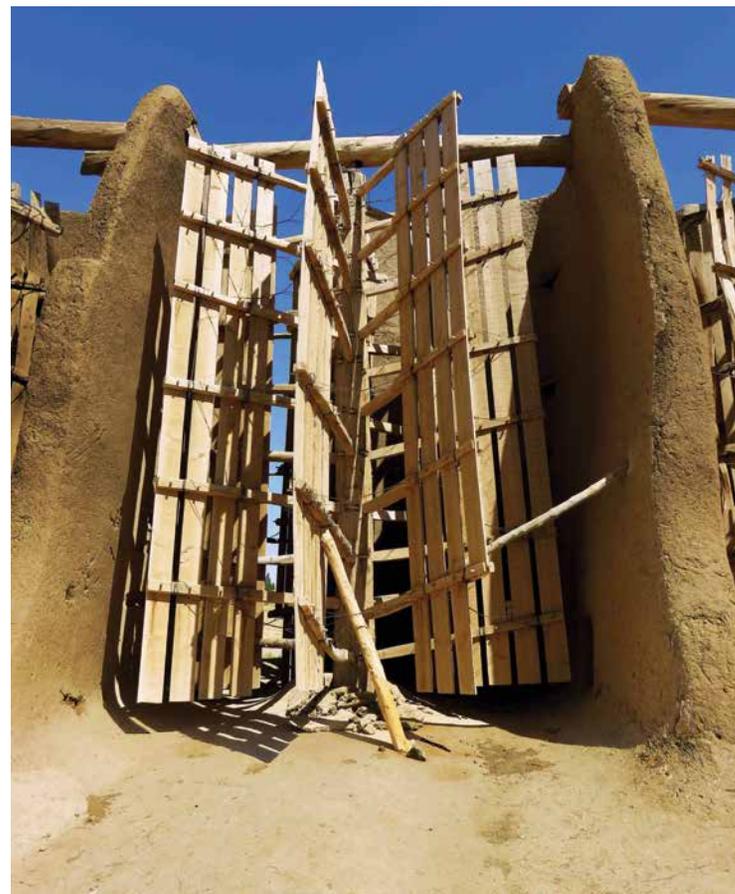
The intensive format had three tracks going on concurrently. I was always wanting to attend at least two at the same time. But the common room, for coffee breaks and healthy snacks, was the heart of the conference. We had a lot of time to network and have stimulating interactions with folks from around the world. I particularly enjoyed talking with two young women architects from Egypt and Morocco. They were both working on large, adobe mosques. They compared notes and shared photos.

There was a feeling of world togetherness and accomplishment.

The room also hosted the poster presentations, which were on display for people to review. One documented the restoration of an adobe home built on the California coast that was designed by Bill Lumpkins, my mentor in Santa Fe. Another described the building of a traditional African home, Japanese plastering techniques and tools were explained. A young woman presented a simple small adobe form and various colored muds she had collected to instruct children. Sandro Canovas, a New Mexican *adobero*, teacher, activist and restoration builder, was there with a friend from Marfa, Texas, who brought part of his earthen-building library (over 100 books) to share. The books were widely reviewed and appreciated.

There was a great sense of respect for New Mexico at the conference. Locals from various places in the state were intentionally included. They shared significant work being done in their communities. Through support from the Chamiza Foundation and Getty Foundation, scholarships had been awarded to 50 practitioners and professionals from Native American tribes, so they could attend. Pueblo leaders, such as one from Ohkay Owingeh, spoke of the importance of the restoration and preservation of earthen structures to their traditional culture, architecture and history. Acoma Pueblo Gov. Brian Vallo explained how homes were built for his community's Feast Days, where up to 150 people stand on a roof to enjoy traditional dances. The load on the beams and earth walls is extreme.

Cornerstones Community Partnership, a nonprofit based in Santa Fe, is highly respected for research and work in this field. The organization helps New Mexico communities rebuild and restore historic churches and buildings. Cornerstone's Jake Barrow and Francisco Uvinia played a big part in the conference's success.



Asbads, adobe/wood vertical windmills in Iran. The windmills grind flour for the community. The bottom photo shows an ice-making and storage system that utilizes night-sky radiant cooling to produce ice, even when temperatures don't go below 40 degrees Fahrenheit. These are examples of clean, renewable energies that have been utilized for thousands of years.
Photos © Alireza Khaksak

Photogrammetry drones develop detailed 3-D models of structures.

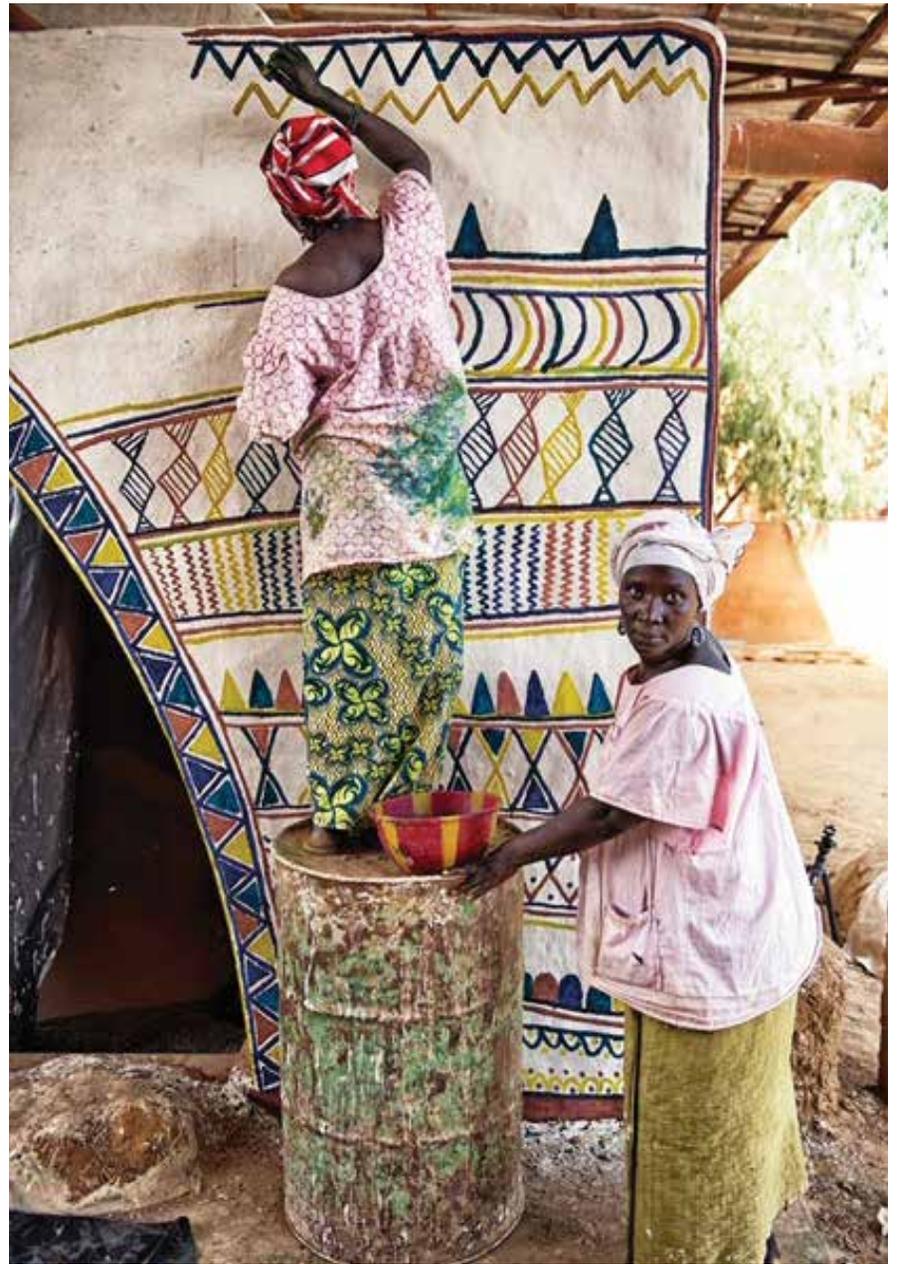
As part of the summary at the conclusion of the congress, a slide was projected. This composite photo showed many of the most important earthen structures around the world: the Djenne Mosque in Mali, the Alhambra in Spain, Hakka structures in China, beautifully painted homes of Ghana and Chan Chan, Peru. I was proud to see Taos Pueblo and Mesa Verde among these. We are fortunate to have these world-class treasures to enjoy.

The international visitors were impressed by tours of Santa Fe and local communities. They visited Cornerstone's restoration of the San Miguel Church, the oldest in the USA, across from "the oldest home." A walking tour included the Santa Fe County Courthouse, the Acequia Madre neighborhood, Cristo Rey Church, Palace of the Governors and the La Fonda Hotel. Out-of-town sites included the O'Keeffe home/studio and the plaza in Abiquiú, Christ of the Desert Monastery, Dar al Islam Mosque and the St. Francis of Assisi Church in Ranchos de Taos. Unfortunately, Taos Pueblo was closed due to COVID-19.

Presentations included state-of-the-art scientific approaches, innovative technologies such as laser scanning, Lidar and flying photogrammetry drones that develop detailed 3-D models of structures. Soils and applied finishes were analyzed with microscopy to understand chemical composition and locations of origin. The presentations were both in person and virtual, English and Spanish. I'm still amazed to see communications in real time, worldwide.



Adobe structures in Chan Chan, Peru, which was the largest city in Mesoamerica until the Spanish arrived. Photos courtesy Maribel Beas, Universidad San Martín



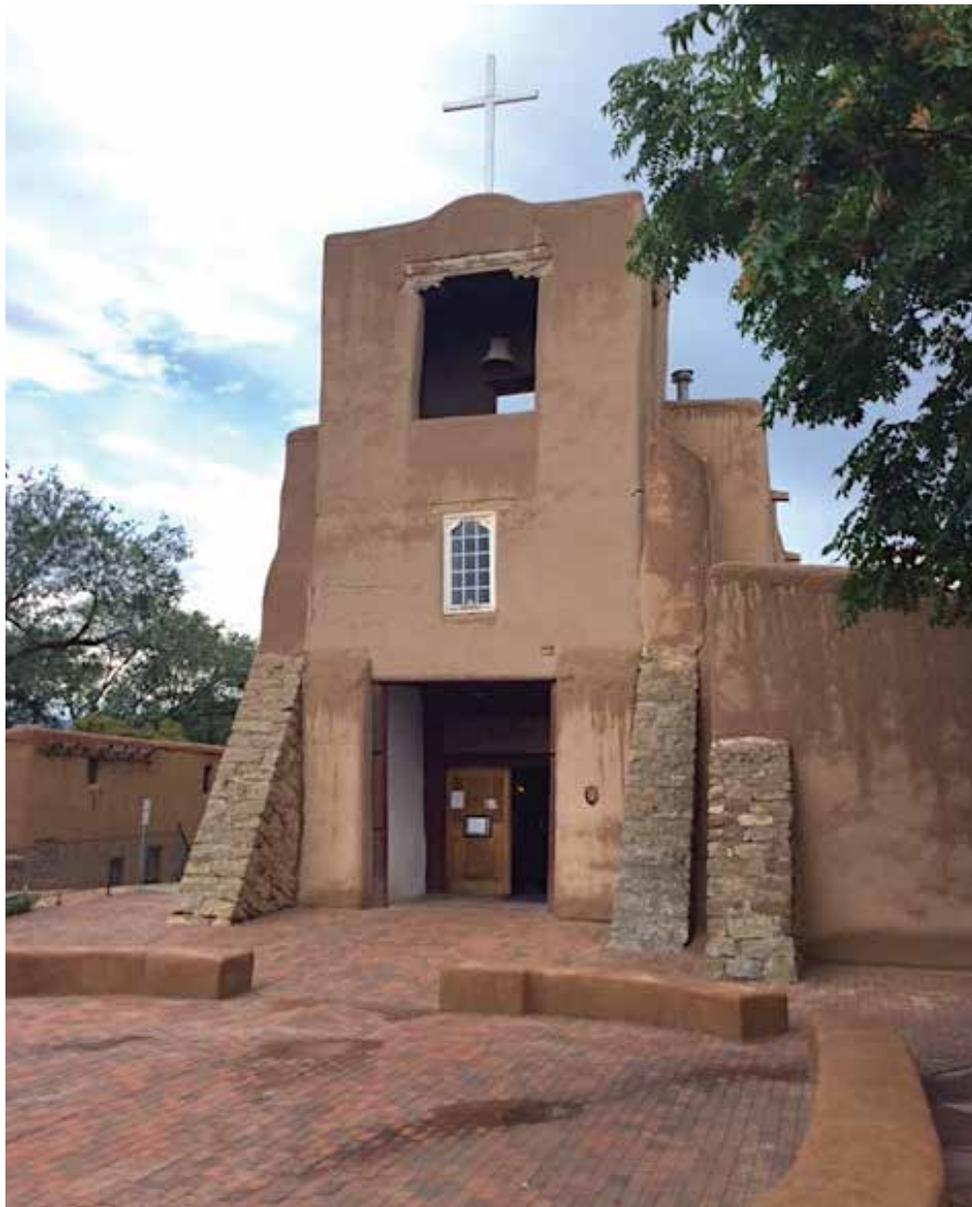
Women of Ayourou, Niger painting adobe walls. Photo © Thierry Brésillon

Amelie Essesse, an architect, showed a video of women in Ghana, Cameroon and Burkina Faso working together to replaster and decorate their buildings with bold geometrics and animal figures. They sang the whole time, pounding to the beat of the song and occasionally breaking out into dance. It showed love and pride.

Alireza Khaksak presented his work virtually. His task was to restore and protect the vertical axis windmills in Nashtifan, Iran, built 2,000 years ago and still used today to grind flour for the community. The vertical axis allows wind to turn grinding stones, eliminating the need for gears. The two-story adobe structure provides wind resistance, funneling energy directly to the blades. This is one of the first windmills in the world. It later appeared in China and Europe.

Vernacular Iranian adobe architecture is very sophisticated. It uses the climate to enhance comfort and produce energy. Courtyards, night sky radiant cooling, evaporative cooling, sun control, thermal mass, reflective surfaces and basic design all have been used for over 1,000 years. This type of architecture brought us to understand and utilize Passive Solar Design.

The San Miguel Chapel in Santa Fe is a deconsecrated Spanish colonial mission church, built around 1610. It was restored and is maintained by Cornerstones Community Partnership and students from St. Michael's High School. Photo by Mark Chalom



New Mexico's earthen structures are among the most treasured in the world.

Folks of diverse cultures, countries, religions and educational backgrounds were excited to be with each other to share their projects and ideas at the congress. There was a feeling of world togetherness and accomplishment. I learned much about the wonders of earthen architecture throughout history. Sadly, the concern that has everyone working double-time is climate change. Extreme weather is taking its toll on the built environment's world treasures at an accelerated rate. This is genuinely concerning, as there is never

enough funding, but fortunately, these folks are dedicated, committed and love what they do. The next TERRA World Congress will be held in Cuenca, Ecuador in 2025. ■



Mark Chalom, an architect, specializes in blending traditional and contemporary styles with sustainable technologies. He looks at the total structure, the site, materials, systems, water, landscaping, and their interaction with each other and the environment. Chalom has received the Passive Solar Pioneer Award from the American Solar Energy Society.

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EARTH USA CONFERENCE

BY MARK ZAINEDDIN

After a nearly three-year absence, Earth USA 2022—the 11th International Conference on Architecture and Construction with Earthen Materials—returned to Santa Fe in September. The conference, organized by a New Mexico-based non-profit, Adobe in Action, focused on an array of topics related to the current state of earth-building architecture, construction and preservation. Over 150 attendees from all over the world—including New Zealand, Rwanda and the United Kingdom—converged on the Scottish Rite Center's Alhambra Theater.

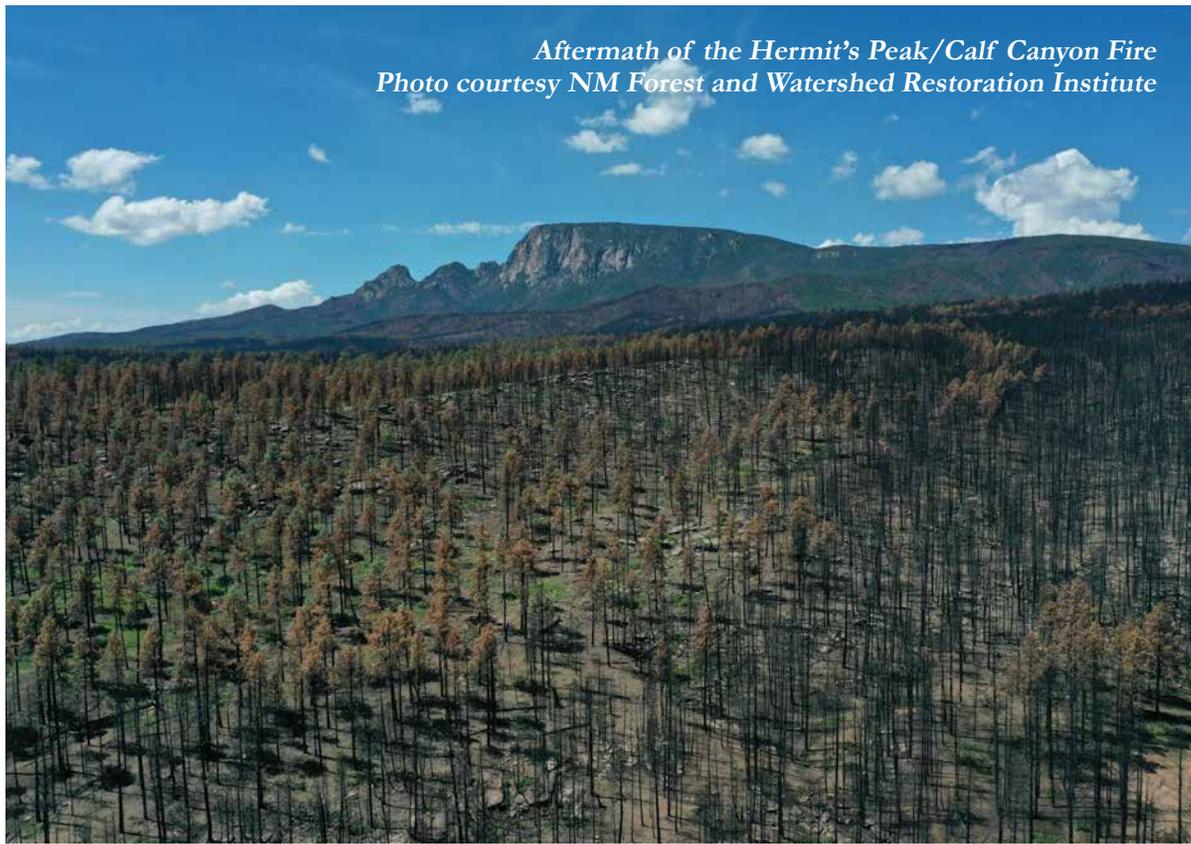
There were 22 podium and 12 poster presentations, as well as a panel on “adobe and fire.” Mark Chalom, a pioneer in sustainable architecture, delivered the keynote. He showed how low-carbon, local, natural materials can easily be used for owner-built, climate-responsive structures that have longevity and beauty and convey a sense of place.

Mel Medina, owner of the Alcalde, New Mexico-based Adobe Factory—one of the largest adobe brickyards in the United States—was memorialized. Medina had passed away less than a week before the conference. Two awards were presented. The Fred Webster Earth Building Engineering Prize was awarded to Scarlett Lee, a Ph.D. candidate and tutor at the University of Edinburgh, for her presentation, “Flood-Resilient Earthen Construction Technology: When Earth Meets Fabric.” Karen Terry received a lifetime achievement award for her decades-long contributions to and advocacy for earthen architecture and passive solar design, as well as for her efforts in helping to define a New Mexico solar vernacular.

Following the conference, many participated in a walking tour of earth-building sites in Santa Fe, and other sites were toured in northern New Mexico and southern Colorado. Full details about past, present and future conferences can be found at WWW.EARTHUSA.ORG.



Earth USA 2022 attendees posed in front of the Scottish Rite Temple.



*Aftermath of the Hermit's Peak/Calf Canyon Fire
Photo courtesy NM Forest and Watershed Restoration Institute*

New Mexico's Megafires Mark a Turning Point

For People, Land, and the Forest Service

BY WILLIAM DEBUYS

Firefighters don't normally allude to early English epics, but in a briefing on the massive Hermit's Peak/Calf Canyon Fire in northern New Mexico, a top field chief said, "It's like Beowulf: it's not the thing you fear, it is the mother of the thing you fear." He meant that the flames you face may be terrifying, but scarier yet are the conditions that spawned them, perhaps enabling new flames to erupt behind you with no escape possible. The lesson is a good one and can be taken further. If tinder-dry forests and high winds are the mother of the thing we fear, then climate change is the grandmother.

The Hermit's Peak/Calf Canyon Fire blazed across 534 square miles of the Sangre de Cristo Mountains, the southernmost extension of the Rockies. Although the fire was the largest in New Mexico's history, it had competition even as it burned. This spring, the Black Fire, a megafire of nearly equal size, devoured forests in the southern part of the state. The combined area of the two fires is roughly equal to that of Rhode Island, the American standard for landscape disasters on a colossal scale.

Records amassed by the Forest Service indicate that, at the fire's peak, 27,562 people were evacuated from their homes. Four hundred and thirty-three of those homes were destroyed and more damaged, while an even greater number of barns, garages, sheds and other outbuildings were also lost. The unquantified property damage, including destroyed power lines, water systems and other infrastructure, will far exceed the nearly billion dollars in damages arising from the Cerro Grande fire of 2000, which torched more than 200 residential structures in the city of Los Alamos. Meanwhile, the heartbreak resulting not just from destroyed homes but lost landscapes—arenas of work, play and spiritual renewal, *home* in the broadest sense—is immeasurable.

The Hermit's Peak fire began April 6 with the escape of a prescribed fire ignited by the U.S. Forest Service in the mountains immediately west of Las Vegas, New Mexico. A few days later and not far away, a second, "sleeper" fire, which the Forest Service had originally ignited in January to burn waste wood from a forest-thinning operation, sprang back to life. It had smoldered undetected through successive snowfalls and the coldest weather of the year. This was the Calf Canyon Fire. Driven by unprecedented winds, the two fires soon merged into a single cauldron of flame, which stormed through settled valleys and wild forests alike, sometimes consuming 30,000 acres a day.

The blaze marks a turning point in the lives of all who experienced the fire. It also marks a transformative change in the ecological character of the region and in the turbulent history of the alternately inept and valiant federal agency that both started and fought it.

THE TURNING OF A CLIMATE TIDE

Two and a half decades ago, a long-running wet spell came to an end in the Southwest. Reservoirs were full, rivers were meeting water needs, and skiers and irrigators alike gazed with satisfaction on deep mountain snowpacks. The region's forests were stable, if overgrown.

Then came a dry winter and, on April 26, 1996, an unextinguished campfire in New Mexico's Jemez Mountains flared into a major conflagration that came to be known as the Dome Fire. I vividly remember the startling whiteness of its mushroom-shaped smoke plume surging into the sky, a sight all the more unnerving because the fire was burning within rifle shot of Los Alamos National Lab, the birthplace of the atomic bomb.

It engulfed much of Bandelier National Monument and stunned observers in two ways. The first surprise was that it erupted so early in the year, before fire season should properly have begun. The second was that it grew to what was then considered immense size: 16,516 acres. How times have changed.

The outbreak of the Hermit's Peak and Calf Canyon fires, weeks earlier than the Dome, shows yet again that fire season is much longer than it used to be. The size of the burned area speaks for itself. A day when the combined fire consumed only as much land as the Dome did in its entirety sometimes felt like a *good* day.

Meanwhile, the news on water here in the Southwest is hardly less worrisome. Arizona's Lake Mead, the nation's largest reservoir, was full in 2000. This year it entered the summer at 27 percent of capacity, as did its younger and slightly smaller sibling, Lake Powell, upstream on the Colorado River. Plummeting water levels jeopardize the capacity of both lakes to produce hydroelectricity, which bodes ill for the region's electrical grid.

On the Río Grande in New Mexico, Elephant Butte reservoir, the state's largest, is down to 6.2 percent of capacity, and New Mexico's inability to meet its water delivery obligations to Texas reveals the absurdity of interstate water compacts based on outdated assumptions about streamflow.

Into an already dire situation came the Hermit's Peak and Calf Canyon fires, both sparked by Forest Service land treatments intended, ironically enough, to reduce the risk of rampant wildfire. Both projects were executed in accordance with the existing management rulebook, but the rules are rooted in a past more stable than the bone-dry, wind-fickle and imperious present.

Chief Forester Randy Moore, who ordered a review of all actions relating to the prescribed fire that exploded into the Hermit's Peak disaster, captured the essence of his agency's failure this way: "Climate change is leading



*Hermit's Peak/Calf Canyon Fire, the largest wildfire in New Mexico's recorded history
Photo courtesy U.S. Forest Service*

to conditions on the ground we have never encountered... Fires are outpacing our models, and... we need to better understand how megadrought and climate change are affecting our actions.”

To say that macro conditions have rendered the Forest Service's procedures obsolete should not obscure the issue of human fallibility. The chief's review uncovered a host of minor bumbles (80 pages worth, in fact) that cumulatively unleashed the catastrophe.

The bottom line: Setting prescriptive fires is inherently dangerous, and the extremes of heat, dryness and wind brought on by climate change leave only a razor-thin margin for error.

Being behind the curve of change this time around has been a replay of the agency's formerly nearsighted view of fire itself. The Forest Service was born in fire. It was a young, struggling agency until the heroics of fighting the “Big Blowup” of 1910 in the northern Rockies established its identity in the national consciousness. PR campaigns exploiting the anti-fire icon of Smokey Bear helped complete its branding.

The agency's fierce stance against fire in all forms crystallized its identity and mission, while also blinding it to important ecological realities. Many forest systems require periodic doses of “light fire” that burns along the ground, consuming underbrush, seedlings and saplings. In its absence, the forest becomes overcrowded, choked with fuel and vulnerable to a potentially disastrous “crown fire” that storms through the treetops, killing the entire stand. The ponderosa and “mixed conifer” forests that dominated a large part of the area consumed by the Hermit's Peak/Calf Canyon Fire were overstocked in exactly that way. The Forest Service rightly deserves criticism for more than a century of all-out fire suppression, which led to unnaturally dense, fuel-heavy forests.

But that's just one part of the story. Climate change is writing the rest.

THE FIRE SERVICE

The Southwest is now in the midst of its second-worst drought in the last 1,200 years. Less publicized is the news that, were it not for greenhouse-gas pollution, the current dry spell would be rather ordinary. Nor is the forecast encouraging: Given the warming of the regional climate, by perhaps 2050, coniferous forests in the Southwest—the majestic stands of ponderosa pine,

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Douglas fir, Englemann spruce and subalpine fir that clothe the region's blue mountains—will be, if not extinct, then rare indeed.

Fire, insects, drought and outright heat, all driven by rising temperatures, will deliver a flurry of blows to doom the forests. However, it is (if, under the circumstances, I can even use the term) cold comfort to realize that, along the way, the ecological impact of the Forest Service's misconceived ideology of all-out fire suppression will be—and already is being—erased by the implacable dynamics of a changing climate.

Having recognized its error on fire, and having also been weaned by endless litigation from its post-World War II subservience to the timber industry, the Forest Service has attempted to recast itself as the nation's premier steward of our wild lands. The Hermit's Peak/Calf Canyon Fire, unleashed by the Forest Service itself, appears to have brought that process of reinvention to an inglorious conclusion.

But all is not lost, for the Forest Service is actually two agencies, and only one of them has failed. The portion of the Forest Service committed to day-to-day custodianship of the national forest system may be underfunded, uninspired and (despite many outstanding individuals in its workforce) poorly led, but its fire-fighting sibling is thriving. Some people call this portion of the agency the Fire Service.

In an era of global warming, fire-fighting is a growth industry and the Fire Service has managed to outfit itself accordingly. It sports the organizational coherence and high morale of a crack military outfit, while possessing equipment and funding to match its mission. Its infantry consists of fire crews recruited across the West that rotate in and out of action like combat troops.

The “armor” of the Fire Service consists of bulldozers, pumper trucks, masticators (that grind trees to pulp), feller-bunchers (that cut and stack trees) and other heavy equipment that clear fire lines scores of miles long. For air support, it commands not just spotter planes, slurry bombers (which douse fires with retardant) and bucket-wielding helicopters, but drones and state-of-the-art “Super Scoopers” that can skim the surface of a lake to fill their capacious cargo tanks with thousands of gallons of water. Then they head for the burning edge of the fire and, assisted by infrared guidance systems, drop their loads where the heat is fiercest.

Like any modern military unit, the Fire Service also uses satellite imagery, advanced communications and specialists in logistics and intelligence (who predict fire behavior). Against the Hermit's Peak/Calf Canyon Fire, it deployed more than 3,000 personnel around a 648-mile fire periphery. For a time, the nation's entire fleet of eight Super Scoopers was based at the Santa Fe airport.

YOU DON'T NEED A WEATHERMAN

The trouble with low-altitude air support is that bad weather can keep planes, choppers



Hermit's Peak/Calf Canyon Fire
Photo courtesy U.S. Forest Service

and even drones on the ground. In fire-fighting parlance, it's a “red-flag day” when the weather service issues a red-flag warning (RFW) signaling that winds are strong enough to produce explosive fire behavior. Such a warning also leaves the Fire Service's air fleet grounded.

In April and May, in the area of our recent fires, more than half the days—32, to be exact—warranted red flags, a record since such warnings were first counted in 2006. That included nine straight days of RFWs—April 9th to 17th—when the fire-fighting air force was largely grounded and the flames raged.

I remember those blustery days. I live in a village on the west side of the Sangre de Cristo Mountains. The fire was on the east side. Most afternoons, I climbed a ridge to watch its immense smoke plumes boil into the sky. A fire volatilizes the water in the trees and other vegetation it combusts, dry though they may be. The vapor ascends the smoke column, crystallizing to ice as it reaches the frosty altitudes where jetliners fly. There, it condenses into blinding white cottony clouds that dwarf the mountains below them. A terrible sight to behold, those *pyrocumulus* clouds embody the energy released when our oxygen planet flaunts its power.

Wind may be the most neglected subject in the science of climate change. Nevertheless, it appears that the strength and distribution of wind phenomena may be changing. For example, derechos—massive, dust-filled weather fronts of violent wind—are now materializing in places where they were once little known. In their vehemence and duration, the gales that drove the Hermit's Peak/Calf Canyon Fire seem to have been no less unusual.

MAKING PEOPLE WHOLE

In multiethnic New Mexico, history and culture color every calamity. The vast majority of the people evacuated from the path of the Hermit's Peak/Calf Canyon Fire were Hispanic, most of them descendants of families that settled the region prior to its conquest by the United States in the war against Mexico of 1846 to 1848.

The Forest Service arrived relatively late on the scene as the colonizing arm of an Anglo-Protestant government centered 2,000 miles away. It assumed control of mountain expanses that had previously functioned as a *de facto* commons vital to local farmers and ranchers. Some of the commons were *de jure* as well, consisting of Spanish and Mexican land grants that were spirited away from their rightful heirs by unscrupulous land speculators, most of them Anglo.

The Forest Service may not have wrenched those lands from the people who owned them, but because many such lands were later incorporated into national forests, the agency inherited the animosity that such dispossession engendered. Restrictions the Forest Service subsequently imposed on grazing, logging and other uses of the land only added to those bad feelings.

The Hermit's Peak/Calf Canyon catastrophe has understandably rekindled old resentments. Many of those who lost their homes or other property lacked insurance. (A typical house had been in the family for generations, was never mortgaged, and relied on wood stoves for heat.)

In the immediate aftermath of the fire, competing law firms began recruiting area residents to participate in class-action lawsuits as a means to obtain compensation for losses. Meanwhile, the four Democrats in New Mexico's congressional delegation—a fifth member is Republican—jointly introduced legislation to help the fire's victims, and happily, the \$2.5-billion Hermit's Peak/Calf Canyon

Fire Assistance Act was rolled into a continuing resolution to keep the government funded, which became law at the end of September.

Given that this country has so far done little to protect its citizens from the dangers of climate change, it is some consolation that, in this instance, the victims of that growing tragedy will at least receive restitution for the cash equivalent of their losses. Their nightmare of paperwork, however, is just beginning.

IF THE THUNDER DON'T GETCHA...

We prayed for rain to stop the fire and ease the record-breaking dryness. When the rain finally came, it filled us with dread as much as gratitude. Severe burns produce “hydrophobic” soils, which absorb a downpour no better than a parking lot. The resulting floods can be orders of magnitude greater than normal runoff. In addition, sometimes the detritus of the fire—downed trees, mud, ash and unmoored boulders—mixes into a “debris flow,” a sort of goopy, fast-moving landslide.

A record monsoon this summer brought blessings to the west side of the mountains and sometimes weekly floods to the scorched east side. Shortly after the flames died down, part of the village of Rociada (which means “dew-laden”) was inundated by a flow of hail and ash two feet deep. Not far away, several people were drowned when they tried to drive across a normally tame creek. Many others, who live beyond the fire’s periphery, including 13,000 residents of Las Vegas, New Mexico, depend on water drawn from valleys now choked with ash. The taste of the fire, both literally and metaphorically, will be with them indefinitely.

And thanks to climate change, there will be plenty more fire. Our dawning new age, shaped by human-wrought conditions, has been called the Anthropocene, but historian Steve Pyne offers yet another name: the Pyrocene, the epoch of fire. This year, it was New Mexico’s turn to burn. Last year, an entire Greek island combusted, along with swaths of Italy, Turkey, large chunks of the Pacific Northwest and California. Fires in Siberia, meanwhile, consumed more forest than all the other areas combined. When it comes to ever more powerful fires, we New Mexicans are hardly alone.

On my side of the mountains, the county sheriff ordered us to prepare to evacuate. Fortunately, the flames halted a few miles away. We never had to leave. But packing our “go” bags and securing our houses now seems to have been a useful dress rehearsal. The drought and winds will be back. A bolt of lightning, a fool with a cigarette, a downed power line, or... goodness knows... the ham-fisted Forest Service will eventually provide the necessary spark, and then our oxygen planet, warmer and drier than ever, will strut its stuff again.

My neighbors and I know that this time we were lucky. We also know our luck can’t last forever. We may have dodged a bullet, but climate change has unlimited ammo. ■

William deBuys has authored 10 books, including A Great Aridness and The Last Unicorn, which compose a trilogy that culminates with the recently published: Rediscovering The Trail to Kanjiroba Earth in an Age of Loss.



New Mexico Wildfires: The Gift That Keeps Giving

Fear and Loathing Near Las Vegas (Part 2)

BY CHARLES CURTIN

It’s June 28th, and after a few weeks of relative normalcy in the Mora Valley in which we’ve savored the delights of electricity, internet and running water, we’ve decided to get off the farm and treat ourselves to an evening in Taos. As we stop by the barn to feed the animals before heading out, I notice a small undulating line of liquid, like a black serpent, slithering across the road about 75 yards from the car. I thought about investigating, however, we were running late and I’m in a hurry, so I figured I’d look on the drive out.

It’s a good thing that the barn is on higher ground because in the five minutes it took to complete the feeding, I returned to see most of the valley, including the road we’d intended to drive on, inundated with rushing water! And yet, there was not a cloud in the sky. The water came from miles upstream, and there was no way the flooding could have been predicted, based on local conditions. However, we have become extremely good at reading the signs of an impending flood. First, a damp, musty chill fills the air. Then, when you see a trickle of water coming across the fields, you know you’ve only got a minute or two to get out of the way!

Our evening’s plans were off, and so began for July and well into August a daily drama of a flood of water running down the canyon most afternoons or evenings, followed by mornings spent on the tractor clearing muck off the road (before the next flow that afternoon). Meanwhile, not just Cañoncito Creek overflowed, but our 200-year-old acequia filled with ash and, after rains, a geyser of black filth would erupt out of the ditch, carving trenches into our road, rendering it impassable. So, we faced the double jeopardy of muck emanating from the creek covering one end of the entrance road—while at the other, deep ruts carved by water off the acequia also blocked passage. The flooding was just the first of many post-fire challenges to beset burned-over mountain communities.

A NEW PESTILENCE DESCENDS

Recent months in the Mora Valley have been rather biblical. Fires, floods, and then...locusts.

Locusts, you say? Are there locusts in New Mexico? To be clear, these are not the winged insects that descend upon communities in droves. These have briefcases, scare tactics and a slick sales pitch. Yup, you guessed it. Lawyers.

Before proceeding, let me be clear not all lawyers are locusts that feed on unsuspecting farms, families and villages. Many are competent professionals who provide an invaluable service by helping people navigate the legal system, which can be essential in addressing complex issues such as post-fire compensation.

Flooding was just the first of many post-fire challenges to beset burned-over mountain communities.

And yet, there is another kind of lawyer. One that is all too common in fire-damaged areas. They follow fires and other tragedies to make a quick buck off of traumatized people. In short...locusts.

Through bundling, large out-of-state firms represented by lawyers with a New Mexico address reel in clients for a commission, when the actual legal work is handled elsewhere. In one of the most cynical manipulations of historical fears of Hispanic

We'll likely never have a better shot at enacting positive change than right now.

OH WHERE, OH WHERE, HAVE THE FEDS GONE?

In contrast to the deluge of feds and contractors during the fires, engagement on the ground practically disappeared following the fires. Yes, organizations such as FEMA were present. However, their congressionally mandated guidelines to prioritize the protection of life and physical structures were of limited value in an agrarian community where many people's greatest asset is their land. Government assistance typically only extended to public property, so during the floods, unless you were on a public road or surrounded by public lands, you were out of luck.

We faced a scenario where we could have protected ourselves by using berms to redirect the water back to the main bed of Cañoncito Creek, but that would have flooded the county road and threatened a neighbor's home. So, we took the brunt of it and watched ag lands that had been lovingly tended for more than a century become fields of debris—rather than fields of hay.

The National Guard was extremely helpful in bringing sandbags early in the flooding, and it was heartwarming to see youth from around the state helping devastated rural communities—but soon, they too were gone, and local people were abandoned to face the onslaught of impacts from events not of their making. In our case, neighbors came with heavier equipment that they used to build levies to channel the water across our fields—but these too were usually leveled by the next flood.

Outside assistance is now reappearing, but too often contains quick and shoddy fixes that may do more harm than good. For example, many of the seed mixes provided by agencies to landowners to protect their soil contain species most ecologists would consider invasive and have little nutritional value for wildlife.

Money is now pouring into this fire-ravaged region. However, it's not the amount of money—but how it is spent—that matters!

Another example of the short-sighted solutions that pervaded in the post-fire period: A nearby road crossing that had three culverts which blew out in the floods and was replaced by a two-culvert one with less capacity. So, not surprisingly, within hours of construction, it began eroding out. For over a week, highly paid out-of-state contractors made bags of money, shoring up something that should never have been done in the first place! This situation is being repeated hundreds if not thousands of times across the region where political band-aid fixes are being applied rather than getting at the heart of the problem, which requires an integrated, locally based approach to wholesale community and landscape revitalization.

DUTCH BOYS AND DIKES

The post-fire process has been a bit akin to the story about the Dutch boy putting his finger in the dike. However, unlike the fable, most simple-minded fixes only led to a larger-scale collapse. Likewise, the government's collective response to the fires has been to bring in thousands of highly paid Dutch boys to milk the system without providing a viable solution because, like the finger in the dike—simple and singular approaches typically lead to more significant problems down the road.

Instead, in what are termed regenerative approaches, one needs to work in harmony with the system to help it heal itself, for lasting solutions only come from channeling internal dynamics rather than fighting them. Paula García of the New Mexico Acequia Association says it best when she refers to *herencia* (inheritance) and *gerencia* (management) as being crucial locally based foundations for creating durable solutions. Cultural traditions and landscape health are entwined, and viable long-term outcomes



During flooding and after flooding © Charles Curtin

residents being taken advantage of by Anglos, New Mexico attorneys with Hispanic names and no experience in fire litigation are trotted out as front men (or women) for the big bundlers.

Hermit's Peak Fire Assistance Act is doing well in Congress, so unless one is a large landowner with considerable losses, most people may not need an attorney to recover damages. Instead, people are being duped into joining "class action suits," which too often is just another term for taking a monetary cut from someone for something they could have received anyway. Unfortunately, many local charities, churches and community centers have become unwittingly duplicitous in this fraud by holding their buildings open for what are called "learning or information sessions," which are usually just thinly veiled promo events to snare unsuspecting clients.

The big bundlers have signed on hundreds of clients through these deceptive techniques; however, successful fire litigation takes considerable expertise, upfront expense and a focus on the needs of individual clients to succeed. The sad reality is, it's probably impossible to effectively serve the needs of hundreds of people through a legal mill. In what can well be described as institutionalized corruption, our leaders turn a blind eye as lawyers scare and mislead people into signing up for legal representation they often don't need, that too often takes a significant portion of the already too-modest settlement. So the locusts' feeding frenzy mostly serves to enrich out-of-towners and furthers post-fire decline by leaving struggling communities with fewer resources for recovery.

An integrated, locally based approach to wholesale community and landscape revitalization is required.



National Guard filling sandbags
Photos © Charles Curtin

rest with working in alignment with the culture and ecology of the region.

Money is now pouring into this fire-ravaged region. However, it's not the amount of money—but how it is spent—that matters!

Forestry business owner David Old of Las Vegas has pointed out there seems to be no coordinated plan to give local people sustainable access to the forest. "What will all the folks with nothing but a beat-up pickup truck and a Stihl chainsaw—the only livelihood they ever had—do for a living?" Noted fire attorney Tom Tosdal, one of the folks who litigated the 2018 Paradise, California fires, has seen the

aftermath of many poorly planned and executed wildfire recovery efforts. He notes that the problem with the typical private-sector solution is that wildfire

The people in the best position to know what is needed have been largely cut out of the process.

litigation's focus on individual recovery means that people and businesses may receive partial compensation—but the burned areas are not restored, and people who have lived for generations on their land are forced to leave because the



Restored Ponderosa Pine forest with a mix of ages and sizes of trees, an open canopy and luxuriant understory that is rich forage for wildlife



A two-culvert replacement for a three-culvert road crossing blew out shortly after replacement.

wildfire recovery, whose mission appears to be, at best, to spend a bunch of money recreating the social and ecological ills that led to the wildfires in the first place! After a brief flush of recovery dollars, the communities are left with fewer resources than ever to deal with the issues that plagued them before the fires. We must do better!

WHAT IS NEEDED?

First, recognition that wildfire recovery is not just an economic or ecological challenge but a restorative justice issue, in which local people need to be heard and engaged in the process to help repair not just fire damage but decades of economic and political oppression that impacts not only the health of communities—but also that of the land.

Second, to our donors and relief organizations: Yes, immediate disaster relief is critical, and most organizations have been exemplary in the rapidity and extent of their response. But that's not enough, and it's time to also apply resources to support workable long-term outcomes, for the fires were not a cause but a symptom of larger social ills that must be addressed for lasting solutions to occur.

The fires were not a cause but a symptom of larger social ills that must be addressed for lasting solutions to occur.

Finally, to our leaders: We'll likely never have a better shot at enacting positive change than right now. Do we embrace a culture of stewardship and community-building that creates lasting solutions, or do we settle for the status quo of the politics of division and face more fires, floods and community decline? Do you want to be part of the problem or part of the solution? There are some viable solutions, examples of which I will introduce in the article on page 19. ■



Charles Curtin has over two decades of experience designing or managing place-based conservation projects. He is the author of *Science of Open Spaces* (2015) and *Complex Ecology* (2018). His forthcoming book is *Prosilience: Channeling the Capacity for Positive Change*. Curtin lives in the Mora Valley of New Mexico, where he works on collective solutions to large-scale challenges such as forest and watershed health, wildfire and climate change. His author webpage is CHARLESCURTIN.COM

underlying problems are never addressed.

Wildfire recovery in New Mexico is embarked on a similar path. Of the many landowners, loggers and others tied to the forestry industry I have spoken to, none have had a meaningful dialog with agencies or politicians regarding how to restore local landscapes and communities. In other words, the people in the best position to know what is needed have been largely cut out of the process.

Einstein purportedly said, "The definition of insanity is doing the same thing over and over again and expecting a different result." This seems to be the case with

Farming and the Trials of Job

BY MARK WINNE

A vulture is circling overhead as I'm staring at the rubble of a house that used to be Randy Cruz's home. "There's my bed," he says, pointing to the remnants of a bedspring. "Under that is where I kept my guns, but I can't find them. They must have melted." A stack of red, yellow and orange Fiesta tableware sits where the kitchen used to be, covered in soot but still neatly stacked, the only stroke of color in an otherwise blackened scene of total devastation.

I met Cruz almost three years ago at the Eldorado Farmers' Market. Like a growing number of local food enthusiasts, I started buying eggs weekly from him while catching regular doses of his excitement for hens, ducks, turkeys and geese at his Sapello, New Mexico farm. At the market

The valleys and pastures had turned so impossibly lush that you were tempted to ignore the carnage.

one day I overheard a conversation between him and a customer. Apparently, a neighbor's pack of marauding dogs had tunneled under his fence and wantonly killed over a thousand of his birds. Cruz was distraught and angry with his neighbor's carelessness, but by the very next day, he placed an order for replacement pullets.

As the dark cloud of the pandemic settled over New Mexico six months later, and Cruz's restaurant and direct-sales accounts began to dry up, he wondered how he'd move the hundreds of cases of eggs that his birds were now producing. It turned out his concerns were premature. Worried about their own food insecurity, individuals were driving 75 miles one way from Santa Fe to buy his eggs. He couldn't keep up with demand, partly because the replacement chickens were not yet laying enough eggs.

Any reasonable person—even natural risk takers, like farmers—would assume that two catastrophic hits in six months is more than your fair share. But just two years later, smoke was blowing from the direction of Hermit's Peak across Cruz's farm. Pretty soon, firefighters were everywhere, evacuation orders were issued, and the flames swept through his farm on their way to consuming 350,000 acres of New Mexico's forests and grasslands. As the final embers from his house were dying out, the angry gods of the Pecos Wilderness whipped up a gully-wamper of a July monsoon deluge that, with the aid of now-bare ground, drowned pastures, moved fences into the next county and turned roads into canals only fit for amphibious vehicles.

If there was an upside to the New Mexico spring and summer from hell, it was that the valleys and pastures had turned so impossibly lush that you were tempted to ignore



Randy Cruz surveys what's left of his home in Sapello, New Mexico. Photo © Mark Winne

the carnage. On an 80-degree, cloudless August day in the Pecos foothills, Paradise had supplanted the inferno that had brought a billion dollars or more of wreckage and ruin to people's lives. But blue skies and green grass are not salves for hearts broken by extreme assaults of man and nature; warm temperatures and a new FEMA trailer don't heal the trauma of dislocation and barely escaping with your life. "As I was driving away from my house, I could see it going up in flames in my rear-view mirror," Randy told me. "I thought our car was going to blow up because flying cinders were raining down on us."

"As I was driving away from my house, I could see it going up in flames in my rear-view mirror."

During a bumpy ride in Cruz's ATV down a washed-out road, I asked him how he feels about all this. "All I know is that I got a business to run," he replied. "I don't think about giving up; I just keep going." One can argue about forms of denial and stages of grief, but you must worry about the farmer who can't take time for himself because he has thousands of birds to feed and water, and hundreds of dozens of eggs to gather each day. Maybe community support helps, which came from neighbors who volunteered to collect eggs after his workers were forced to leave. And maybe moments of healing came from his loyal Eldorado customers who lined up at his farmers' market stall on May 20 to welcome him back.

Perhaps to insulate his farm from the vagaries of Mother Nature as much as to diversify his product line, Cruz purchased a containerized, controlled-atmosphere plant production system. Banking on the growing demand for local fresh vegetables and the technology that allows you to meet that demand year-round, Freight Farm sells a 40-by-8-by-9-foot standard shipping container outfitted with ceiling-to-floor movable plant shelves, a computerized water, CO2 and nutrient system and highly efficient LED lighting. Plug it in, seed the rock-wool trays, monitor the mixture, and harvest. Bingo! The container will hold the equivalent of two acres worth of lettuce—seed to harvest in 60 days for each head. "Cid's [the Taos supermarket] has already said they will buy \$100,000 of produce from me a year," Cruz told me.

He also wants to expand his egg production. As it stands now, one farmhand devotes nearly a full day to sorting and washing eggs—a labor-intensive approach that limits growth. The capital-intensive answer is a \$75,000 egg-washing and sorting machine that will process 9,000 eggs per hour. Randy just purchased this lovely little piece of appropriate technology that takes eggs right from

More poultry, eggs, workers and sales will ensue.

the chicken coop along a conveyor belt into a tunnel lined with swirling brushes which remove any foreign matter. Each egg is electronically weighed—weight being the determinant of size category (e.g., large, jumbo)—and sent into the appropriate chute for packaging. More poultry, eggs, workers and sales will ensue.

Farming will always be a fraught enterprise. No matter how favorably the gods look upon you

from season to season, or how many resources you have to deflect the slings and arrows, it's always three steps forward, two steps back, one year; two steps forward and three steps back the next. If over a lifetime you come out a little bit ahead, then you've done well. In the meantime, tending to the well-being of those who voluntarily choose that struggle—to feed us, among other reasons—is a community responsibility that can't be neglected. ■

Mark Winne, a Santa Fe-based author, has written four books, the latest of which is Food Town USA. He also works as a senior adviser for the Johns Hopkins University Center for a Livable Future.

REGIONAL PARTNERSHIP TO TACKLE CLIMATE CRISIS

Boulder County, Flagstaff, Salt Lake City and Santa Fe

A partnership of local governments will soon pool resources to fund carbon dioxide (CO₂) removal (CDR) projects in the Four Corners region. The 4 Corners Carbon Coalition (4CCC), established by Boulder County, Colorado and Flagstaff, Arizona, will work with Salt Lake City, Utah, and Santa Fe, New Mexico. Earlier this year, Boulder County and Flagstaff invested seed funding to launch the coalition with the goal of spurring regional innovation to fight climate change. The coalition will provide funding to accelerate CDR project deployment and business development.

CDR describes diverse processes on land and at sea that take carbon dioxide out of the atmosphere and durably lock it away in geological, biological and synthetic formations for decades, centuries, or even millennia. According to the United Nations' Intergovernmental Panel on Climate Change (IPCC), cutting emissions from fossil fuels is necessary but is no longer sufficient to stem the worst effects of climate change.

Flagstaff Mayor Paul Deasy said, "This collaboration gives local communities the opportunity to show what community-based CDR might look like and the potential benefits of supporting vetted projects in our backyards." "Less than a year ago, the most devastating fire in Colorado history destroyed over 1,000 homes," said Boulder County Commissioner Matt Jones. "Boulder County knows all too well the catastrophic impacts of climate change. We are thrilled to partner with other local governments to fight the crisis through carbon dioxide removal. The coalition will take action to develop and test real world projects to address the enormous challenge we face."

Salt Lake City Mayor Erin Mendenhall said, "We're building cleaner buildings and investing in healthy transportation. But we need to do more. [We need to] support the next frontier of projects to reduce local emissions. This innovative partnership will support and bring awareness to the many ways that we can pull carbon out of the air. I'm excited to see what we can do."



The inaugural round of funding will support projects that integrate carbon dioxide removal with concrete production.

"We're committed to saving our planet. Joining the 4 Corners Carbon Coalition is another important way we can make a difference," said Santa Fe Mayor Alan Webber. "With our partners, we'll continue to eliminate greenhouse gas emissions by installing solar arrays, transitioning to electric vehicles and practicing energy conservation. Together we're going to address the climate crisis with the urgency it deserves."

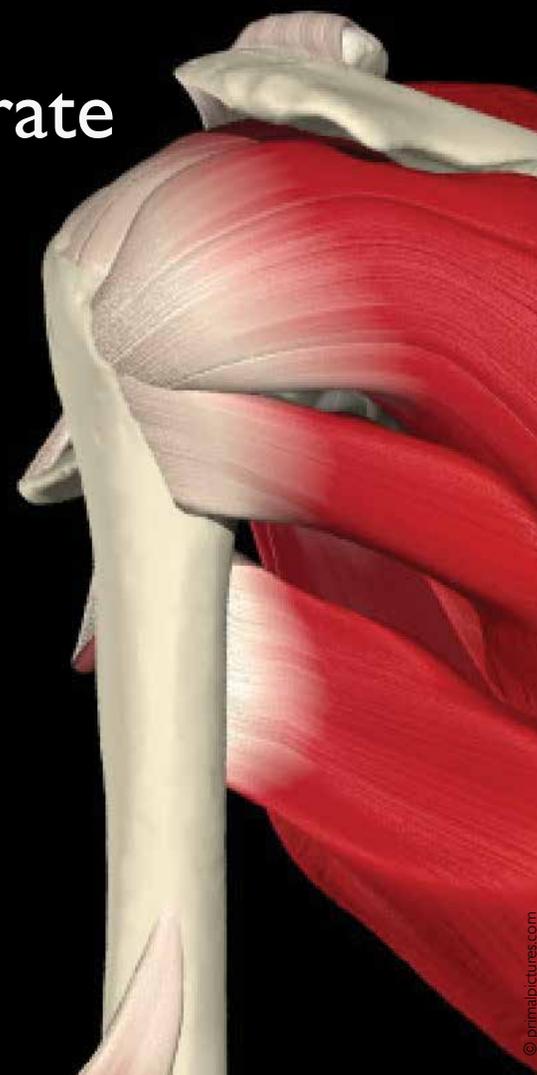
The 4CCC's inaugural round of grant funding will support projects that integrate CDR with concrete production in the region. Visit www.4cornerscarbon.org for more information about the coalition and the application process.

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THE SANGRE DE CRISTO MOUNTAIN INITIATIVE

An Audacious Commonsense Proposal

BY CHARLES CURTIN

In this and the previous issue of *Green Fire Times*, I have reviewed the many challenges facing communities that burned in recent wildfires. There are many complaints about what is wrong, and I've contributed some myself—but few proposals for proactive, viable solutions. We've got one, and we ask communities, our leaders, policymakers, funders and foundations to take a break from business as usual, give us a listen, and invest in a new approach. Because with national attention and vast amounts of resources pouring into the region, we'll likely never have a better chance to fundamentally improve our forest and watershed stewardship and the health of our mountain landscapes and communities.

MOVING BEYOND THE POLITICS OF DIVISION

In New Mexico and across the West, we see the consequences of competition, division, fragmentary policies and short-sighted planning in the too-thick stands of trees choking our forests, the diminished habitat for wildlife, and the robbing of acequias, farms and ranches of the water needed to sustain life and livelihoods. At the same time, a shortage of good-paying jobs is leading to the growth of the region's most significant export: our children.

These collective failures are also evidenced in the fire scars radiating across our landscapes and the floods that roar down our valleys, the decimated water supplies to cities such as Las Vegas, the lost homes and lifeways, staggering firefighting costs and incalculable human suffering. In short, the challenges we face are not just economic or ecological—but about social justice. Do we turn our back on lifeways that have come to define New Mexico, or do we lean into the hard work of reconceiving how we treat the land and the people who rely on it? We need more than short-term band-aid solutions—but also long-term strategic approaches that address causes and not just the symptoms.

As a scientist and conservationist who for decades has worked at the confluence of ecology and culture, I've been struck by how the health of landscapes and watersheds often reflects the health of the social systems within which they are embedded. This observation that people create their environmental reality was driven home to me during collaborative work with the rancher-led Malpai Borderlands Group in southern Arizona and New Mexico beginning in the 1990s.



The future that awaits? If we do not thin and clear burned timber, within a few years our forests will become dangerous and impassible, limiting people's access to their forests and way of life. © Charles Curtin

This rugged and hard-bitten group had long suspected and fought against outsiders. Yet, through a chance encounter with Quaker activist Jim Corbett, who was leading Central American refugees through the borderlands as part of the Sanctuary Movement, the ranchers realized they were fighting a war of attrition. If they continued an adversarial stance, their lifestyle and livelihoods would soon be gone.

So, they did something radical—they invited the groups they most feared, environmentalists and government agencies, into their homes and communities. Soon they discovered they had a lot in common regarding a passion for nature. Through the concept of the “radical center,” they embraced an approach of inclusion rather than exclusion to transform not just their lives and landscape—but that of countless other communities across the globe that followed their example.

In the decades since, I've seen the same pattern many times in projects with pastoralists in East Africa, fishermen of the western Atlantic, Arab and Israeli conservationists in the Middle East, Montana ranchers, tribal bison recovery programs, New Mexican Hispanic communities, New England farmers and many others. They all succeed or fail for the same short list of reasons. How people conceptualize challenges determines the outcome (*see my author website CHARLESCURTIN.COM and 2015 book Science of Open Spaces for more details*).

Archimedes purportedly said, “Give me a lever long enough and a fulcrum on which to place it, and I shall move the world.” In our case, the fulcrum is shifting people's emotional and mental perceptions. In my career, I've moved from highly technical replicated landscape studies to focus on community building, and now emphasize shifting cognitive processes as the lever that transforms. In this context, northern New Mexico is a tough nut to crack because there has been generational trauma and longstanding fear of outsiders. Suspicion is the fortress wall that has preserved cultural integrity in the face of the onslaught of mass culture, media and commercialization but has also inadvertently created competition and dysfunction within communities.

As with the borderland's ranchers, this defensive stance has outlived its usefulness because it leads to the inevitable loss of land, lifeways and livelihoods. As forestry business owner David Old points out, like “crabs trying to escape a bucket,” too often, people pull down others rather than seeking to raise everyone's opportunities.

We'll likely never have a better chance to fundamentally improve the health of our mountain landscapes and communities.

Across the board, from individuals to local politicians and on to the highest levels of government, we encounter the same pathologies where people's first response is to ignore or attack anything new or novel—even when they stand to gain in the process. Our burnt and overly thick stands of trees and drying watershed are a direct outcome of this dysfunction. So, community and landscape revitalization require reconceiving how people interact before one can reconceive the solution itself.



The Mora Valley with dense forest growth ablaze, 2022
© Charles Curtin

WHAT'S THE POINT?

Communities, primarily in Mora and San Miguel counties, have been decimated by recent fires. Within 24 to 48 months, \$100 million in commercial value from deteriorating sawlogs will be lost (in addition to small-diameter biomass in the years that follow). This potential income matters because there are insufficient resources to restore our forests post-fire. So, this income would pay for clearing dead timber and the thinning of live trees, which has immense importance in allowing local people access to their forests for firewood cutting, grazing, hunting and many other traditional uses that are crucial parts of their culture and livelihoods.

But what of the live trees? Why harvest those? Aren't trees good for the environment? You may ask...

Trees are, of course, crucial for the environment, yet current forest stand densities in New Mexico are often 100 times historic levels. This is not healthy! Not only do these thickets lead to wildfires and insect outbreaks,

but the typical tree also uses about 100 gallons of water daily. Multiply that by millions of trees, and you can see why the acequias, farms and settlements downslope from the mountains face water shortages (even without a warming and drying climate).

Before European settlement, due to aboriginal burning, many of New Mexico's forests were

Suspicion has preserved cultural integrity but has also created competition and dysfunction within communities.

so open it was said you could ride a horse through them (sometimes at a gallop!). A grassy understory consisting of a diversity of nutritious native grasses was the foundation of a robust ecosystem. By contrast, today's forests' dark and shaded understories are a virtual desert. In sum, our forest ecosystems are out of whack with historical patterns, as they've been gradually transformed from open savanna-like habitats to closed forests with dense canopies and no understory. Ecologists call these trends shifting baselines, when slow incremental changes lead to historical anomalies becoming the new normal people experience in their lives.

And that's the issue! Few have seen a healthy forest, so they have no idea what they are missing! Like the proverbial frog in boiling water, the situation declines so slowly people don't realize they're in hot water living amongst a sick and dying ecosystem. The recent fires and floods and all the associated

Within 24 to 48 months, \$100 million in commercial value from deteriorating sawlogs will be lost.

traumas are the natural response of a system seeking to return to the processes around which it evolved. Our goal is to use this narrow window of opportunity to restore our forests and watersheds to a healthy state where catastrophic fire and floods are not the inevitable outcome of disequilibrium.

WHAT IS THE SANGRE

DE CRISTO MOUNTAIN INITIATIVE?

We are a consortium of ranchers, loggers, foresters, conservationists, ecologists and finance and transportation experts who together have decades of experience developing integrated solutions to complex and multi-faceted challenges (see www.SDCMI.org). We are seeking to revitalize the forestry industry of the Sangre de Cristo Mountains as a means of restoring landscapes and communities in the Hispano-Indigenous uplands of north-central New Mexico. Our current thinking is built upon more than a decade of talking with and learning from local people.

What began with a focus on renewable biomass energy to thin our forests while producing valuable ecosystem-renewing products such as biochar—has transformed into a more integrated strategy where we realize the carbon-negative energy from wood products is only part of the solution. Instead, we must couple it with re-envisioning the whole process from the tree to the markets. This is done through a carbon supply chain strategy that seeks to create



Santa Gertrudis de lo Mora parish leads a procession on the main road of the village of Mora. This 1895 image depicts scant forested vegetation on the hillsides. Courtesy, New Mexico Historical Society

efficiencies through principles borrowed from permaculture and regenerative design to ensure that, like any healthy ecosystem, as much of the materials and benefits as possible flow back to the local landscapes and communities.

As much of the materials and benefits as possible flow back to the local landscapes and communities.

This requires investing in an integrated approach that:

- Increases the capacity of local participants in the forestry industry both individually and through strategically coordinated sharing of resources
- Focuses on existing constraints to a viable forest industry and forest recovery process such as mill capacity
- Adds in biomass energy and other regenerative sectors to make the existing industry more carbon negative, efficient and profitable
- Attracts outside businesses such as Woodsyn from Arizona, which uses small-diameter trees to create carbon-sequestering building materials

The health of landscapes and watersheds often reflects the health of the social systems within which they are embedded.

However, this expanded capacity cannot happen fast enough to meet the need to rapidly remove over 250 million board feet of burned timber from private lands in a few years. So, in the near term, this requires reaching out-of-state markets, and the most efficient and carbon-smart way to do this is through reviving our railroads.

Yes, this is a big lift—but all our team have successfully completed similarly scaled projects. Again, this is primarily not a technological or engineering challenge—but a cognitive one. People must perceive a different and more viable future to generate more equitable and durable outcomes.

Toward that end, in addition to reaching out to people individually and in small gatherings, we’ve assembled a database of hundreds of key stakeholders from across the region and convened listening sessions where we engage people in the project formulation process. However, this is not the usual pattern where people talk at each other, say nice visionary

things—and then leave. It’s an interactive process our partner OnTrackNorthAmerica has refined for decades. They have developed a system of constructive dialogue between diverse people to reach concrete solutions to complex and messy challenges. This framework for constructive dialogue is fundamentally different because it allows people to hear each other and collectively move toward a jointly arrived-at solution that transforms people’s thinking and actions.

So why call our approach both audacious and common sense? Well, we are asking a political system built around individual gain to instead focus on the collective benefit. And we’re asking for it to be done at an unprecedented scale, scope and speed (over a million acres in a few years). And yet it makes sense.. There is no alternative to renewing our lands and livelihoods, and we’ll likely never have a better shot at it.

We are seeking to revitalize the forestry industry of the Sangre de Cristo Mountains as a means of restoring landscapes and communities.

How can you get involved in the process? First, if you want to be engaged in our approach, reach out to us through the contact information on our website (WWW.SDCMI.ORG). If you are a stakeholder or have a connection with our communities and mountains, we want your input!

Second, we are developing a conceptual plan to allow us to move forward rapidly with the next steps. State and federal governments can’t move fast enough to address our challenges. So, a public-private partnership is essential in crafting realistic long-term solutions. We need your engagement in the process and hope you’ll reach out to political powers, from the governor on down, letting them know we need a new open and inclusive approach that works with ecological principles—not against them.

Finally, don’t take our word for it—investigate for yourself! Come with an open mind, creatively seek new solutions, and join us to reconceive the future of our rural communities and forested uplands. ■

OP-ED: HILARIO ROMERO

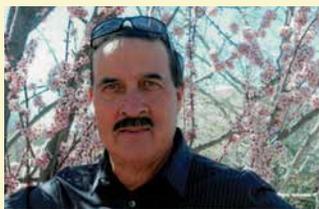
CLIMATE EXTREMES AND DROUGHT PLAN FOR BURNING IN NEW MEXICO'S FORESTS

*Solutions for Victims of the
Hermit's Peak/Calf Canyon Fire*

The Hermit's Peak, aka Cerro de Tecolote/Calf Canyon, aka Cañon de la Vaquita uncontrolled burn, destroyed 350,000 acres of timber, animals, structures, ranches, farmland, and polluted rivers, streams and arroyos, along with New Mexico's precious norteño Nuevomexicano cultural areas.

We need a commonsense approach to care for our forests. In the past 25 years, we have lost hundreds of thousands of acres to fire. The U.S. Forest Service cannot continue fire management without shared oversight. Below is a plan for future cooperative burn management with affected communities.

1. Initial forest and fire planning must always include communities near the burns *years ahead* of time.
2. All future plans must consider climate extremes, drought, low snowpack, rain/wind events, with input from nearby communities.
3. Planned areas for Forest Service thinning and collection of dead and down in nearby communities must occur years before a burn.
4. Firebreaks between forests and communities should also be done years before any decision is made to burn the forest.
5. Burning in New Mexico during early spring (mid-February thru May) must be prohibited because the risks are too high, especially after low snowpacks, spring droughts and windstorms.
6. All sources of weather forecasts must be considered, including local weather wisdom, before any burn can be set.
7. Independent studies should determine how costly these out-of-control-burns are, compared to those that are cooperatively planned.
8. The Forest Service must immediately set up outreach to *all* communities in the burned area for two-way communication and cooperative education, now and into the future.
9. Cleanup and constant monitoring after these out-of-control burns is necessary to prevent future fires and contamination of *all* water sources.
10. Bring back a new Civilian Conservation Corps (CCC) Camp initiative with affected community members impacted by the Hermit's Peak /Calf Canyon Fire, and others, for cleanup of dead and downed timber, timber reuse, and where possible, thinning. ■



Hilario E. Romero, a New Mexican Mestizo, is a former New Mexico state historian. He spent 40 years in higher education as professor of History, Spanish and Education, including at Northern New Mexico College, UNM and New Mexico Highlands University.

Using Hempcrete for Building Emergency Shelters

BY ARNIE VALDEZ

In *Green Fire Times'* March/April 2022 issue, I wrote about using hemp-infused blocks for building a vaulted roof on a 100-square-foot adobe structure. During construction of that building, I had the opportunity to meet Amy Farah Weiss, founder/director of St. Francis Homelessness Challenge (SFHC). Amy shared the importance of utilizing fire-resistant materials for building safe, dignified and affordable cabins that meet California Code for emergency shelter. She was working on developing a prototype hempcrete insulated sleeper-pod for use in addressing homelessness issues in the Southwest. The sleeper-pod was built on an 8-by-12-foot trailer for mobility. The light metal/wood frame walls, floor and ceiling were insulated with hempcrete. [Photo]

*A cost-effective,
energy-efficient solution*

Seeing the cabin inspired me to build another version that would incorporate solar energy for heating and generating electricity, rainwater collection and a composting toilet. Amy, via SFHC, offered to cover the cost of building version two. My project would be one of three sites working on prototypes based on availability of local materials, with funding of \$5,000 for each cabin. The grant covered a basic shelter without the alternative energy and conservation features. Those had to be covered by each project.

DESIGN

The building is built on the bed of a tandem-axle trailer. The floor platform is on top of the trailer's side-rails, since inside measurements of the bed floor are about six feet. I attached two 12-inch steel open-web trusses to the bottom of the platform. The skids allow the structure to be removed from the trailer and placed on the ground. On top of the platform, the floor, wood post and beam walls are insulated with hempcrete. The roof is a low-slope pitch insulated with

... CONT PG 37



Solar cabin made of wood, hemp hurd, hempwool, etc. on a trailer

Moving Hempcrete Forward

BY ALEX SEXSMITH

It was with great enthusiasm that I came across Edward Mazria's article on the 2030 Challenge a year ago in *Green Fire Times*, and the discussion of hempcrete in the March/April 2022 edition, featuring the work of Arnie Valdez and his Rezolana Institute in San Luis, Colo. There was also an informative sidebar about the U.S. Hemp Building Association (USHBA) submitting hempcrete to the International Code Council for inclusion into the building code, similar to straw bale or adobe. Since that time, hempcrete has been approved for inclusion in the International Residential Code, which will be formally adopted in 2024. This is a great step forward for the use of hempcrete in the U.S. It took the concerted effort of many at the USHBA. Taking it to the next level, we need to build awareness across the architecture and construction industries, continue to build the supply chain, and educate potential homeowners as to why hempcrete is of specific interest to those looking at the intersection between energy efficiency, indoor air quality and the effects of decisions we make on the overall environment.

Hempcrete is a traditional building technique that is enjoying a renaissance.

Many high-performance materials used in contemporary net-zero homes are made with petrochemicals or industrial products. Greater and greater energy-efficiency, in many cases, comes with the side-effect of toxic chemicals in our water systems, air, or landscapes. In our own homes, chemical off-gassing leads to reduced indoor air quality. This need not be the case, but it requires us to think differently and change the way we build.

Hempcrete will be submitted for approval for the International Building Code in 2025, which will allow for its use in commercial or institutional buildings. Hempcrete is often touted as a carbon-sequestering material, but on an industry-wide or global level, we need broader adoption to significantly reduce emissions numbers. As with any growing industry, there are bumps in the road, but as the supply chain grows and the number of committed professionals grows, "alternative building" will become more and more mainstream, and hempcrete will be recognized as a traditional building technique that is enjoying a renaissance for the right reasons.

BUILDING WITH HEMPCRETE IN THE REGION

BY ROBIN ELKIN

Plant-based materials including hemp, straw, rice hulls, bagasse (sugar cane fiber) and other agricultural byproducts are important sources of materials in efforts to decarbonize and transition the building industry to the concepts in *Build Beyond Zero: New Ideas for Carbon-Smart Architecture* by Bruce King and Chris Magwood. The climate and global resource systems are intertwined and causing disruptions in the building industry and material supply chain. New Mexico imports the majority of the materials used in building construction. If the hempcrete industry can be developed in-state, the majority of bulk building materials can be sourced from the near region and locally. The localized supply chain will create employment and opportunities for new funding strategies to build affordable and work-force housing.

Regionally, hemp hurd can be sourced from Colorado, Kansas and Missouri. The supply chain flow is direct from farm to processor to building project. In Colorado's San Luis Valley, farmers are growing hemp as a lower-water-use



Hempcrete residential wall cast installation (in process) by the Hemp Building Company, Longmont, Colo. WWW.HEMPBUILDINGCO.COM

If the hempcrete industry can be developed in-state, bulk building materials can be sourced from the near region and locally.

rotation crop and alternative to alfalfa as water allocations are reduced. Water resources are declining in New Mexico, and farmers could grow industrial hemp as a lower-water-use alternative

to current crops. New Mexico has 100,000 to 200,000 acres under center-pivot irrigation. Annually, it would take 2 to 5 percent of this total to support an industrial hemp processing facility.

Certified pre-mixed hempcrete binders are available from distributors in Colorado, Utah and other suppliers in the U.S. Hempcrete binders can also be made from Type S or air lime (widely available) and Type N or high-calcium lime (available in Texas and elsewhere). Pozzolans are used as hempcrete binder additives to increase the setting strength and include Portland cement, hydraulic lime, metakaolin and the natural minerals pumice and brick dust. Pumice pozzolan is mined and processed in New Mexico and used in the oil and gas industry in sealing wells. Clay is used in New Mexico to make adobes and can also be processed to make brick dust pozzolan, which was used to make Roman cement. Metakaolin is calcined (heated) kaolin clay, used as a concrete additive. It is imported from México.

HEMPCRETE NEXT STEPS

Hempcrete building is increasing in Colorado (see photo), Texas and in other regions of the U.S. Hopefully, there will be hempcrete building projects in New Mexico in 2023. Stay posted for announcements in GFT for hempcrete training events in 2023 or contact us at the email addresses below. ■

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Robin Elkin (MCRP) works in green building, planning and disaster recovery. He owns Refuge Industrial Hemp Building, which provides hempcrete consulting, training, materials and installation. REFUGEINDHEMPNM@GMAIL.COM

Carbon Positive: Design Strategies That Work

BY EDWARD MAZRIA

Between now and 2040, global population is projected to grow by more than 1.3 billion people, and U.S. population by 34 million people. Just meeting the needs of these population increases will necessitate adding millions of housing units, schools, health care and associated facilities and infrastructure.

How we plan, design, construct, renovate and repurpose the global built environment over the next decade to meet these needs may determine the fate and well-being of life on the planet. We must deliver an architecture and development pattern that mitigates carbon, supports adaptation, and ties to local conditions, human health, ecological restoration and energy and water availability and security.

How we plan, design, construct, renovate and repurpose the global built environment over the next decade may determine the fate and well-being of life on the planet.

Building Resiliency

Resilient planning, design and construction strategies are derived from a strong relationship to climate and natural processes. Many of these—some key ones follow—have been aggregated into a set of accessible guidelines at various scales that can be adopted in the Western U.S. More options are available through Architecture 2030's free, open-access 2030 Palette database. They support an approach to the natural and built environment that dramatically reduces or eliminates greenhouse gas emissions, addresses climate adaptation and resilience, and offers the potential for an accessible and inexhaustible supply of renewable energy.

The following outlines some of the key strategies for various climates and conditions that can be implemented immediately. For more detail on these and many other strategies, see the 2030 Palette (<http://www.2030palette.org>).

Transit-oriented development: Establishing TODs within ¼- to ½-mile walking distance of transit with a mix of housing and commercial areas encourages walking and bicycling while reducing infrastructure costs and emissions.

New growth areas: Planning for growth by identifying and establishing environmentally suitable new growth areas, adjacent to or within cities and located along existing or planned transit lines, will limit urban sprawl, which can avoid damaging farmland and other environmental assets.

Habitat corridors: Mapped and protected habitat corridors preserve the ability of species to migrate successfully while enhancing the integrity of sensitive ecosystems.

Urban infill and retrofit: Infill, repurposing and redeveloping areas and buildings within walking distance to transit and district centers reduces sprawl, infrastructure and growth pressure on rural areas and open space.

Street networks: Planning short block lengths and well-connected, dense street networks encourage bicycling, makes walking more interesting, increases foot traffic for local businesses, reduces vehicle traffic and enhances traffic flow, and makes destinations and transit stations more accessible.

Heat-island mitigation: Increasing the solar reflectance, tree canopy, and vegetative cover in urban areas cools outdoor temperatures while reducing air pollution and energy consumption.

Water catchment and storage: Catchment systems store rainwater and can provide a clean, free water source when treated and disinfected.

Cool roofs: In hot climates or seasons, a light-colored roof that reflects sunlight and emits heat efficiently will remain cooler and reduce heat transferred into a building.

Double roofs: In hot climates, a structure located just above the roof shades the roof and allows warm air buildup between the roof and structure to escape, reducing indoor cooling requirements. When extended, the roofline can shade exterior walls and create shaded outdoor living spaces.

Elevated structures: When designing in coastal or flood-prone areas, it is essential to plan for possible inundation by elevating structures or leaving space for water flow without compromising the structural integrity of buildings and infrastructure.

Direct-gain passive heating: In cold climates, equator-facing solar glazing coupled with adequate thermal mass will heat a space in winter over a 24-hour period.

Solar shading: During warm summer months, overhangs block direct sunlight from equator-facing solar glazing, reducing indoor cooling loads.

Side daylighting: Exterior wall glazing provides interior task-daylighting levels at a depth of 1.5 to 2 times the height of the opening. Adding a light shelf can increase the daylight depth to 2.5 times the height of the opening.

Cross ventilation: Ventilate and/or cool buildings by locating window openings perpendicular to prevailing winds and on opposite sides of a space or building. Maintain an unobstructed path between inlet and outlet openings for adequate airflow.

Night-vent cooling: In dry climates with cool nighttime temperatures, use cool night air to flush heat from a space and cool interior walls and floors, keeping a space cool during the daytime.

Designing with wood: Specify reclaimed wood or wood from well-managed forests that encourage protecting habitats and water quality, local harvesting, air-drying lumber, and not harvesting lumber from old-growth forests.

Designing with concrete: Reducing the carbon footprint of concrete includes (but is not limited to):

- designing for structural efficiency (not using more concrete than necessary)
- substituting supplementary cementitious materials from non-fossil fuel-based sources
- utilizing carbon sequestration (CO₂ injection)
- using larger aggregate (e.g., 1" vs. ¾" coarse aggregate) where appropriate

- specifying Portland limestone cement over typical Portland cement where locally available
- reducing the weight of slabs to reduce the size of columns and foundations

Designing with steel. Design for material efficiency to reduce the amount of steel. Specify steel from electric arc furnaces to reduce steel emissions because EAFs use high levels of recycled material and can be powered by renewables.

We have the design and planning strategies to effectively address the climate crisis. We must now accelerate their application to ensure a habitable planet. ■



Photo: Jamey Stillings
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Edward Mazria, FAIA, is founder and CEO of the nonprofit, Santa Fe-based, Architecture 2030 (<https://architecture2030.org>) and an internationally recognized architect, author, researcher and educator. Over the past four decades, his seminal research into the sustainabil-

ity, resilience, energy consumption and greenhouse gas emissions of the built environment has redefined the role of architecture, planning, design, and building in reshaping our world. He was awarded the 2021 ALA Gold Medal for his “unwavering voice and leadership” in the fight against climate change.

BOOK PROFILES

BUILD BEYOND ZERO: NEW IDEAS FOR CARBON- SMART ARCHITECTURE

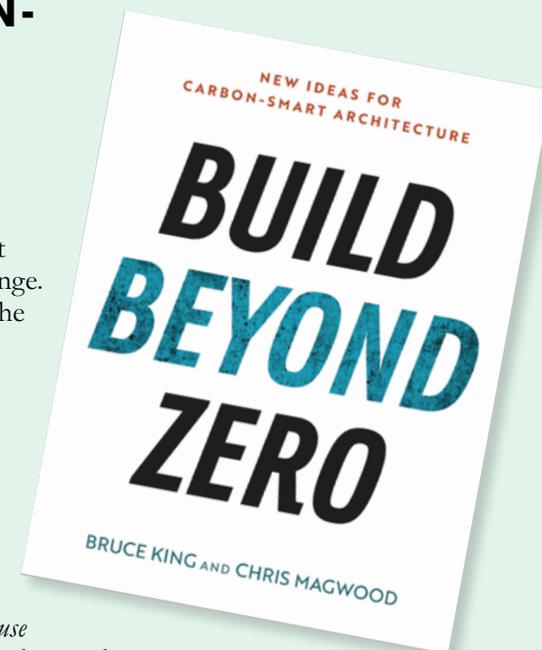
BY BRUCE KING AND CHRIS MAGWOOD
ISLAND PRESS, 2022

With all the talk of electric vehicles it’s easy to forget that buildings are a major contributor to climate change. Building low- or neutral-carbon buildings has been the goal for a long time. Now a new book is proposing going even further:

“Net Zero” has been an effective rallying cry for the green building movement, signaling a goal of having every building generate at least as much energy as it uses. Enormous strides have been made in improving the performance of every type of new building, and even more importantly, renovating the vast and energy-inefficient collection of existing buildings in every country. If we can get every building to net-zero energy use in the next few decades, it will be a huge success, but it will not be enough.

In *Build Beyond Zero*, carbon-tracking pioneers Bruce King and Chris Magwood show how buildings are culprits but stand poised to act as climate healers. They offer an exciting vision of climate-friendly architecture, along with practical advice for professionals working to address the carbon footprint of our built environment. They re-envision buildings as one of our most practical and affordable climate solutions. They provide a snapshot of a beginning and a map toward a carbon-smart built environment that acts as a CO2 filter. Professional engineers, designers and developers are invited to imagine the very real potential for our built environment to be a site of net carbon storage, a massive drawdown pool that could help heal our climate.

With the help of other industry experts, the authors show the importance of examining what components an efficient building (from windows to solar photovoltaics) is made with, and how supply chains deliver all those products and materials to a jobsite. *Build Beyond Zero* looks at the good and the bad of how we track carbon (Life Cycle Assessment), then takes a deep dive into materials (with a focus on steel and concrete) and biological architecture, and wraps up with education, policy and governance, circular economy and where we go in the next three decades.

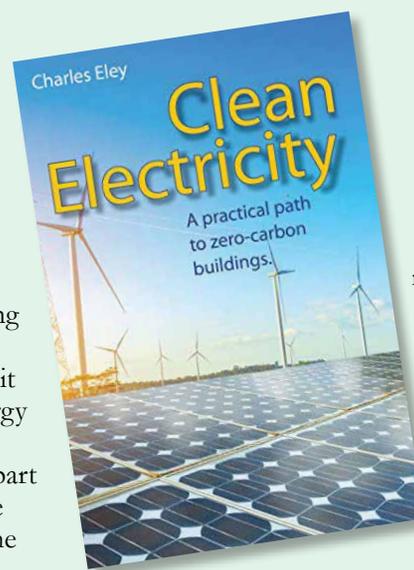


CLEAN ENERGY: A PRACTICAL PATH TO ZERO-CARBON BUILDINGS

BY CHARLES ELEY
DESIGN GUIDE BOOKS, 2022

Clean, carbon-free electricity produced by wind and solar is the most viable path to addressing global warming and climate change. This book is about the transition taking place in the electric industry and the choices we have as consumers. It begins with a little history of electricity and a description of the existing electric grid, the pollution it creates and the challenge faced by authorities and utilities. It describes renewable energy technologies that are emerging at the utility-scale and how these technologies, along with battery and storage, are replacing legacy coal and gas power plants. The second part focuses on what each of us can do to use less dirty electricity and how we can acquire renewable energy from the grid or install our own solar systems. Part three looks at the pressures for change on the electric utility industry and speculates on what these big companies might look like in the future.

Charles Eley, an architect, mechanical engineer and author with 40 years’ experience in energy-efficient and sustainable design, served as the founding executive director of the Collaborative for High Performance Schools, developed a number of energy analysis software applications, and has served as energy consultant for a number of land-



mark green buildings. He currently provides specialized consulting to nonprofits, and teaches classes on building energy efficiency and green technologies. For more information, visit WWW.ELEY.COM.

“As we work to address climate change, electrify our buildings, transportation and industries, and transition to a clean grid, Charles Eley provides us with the ‘how-to’ to make it all happen—from available and emerging renewable energy technologies to the needed strategies and decisions about planning, design, construction and policy. It is a must read for architects, planners, industry professionals, building owners and policymakers.” —Edward Mazria

PLANNING 2050

BY KATHERINE MORTIMER

In 2006, Santa Fe architect Edward Mazria issued a challenge to architects around the world to design with increasing levels of energy-efficiency to meet the goal of net-zero greenhouse gas-emitting buildings by the year 2030. The 2030 Challenge has been accepted by over 800 planning, architecture and engineering firms.

Now, a professional planner from Austin, Texas, Julio Carrillo, has issued a similar challenge to urban- and community-planning professionals. Planning2050 calls on planners at all levels of government and in private practice to transform their practice and ensure positive outcomes for social equity, community resilience and climate-change mitigation. The initiative is intended to provide resources and tools to assist planners in a wide range of areas so they can design and implement effective and efficient strategies by 2050.

Planning2050 aims to accelerate sustainability data collection for cities and communities that use systems analysis. The result will be specific design solutions that are scalable and replicable for any jurisdiction. The UN's Sustainable Development Goals will be used to develop metrics to track progress.

The primary audiences of Planning2050 are urban and community planners, governments (mostly local), planning consulting businesses and large land developers. There will be pathways to participate for these groups as well as others. The strength of the initiative is that it is being developed by planners for planners, with input from professionals who impact built and natural environments.

Climate change presents a fast-emerging threat to "business as usual" for many organizations. Governments, particularly local governments, are responsible for ensuring the health and safety of people and businesses within their jurisdictions. Professional community planners are looked to for direction to ensure goals are met. With changing baseline climate conditions, this has become more complicated. Many started by changing light bulbs, recycling and similar strategies; however, low-hanging fruit alone will not attain health and safety mandates.

Government and other large organizations divide work into silos of expertise to leverage the detailed knowledge needed in today's complex world. In order to affect systemic change, however, planners need to work across silos and partner with experts in interrelated fields.

The products of Planning2050 are intended to respond to three important questions:

Where are we now?

Assessments will identify existing planning practices that are either harmful or could be done in a way that has more potential to reduce climate change, advance social justice, or create more resiliency. Participating jurisdictions' practices will be assessed using local goals and priorities.

Where do we want to be?

Commitments are voluntary pledges to specific goals. They will include targets selected by the jurisdiction and the collection of data for each action.

How do we get there?

Data fields will ensure that the best practices included are current and reflect the profession's best experience. The database will be flexible and continuously updated.

In its foundational period (2022-2025), Planning2050 is focused on eliciting best practices from the planning community (early adopters), with cities and communities leading at different scales through their commitments. Professional planners are encouraged to share practices they believe will support achievement of the Planning2050 goals at [PLANNINGCOMMITMENT.ORG/CONTACT/](https://planningcommitment.org/contact/). ■

Katherine Mortimer is the founder and principal of Pax Consulting, LLC, a New Mexico business providing government and businesses with tools they need to be resilient and sustainable by addressing environmental stewardship, economic vitality, and most importantly, social justice.

POST-SECONDARY PROGRAMS RECEIVE ZERO ENERGY DESIGN DESIGNATION

In September, the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy awarded its first-ever Zero Energy Design Designation (ZEDD) seal of recognition to 17 leading educational programs that are preparing architectural and engineering leaders to design and build the most sustainable buildings possible. This new designation distinguishes post-secondary academic programs that impart the best practices of zero-energy design and require students to apply those building science concepts in actual projects.

"Our fight against climate change runs straight through our nation's buildings, and the programs we honored are paving the way for students to lead our net-zero greenhouse gas emissions future," said Carolyn Snyder, deputy assistant secretary for energy efficiency. "Graduates will join the front lines of our fight against the climate crisis by designing sustainable buildings that bring the benefits of our clean energy future to all."

The Zero Energy Design Designation program supports the Biden-Harris administration's goal of a net-zero emissions economy by 2050. With buildings being one of the main contributors to carbon emissions, building professionals must be trained to design and construct high-efficiency, low-carbon buildings powered by renewables to achieve this goal. DOE's ZEDD designation, offered to qualifying programs of study for three years, requires graduating students to:

- Complete a Building Science Education Curriculum that uses DOE's Solar Decathlon Building Science Education learning modules or otherwise meets ZEDD's learning objectives; and,
- Participate in a Zero Energy Design Practicum by completing the DOE Solar Decathlon Design and/or Build Challenge or by engaging in a real-world, zero-energy design project that would earn the DOE Zero Energy Ready Home certification or a more stringent energy and environmental performance standard.

CITY DONATES LOT FOR GREEN HOMES

In October, Santa Fe's governing body approved the donation of downtown property for development of low-priced housing units, for sale to qualified homebuyers. The lot is in a historic district within easy walking and biking distance to the Plaza and the River and Rail Trails. The donation is the first of a series of dispositions of under-used city-owned property for the purpose of stimulating the creation of housing units on infill lots. The city seeks to provide developable lots through real estate donation/disposition agreements. Mayor Alan Webber said, "We're excited to build good homes that Santa Fe's working families can afford."

The developers were selected through a RFP process. The project team that scored the highest was headed by Santa Fe Habitat for Humanity, which proposed building five homes, arranged in a traditional Santa Fe compound. The building materials will be contemporary modular components, provided through a partnership with local design firm B.Public. The objective is to reduce construction time and waste and maximize energy-efficiency without sacrificing quality, affordability or design aesthetics. The final design and development plan requires approval by the Historic Design Review Board.

The homes will be made affordable through Habitat's unique approach of using the future homeowner's "sweat equity," in addition to volunteer laborers, donated materials and self-financed 0-percent interest mortgages. Kurt Krahn, executive director of Santa Fe Habitat for Humanity, estimates that the homes will cost approximately \$225,000 to construct, with monthly housing payments of \$600 to \$800.

Edie Dillman, CEO of B.PUBLIC Prefab, said, "By building with pre-insulated structural walls, the community will see the shell of this project complete in a matter of days. Our craftsman-built prefab is designed for 100-plus years of comfort and 80-to-90 percent energy savings. Now that is sustainability and housing stability."

SANTA FE HOME TO NEW MEXICO'S FIRST NET-ZERO ENERGY HOUSING UNIT

In August, the first phase of Siler Yard, New Mexico's first net-zero energy, multi-family-unit project opened in Santa Fe. The intention was for it to be affordable, meet a workforce need and to be sustainable. It was designed for the art and creative community who earn under 60 percent of the Area Mean Income.

The 65-unit, \$17.4-million project was made possible through a \$10.4-million competitive Low-Income Housing Tax Credit and a \$5.2-million, 40-year Section 221(d)(4) mortgage—both U.S. Department of Housing and Urban Development (HUD) programs for affordable housing. The project also received permit and fee waivers from the City of Santa Fe, which also contributed \$400,000 in infrastructure funding from the 4.3 acres of land it was built on. A \$650,000 Affordable Housing Program subsidy was awarded to the New Mexico Interfaith Housing from Century Bank and FHLB Dallas.

The Siler Yard development has been a decade in the making," said Daniel Werwath, executive director of New Mexico Inter-Faith Housing. "The development will provide high-quality housing to individuals at rates far below the local average for monthly rent." The rent for one- to three-bedroom apartments ranges between \$427 and \$1,185 a month, based on the tenant's income. As it is a net-zero structure, all utilities are included.

A second phase will include a home for MAKE Santa Fe (a nonprofit community work space), meeting rooms, exhibition and performance spaces, and public open space. It will "support the surrounding neighborhood, the broader creative economy, and create a place that serves as a vibrant intersection of Santa Fe's creative culture," according to the project's website.



Siler Yard Arts Creativity Center: Affordable Housing + Workspace + Economic Development



SANTA FE STRENGTHENS WATERWISE CONSERVATION PROGRAM

The City of Santa Fe's Certified Waterwise pilot project, which has helped Santa Fe businesses realize extensive water savings since 2018, is now permanent. The pilot has saved 2.1 million gallons of water per year over the last four years, and to date, 110 commercial establishments—restaurants, museums, hotels and small businesses—have participated in the free program, which has positively impacted their bottom line.

Businesses that sign up receive a free water-usage assessment, which includes checking for leaks and replacing aerators and other devices, as well as a comprehensive report with recommendations on potential equipment and operational changes for further water savings. Residential customers can monitor their home consumption and efficiency by using the Eye on Water app. Visit the [HTTPS://SAVEWATERSANTAFE.COM](https://savewatersantafe.com) for information.

Santa Fe Community College is the city's education partner in the program. SFCC provides training, education and auditor certification. Along with the city's Water Conservation Office, the Water Conservation Committee and SFCC, the Certified Waterwise program was developed in partnership with the Santa Fe Green Chamber of Commerce and KUELWATER.ORG.

Santa Fe was credited as the most sustainable mid-size city in the U.S. by Green Builder Media in 2020. The Waterwise program recently received an EPA WaterSense endorsement. The program is being expanded to include funding for outdoor irrigation assessments in partnership with YouthWorks and will train the next generation of water professionals through a landscaping assessment pilot project in the Nava Ade neighborhood.

Businesses that would like to learn about how to participate in the Certified Waterwise Business program may contact Glenn Schiffbauer at the Santa Fe Green Chamber of Commerce: 505-501-0222; GLENSCHIFFBAUER@GMAIL.COM.

Building Community Resilience with Participatory Mapping

Four New Mexico Case Studies

BY AMY BELL, PLA, ASLA

When regenerative design grows from people and place, it strengthens community capacity and resilience. In our planning and design work across the state of New Mexico, we often have limited material resources with which to negotiate complicated challenges. Despite this, we are continuously inspired by the tremendous social capital found even in our smallest, most rural communities, whether it's energetic volunteers, experienced historians, artists, or other local features and resources. When we can identify and build from existing community assets, we are able to develop authentic and sustainable ways to address needs while also celebrating community history and identity. And who is better able to identify existing resources, issues and potential solutions than the people who live in that community?

Groundwork Studio has had the opportunity to explore the potential of participatory mapping and community-led project identification through four projects in central and northern New Mexico. These projects were designed to work with community members in the identification of key issues and solutions for flooding, failing infrastructure, pedestrian safety and accessibility, brownfield redevelopment and local economic development. Embedding education and engagement in the planning process can help identify projects with broad-based community support as well as ways the community can move them forward.

The following examples highlight how a participatory process can result in positive outcomes for that particular community as well as serve as a model for other communities.

Pueblo Alto/Mile Hi Neighborhoods Green Stormwater Infrastructure Outreach Albuquerque, N.M.

The Pueblo Alto/Mile Hi Drainage Outreach effort involved Pueblo Alto, Mile Hi and surrounding neighbors in a transparent process identifying assets and opportunities to resolve local drainage issues. These neighborhoods regularly experience flooding caused by an undersized storm drain system. While the City of Albuquerque moved forward with long-term regional-scale reconstruction, it engaged Bohannon Huston Inc. (BHI) and Groundwork Studio in a process to work with neighbors to learn how localized solutions, like green stormwater infrastructure (GSI) could help alleviate flooding issues. Our team led an intensive education and outreach process, including development of a project website with interactive crowd-source maps and green stormwater infrastructure resources, outreach committee meetings, walking tours, surveys and public meetings. A high level of community involvement, the support of elected officials and close collaboration with the city's Department of Municipal Development resulted in a clear path forward.



Pueblo Alto Neighborhood Walking Tour

Redevelopment of brownfield properties can leverage support to help revitalize downtowns and spur local economic development.



Visualization of GSI pilot project

Pueblo Alto was the first neighborhood-scale GSI evaluation to be completed in Albuquerque, and the first of its kind in terms of engaging the neighborhood in exploring residents' preferences. Projects that address drainage issues are often considered engineering that may not require much community engagement. In fact, residents can be greatly impacted by issues like flooding, and can make a big difference both in advocacy for the city to make changes in the public right-of-way, as well as improving their own private residences. This participatory outreach process informed the city regarding effective methods for encouraging public engagement. Innovative activities, such as walking tours and interactive mapping, were tested and found to engage a broader audience than more traditional meetings and surveys.

Insights gained from community members were paired with engineering studies to develop recommendations for GSI projects that have a high level of community support and the ability to mitigate flooding. Community involvement with planning and implementation of GSI will become more important as climate change increases the frequency and severity of flooding in residential areas. This process not only provided community members with tools needed to advocate for larger city-led projects, it also gave them valuable information on how to implement GSI on their own properties. You can learn more about the project and read the report at [HTTPS://GWS.MYSOCIALPINPOINT.COM/PUEBLO-ALTO-MILE-HI](https://gws.mysocialpinpoint.com/pueblo-alto-mile-hi).

Taos Alleyways Network Assessment, Taos, N.M.

The Taos MainStreet organization has been working on a visioning process for improving their downtown alleyways since the Strong at Heart Plan was completed in 2018. Expanding and enhancing the alley network is an extraordinary opportunity for a well-connected downtown transportation system and comes with substantial benefits, improving public safety and accessibility, visitation to local businesses and increased authenticity and historic character. In February, Taos MainStreet engaged



Community mapping in Taos

Groundwork Studio as a Revitalization Specialist through New Mexico MainStreet, for assistance with the alleyway analysis. The team began creating a plan for how to move forward on the Taos Alleyway Network Project Report and the larger goal of enhanced downtown walkability. The group agreed that stakeholder and public input was imperative in the initial assessment and that this information could be gathered from an interactive website/map and in-person walking tours.

The Taos Alleyway Network Project website was created using ArcGIS Online with an interactive Social Pinpoint map embedded in the site. The website allowed for project updates to be publicly available, act as a resource for the community to view alleyway improvement examples and interact with a map of existing alleyways. The map has a basic background with street names and shapefiles of downtown alleyways by owner (town-owned street/alley vs. private property).

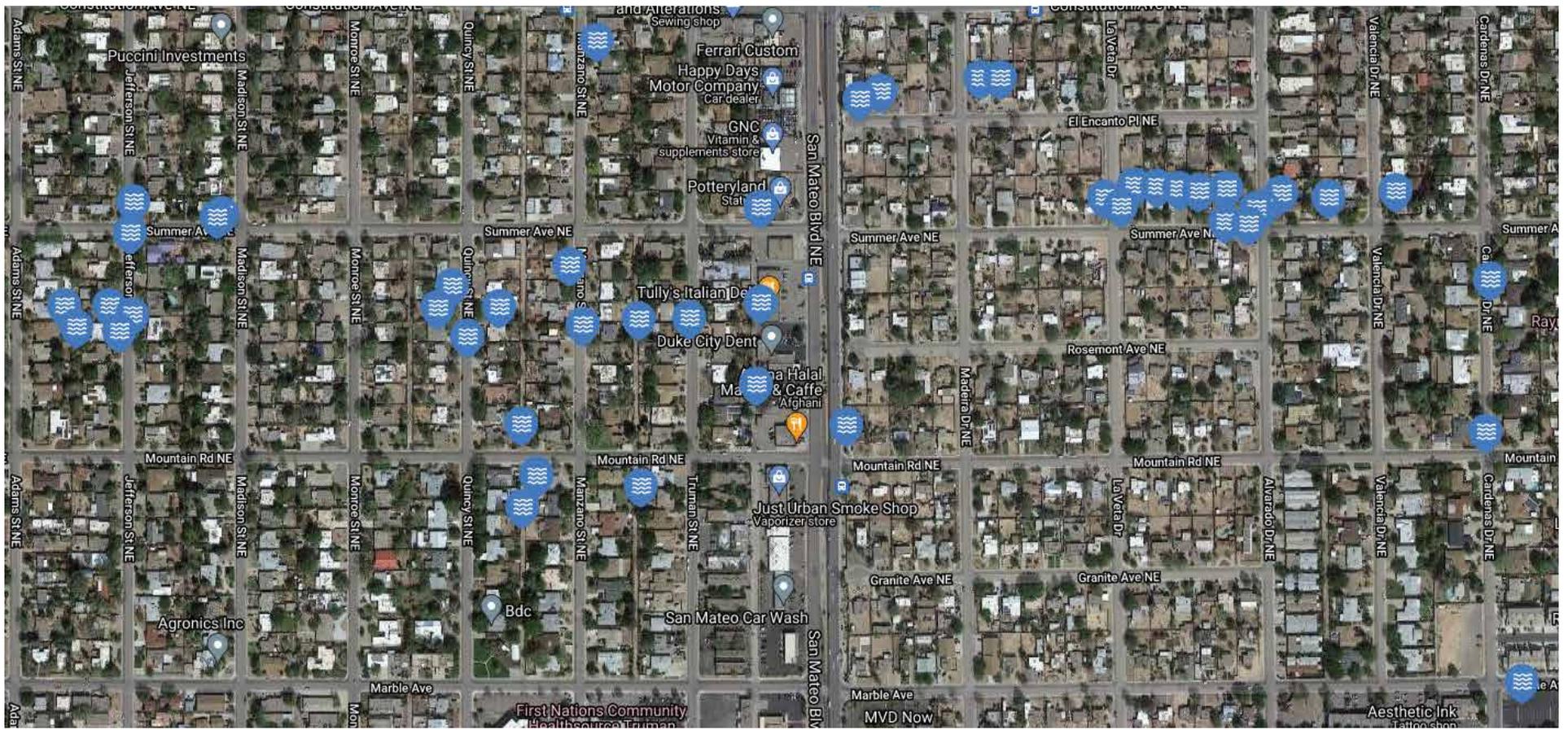
In March, the map was embedded in the website to allow the public to enter comments in six categories. Groundwork Studio helped Taos MainStreet organize two guided walking tours, with 26 key stakeholders participating. Through the interactive website/map and walking tours, we were able to collect community input on alleyway conditions and potential improvements. In all 115 comments were made by 48 users.

Through the community mapping process, participants discussed options for improvements and made suggestions about what they would like to see in the Plaza and surrounding alleyways. Based on recommendations from stakeholders and the public, our team created a spreadsheet to help prioritize locations. These pilot projects will begin with short-term activations such as pop-up parklets, art installations, temporary lighting and events. Alleyway activation will begin engaging locals and visitors in these spaces, making them more friendly and inviting. At the same time, we will be working on long-term infrastructure improvements such as repaving, closing alleyways to cars, permanent lighting and signage, and green stormwater infrastructure. Visit the project website at <https://bit.ly/taosalleynetwork>.

Community involvement will become more important as climate change increases the frequency and severity of flooding.

Downtown Albuquerque Community Forest Action Plan

Downtown Albuquerque is an 80-block district. Downtown and its surrounding historic neighborhoods are characterized by their walkability. Unfortunately, the area suffers from a significant lack of street trees and lacks a cohesive urban forestry program or plan. Downtown Albuquerque would benefit from street trees to support a human-scale experience,



Partnering Neighbors with Technicians to Develop Results: Neighborhood Flooding Sites

add vitality and beauty, and reduce the area's significant heat island effect. In the fall of 2021, Downtown Albuquerque MainStreet conducted a survey of the most pressing needs. Over 500 responses identified increasing the street tree canopy as one of the top-three issues, along with filling downtown vacancies, and dealing with crime and vandalism.

The plan, funded by a State Forestry Community Urban and Forestry grant, is being developed through a partnership among New Mexico MainStreet, Downtown Albuquerque MainStreet, Albuquerque Parks and Recreation, and Groundwork Studio. The inventory and evaluation process, which began in late summer 2022, will result in a strategic plan for increasing tree canopy. Our team is engaging with community



Taos Alleyways interactive mapping and walking tour

members to inventory existing trees and identify potential locations to plant more trees. We coordinated with PlanIt Geo to develop an audit tool with their Tree Plotter application, specifically tailored to allow volunteers to enter information on existing conditions. The data will be used to develop an implementation matrix, a valuable tool for informing and advocating for tree planting and tree care projects. Additionally, the city is leveraging its iTree Canopy subscription to survey canopy coverage and create baseline data for monitoring and data analysis.

We are able to develop authentic and sustainable ways to address needs while also celebrating community history and identity.

Development and implementation of a community education and awareness program, including training in the inventory software and methods, is a key part of the project. Building from the State Forestry Urban and Community Forestry Program's materials, we are creating a program about the importance and care of street trees and advocacy for new trees. This includes identification and outreach to area neighborhood associations, community groups and businesses, as well as citywide professional associations.

Eastern Plains Council of Governments Brownfields Inventory

A brownfield, simply defined by the Environmental Protection Agency (EPA), is a property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. The Eastern Plains Council of Governments (EPCOG) Brownfields Inventory will work with community members to identify priority sites. EPCOG serves the counties of Curry, De Baca, Guadalupe, Harding, Quay, Roosevelt and Union, and includes some of the least populated areas in the state. Created in 1969, EPCOG is a voluntary association of governmental entities within the planning and development district. New Mexico Environment Department (NMED) staff began working toward this project with Eastern Plains communities in September of 2021, and engaged Groundwork Studio to provide support in the fall of 2022. The redevelopment of brownfields properties presents a significant opportunity to leverage state and federal support for projects that can help revitalize downtowns and spur local economic development.

The project includes a high level of community involvement. Our team will work with local leaders, municipal staff and property owners to document and map

VALLE DEL ORO NATIONAL WILDLIFE REFUGE

Headquarters & Visitor Center

In September, the grand opening of the Valle de Oro National Wildlife Refuge visitor center took place, commemorating 10 years of conservancy work. Leaders from across the state, city, county and Isleta Pueblo gathered with organizers to celebrate the refuge, which sits on more than 570 acres of ancestral land of the Tiwa people. The refuge is restoring riparian wetland habitat, ecological function, cultural connection, public accessibility and environmental stewardship to the site.

Valle de Oro is the first urban wildlife refuge in the Southwest. It was established by the U.S. Fish & Wildlife Service with support from grassroots efforts of conservation-minded volunteers. It is located a few miles south of Albuquerque at 7851 2nd St SW on 570 acres adjacent to the Río Grande and Isleta Pueblo. The refuge offers equitable access for residents of a densely urban region to encounter nature. It features spectacular vistas of the Sandia Mountains, Vulcan volcano tubes and Río Grande bosque.

The LEED-certified visitor center demonstrates sustainable design appropriate for an arid climate, and includes a half-acre wetland habitat feature, fed by rainwater and a groundwater well. The bosque-inspired ecosystem allows visitors to experience a Southwestern riverine wetland up close, through windows and from overlooks and paths. Its variable water depths support a variety of native plants that provide habitat for local birds, amphibians, small mammals, insects and aquatic fauna.

The project was the recipient of the 2021 NAIOP (Commercial Real Estate Development Association) Award of Excellence. The design-build team for the center was led by the locally based joint venture CF Padilla-Brycon, in collaboration with Formative Architecture and Weddell Gilmore. Partners also included Ideum and Friends of Valle de Oro National Wildlife Refuge. Biohabitats, a certified B Corporation, designed the interpretive wetland and onsite treatment system, which treats the center's water and returns it to recharge groundwater. Non-potable water from the regional wastewater recycling plant is used to irrigate much of the landscape and flush toilets. Harvested rainwater and onsite well water feeds edible and cultural gardens. ■

Valle de Oro is open Tuesdays through Saturdays, 9 a.m. to 4 p.m. WWW.FWS.GOV/REFUGE/VALLE-DE-ORO



The new LEED-certified visitor center demonstrates sustainable design appropriate for an arid climate.



Tree inventory training with volunteers in Downtown Albuquerque

A powerful means to engage with and strategically address critical issues in a community

potential Brownfield properties and compile a list and maps of abandoned, underutilized, vacant or dilapidated properties that are potential sites. We will create an easily accessible database of properties available for redevelopment and sites for future assessment and cleanup as funding becomes available. The inventory will also list former gas stations that are ready for reuse as determined by the Petroleum Storage Tank Bureau (PSTB). Our team will work with community members on prioritizing sites for Targeted Brownfields Assessments. Considerations include eligibility for funding, status of reuse/revitalization plans, environmental justice considerations and ability to secure access agreements.

The New Mexico Economic Development Department (EDD) is actively engaged with EPCOG and NMED and has multiple programs to assist local businesses. As part of the brownfield inventory report, NMED will link to EDD programs and opportunities that are available to businesses should they choose to open in one of these communities. Learn more about the NMED Brownfields Program here: [HTTPS://WWW.ENV.NM.GOV/GWQB/BROWNFIELDS-PROGRAM/](https://www.env.nm.gov/gwqb/brownfields-program/).

These projects show how the convergence of focused public participatory mapping activities can provide local communities with a powerful means to engage with and strategically address critical issues in a community. By creatively combining the technology available in a manner that allows community members to take control of their own data, we can leverage those efforts into meaningful solutions. ■

Amy Bell, PLA, ASLA, is principal landscape architect at Groundwork Studio in Albuquerque.

HISTORIC WHEAT AND CORN MILLING ON THE SANGRE DE CRISTO LAND GRANT

BY MARÍA MONDRAGÓN-VALDEZ, PH.D.



Grist mill at El Rancho de las Golondrinas, a living history museum near Santa Fe.
© Seth Roffman

Ancient Food in the New Mexican Frontier

In the summer of 1853, a team of Army Corps of Topographical Engineers, a cartographer, botanist, artists and several scientific men, accompanied by guides and soldiers, journeyed from St. Louis, Missouri, into the newly occupied Mexican highlands. The mission of the John Gunnison Reconnaissance Survey was to locate a route for the Pacific Railroad along the 38th parallel, across the Rocky Mountains, through the San Luis Valley, on to California. Eyewitness accounts of journeys in the first decades of occupation describe an agricultural enclave growing and milling corn and wheat in an area of occupied New Mexico that is now the uplands of Colorado.

By the dawn of the 19th century, grist mills became a common feature in all villages.

After sleeping on buffalo robes near Sierra Blanca Massif, Capt. Gunnison and his men were served a breakfast of *atole*, a survival drink that had allowed Pre-Columbian society to thrive. Corn, beans and squash were Aztec staples that arrived with settlers from the Valley of México, and adapted to the desert Southwest. *Atole* was made by Pueblo women who were the first farmers and millers. Young blue corn kernels were repeatedly rinsed, sun-dried and then ground on a *metate*, toasted, diluted with water and boiled with juniper ashes to fortify nutritional value. *Atole* is 20 percent higher in protein and has a lower glycemic index than white or yellow corn. It is high in carbohydrates, fiber, and packed with amino acids, vitamins, folic acid and minerals such as zinc. Colonists added goat milk and sugar.

Continuing their journey through the Sangre de Cristo Pass, Gunnison's men opened a crude road for wagons loaded with scientific instruments such as barometers, compasses, surveyor chains, telescopes, notebooks, art supplies and camping gear. A diary of sketches and maps, and daily journals documented the landscape at points along the route. When they located

Northward movement expanded into the San Luis Valley's mountains to settle private and communal land granted by México.

an ancient trail, Gunnison's team and a contingent of soldiers marched to the newly built Fort Massachusetts (six miles north of contemporary Fort Garland, Colorado). Leaving the group, two lieutenants traveled a well-worn path southward to Taos to replenish supplies and hire Cajun "mountain men" as scouts and guides. Trotting at a brisk pace along the Taos Trail, the riders passed through the Culebra Watershed. Camping overnight on the Río Costilla, at daybreak they saw three new plazas with fields of corn, wheat and oats.

Gunnison was not the first government surveyor nor the only explorer to visit the 125-mile-long-by-65-mile-wide San Luis Basin. Long before

The 1599 mill produced flour for the colonists and a lucrative commodity for trading.

One-tenth of all harvests were given to the friars.

French and Canadian voyageurs and American military surveyors found their way there, *Nuevo Mexicanos* traveled El Camino Real de Tierra Adentro, the

ancient trade route forged by Indigenous pioneers. Explored and mapped by 1779, the rivers and mountains in the San Luis Valley were named in a cartographic rendering known as the Miera y Pacheco Map. Using Spanish-Colonial maps, Zebulon Pike found his way into the basin in 1807.

After the Civil Rights Act of 1866, many Ute captives remained in San Luis Valley households of landed families, working as servants.

Building a stockade on the Conejos River and flying an American flag in Spanish-held territory, Pike attempted to delineate the western boundary of the Louisiana Purchase. Arrested and interrogated at Santa Fe, he published his journal and maps in America and Europe after his release, opening the door for exploitation of a massively endowed landscape.

Four decades after Pike's exploration and five years before the Gunnison Expedition, Capt. John C. Frémont led catastrophic winter expeditions in 1848 and 1853 to locate a low route to California through the mountain ranges. Like Gunnison, Frémont was a highly educated member of the Army Corps of Topographical Engineers. Frémont's aggressive and unrelenting father-in-law was a Missouri senator who promoted westward expansion. Frémont twice lodged with Kit Carson on the Taos plaza. He became acquainted with French-Canadian and American mountain men who lived in frontier villages, where he replenished his supplies and hired scouts to guide him through trails in the San Luis Valley.

Frémont's first expedition cost the lives of 11 men and 200 pack mules. When the remaining frost-bitten, starving survivors stumbled into Questa, they were warmed with atole and wheat bread. Returning five years later on a merchant-funded survey, Frémont found a winter passage over the Continental Divide. To make the second perilous journey, he hired many Delaware Indians and Missouri freighters, who had to be rescued by Taos mountain men and New Mexicans. An unintended result of the surveys was the newly forged trail. When New Mexicans traveled on rescue missions, they marked trees along the route. As this route became known, northward movement expanded into the San Luis Valley's mountains to settle private and communal land granted by México.

After generations, overgrazing around the old villages and wetlands had grown acute. Foothills were likewise impacted, as the population relied on wood for cooking and heating. Exacerbated by periodic drought, the carrying capacity of the semi-arid landscape reached its limit. Throughout the entire bioregion, buffalo that had migrated within the valley diminished, leading to food insecurity and chronic unrest. Fierce resistance ensued all along the borderland. Ute war parties drove the settlers away. To attempt to stem the tide of raids, in 1852 the army situated a fort near Ute trails. Fort Massachusetts was manned with dragoons and infantry from Ft. Union, New Mexico. The shock and awe of a fortified garrison surrounded by a wooden palisade with pointed ends was intimidating. However, the fort relied on Taos for corn, wheat and rations. Heavy snowfall forced it to close during its first winter.

Nuevo Mexicanos traveled El Camino Real de Tierra Adentro, the ancient trade route forged by Indigenous pioneers.

By 1853, the post commander reported that there were 25 families living on the "Coulubre river" who were "engaged in planting corn and wheat." An equal number on the Río Costilla were cultivating corn, wheat and beans. The inventory of the settlements, number of families and crops grown were listed all along the road to Taos. This clear sign of food production must have relieved the commanders, as soldiers and their mounts relied on locally produced, high-calorie rations. Yellow corn became the central ingredient, changing the military's typical reliance on wheat. A different team searching for a central route from the Missouri Valley to the Pacific stopped at a temporary way-station manned by Americans along the Culebra River. Expecting important visitors, laborers slaughtered a lamb, women "boiled milk with

salt" and made a "supply of [corn] tortillas." Sharing their *jacal* (log structure plastered with mud), the lodgers slept on the floor alongside "three men, two women, two girls and four children, on hides stretched on a rough frame." Leaving the shelter at sunrise, the visitors' narrative of a "verdant green meadowland" with fields of corn, wheat and oats—alongside grazing sheep, goats, pigs and cattle—ignored frontier reality. Living a meager existence in fortified windowless adobe shelters barricaded with gates, the first *pobladores* (early settlers) defended themselves with bows, arrows and lances. For the first two years, Taos staples ensured their survival.

After the military firmly secured the northern frontier, more colonies on both sides of the Río Grande took root. In 1858, Fort Garland, a larger, better situated, formidable adobe garrison was constructed. Plaza gates in the frontier were opened as more colonists arrived. In this decade of occupation, Albert Richardson, author of *Beyond the Mississippi*, visited San Luis de la Culebra (now San Luis, Colo.). Richardson's account described pobladores working fields sown by hand, using forked tree branches with a pointed plowshare of oak, strapped together with a cowhide band.

Harvesting was done with handmade wooden hoes, "scythe and hand rakes," while goats thrashed stalks to separate grain from chaff. This locus of agriculture reflected how the pobladores in the upper Río Grande transplanted survival skills that had evolved in the middle Río Grande.

The fort, soldiers and their mounts relied on locally produced, high-calorie rations grown along the road to Taos.

Richardson witnessed progress but also poverty and the necessity of brute strength to cultivate with tools he considered biblical.

The Foundation of Grist Milling in Occupied Northern New Mexico

One of many locally found resources that set the stage for milling was the abundance of volcanic rock. Rough, abrasive lava stones had been used in Neolithic Europe and in ancient Mesoamerica. Since many villages in the bioregion were situated near mesas formed by lava flows, the pobladores had access to volcanic rock to make millstones.

Richardson described the handmade millstone of a working *molino*, or "Mexican grist mill" at San Luis. The "horizontal water wheel with a millstone one story above the stone" was "revolving no faster than the wheel, grinds but slowly, and having no bolting apparatus, turns out very coarse flour." There were similar mills within the Río Culebra watershed at San Francisco, San Pablo, San Luis, and west toward Viejo San Acacio. There were likely undocumented mills at San Pedro, San Isidro, and perhaps at the village of Chama. Within the Río Costilla watershed, every plaza dweller had access to a common mill.

Adapted to specific locations, each settlement's grist mill was sited near flowing water. Mill wheels were patterned after the cumbersome grinding stone hauled along the Chihuahua Trail by the Juan de Oñate colony. Witnessing hand-grinding of Pueblo-grown corn, by the first planting season Oñate penned a letter stating that wheat fields were cultivated and a mill was in place at San Gabriel. The 1599 mill must have been a multi-purposed endeavor—primarily producing flour for the colonists while creating a lucrative commodity for trading. Equally important, this endeavor supported the missions, as one-tenth of all harvests were given to the friars.

After this initial acknowledgment of grist milling, the record is silent, very likely because the colony and mission archive were destroyed during the 1680 Pueblo Revolt. The information gap ended in 1756 when three grist mills were reported at Santa Fe. Two decades later there was a brief mention of three more mills at Chimayó. By the dawn of the 19th century, a new level of self-reliance was achieved as grist mills became a common feature in all villages.



Pikes Stockade, on the north bank of the Conejos River, is where explorer Zebulon Pike raised the American flag on Spanish soil in 1807. © Arnie Valdez



Within a year of the establishment of Fort Massachusetts, the first plazas on the Sangre de Cristo Land Grant and the Conejos Land Grant were taking root. On a tributary of the Río Grande, the José Jacquez Mill was grinding corn. Although the fort used rations of corn, wheat grew increasingly important, due to preferences of American miners who were arriving in what would soon be deemed as Colorado Territory. To meet the demand, a commercial mill with an 1855 water right was designed to replace the “primitive [corn grinding] metates.”

After his captive laborers dug an irrigation ditch to divert water, Lafayette Head, a Missourian and Confederate with experience in the Mexican War and occupation of New Mexico, imported modern parts for his mill from St. Louis. Operational by 1857, the Head Mill had steel burrs and a new method for screening flour. His neighbors responded by planting large fields of wheat, which he milled, packed in wooden barrels, and freighted by wagon to Denver. The villagers parlayed their valuable commodity by donating five bushels annually to entice a resident priest to reside in the colony.

Using his military credentials and economic position as a miller with a water right, Head was named by President Buchanan to lead the Indian Agency at Conejos. As their agent, Head

was responsible for distributing commodities, which included flour, salt and lard. Accompanied by a handful of men to meet Abraham Lincoln in Washington, Head’s goal was to demonstrate American power to broker a treaty. Many of these Utes were young, not leaders, and were from western bands. The eastern band on the Sangre de Cristo Land Grant ignored the treaty.

In contradiction to his posture as a fair broker of peace, Head was selling captives in the Río Culebra and Río Conejos plazas and brokering pilfered commodities. His exploited captives labored in his plantation-like fields or were servants in his household. They dug ditches, were agricultural laborers, and herded large flocks of sheep that were exported to gold fields.

Beginning in 1865, the military relocated Navajo women and children from their western homeland and the San Luís Valley to the Bosque Redondo Reservation near Fort Sumner. At the conclusion of the Civil War, Congress passed the Civil Rights Act of 1866, prohibiting slavery; nonetheless, many Ute captives remained in San Luís Valley households of landed families, working as servants.

Of the many early settlements that fanned out from the original colony on the Conejos River, a very notable founding was La Loma de San José. Traveling from Santa Fe and Ojo Caliente in a caravan of 14 wagons with herds of goats, sheep, chickens, hogs, cattle and horses, a core group of interrelated families made their way from the lower Conejos villages into the high mountains.

In 1859, following the tree-marked trail of the rescued Frémont Survey survivors, the colony settled near contemporary Del Norte, Colorado. They built adobe homes and planted blue corn in a protected microclimate. To ensure their survival, they fabricated a grist mill on the San Francisco Creek. After years of use, richly colored cobs had turned the millstone blue; thus, it became known as the Blue Mill. Three grades of flour were produced: the first, “the floor,” was premium. The second, *semeta*, was fair. The third grade, considered poor quality, was known as *salvado*, recommended for biscuits and cookies.

The miller’s family later supplied surplus flour to extended families that followed the settlers’ lead into the La Garita Mountains. Likely using the common rate, the miller would keep one of every 10 *fanegas* (2.5 bushels). The villages were not organized by grid, as settlers built houses randomly, but near water. Because the Conejos communal grant was not confirmed, newly arriving American homesteaders often contested the villagers’ property and water rights.

There were an estimated 22 villages on the Conejos Land Grant, beginning in 1854. In contrast, there were six villages and one military fort on the Sangre de Cristo Land Grant. The discrepancy is explained by organic, communal, self-organization on the Río Conejos, versus the Sangre de Cristo, which evolved as a private manor owned by a French-Canadian living at Taos. Linked together by culture, family and agro-pastoral lifestyle—including the growing and milling of corn and wheat—early *Nuevo Mexicanos* who settled *tierra incognita* navigated the geopolitical quandaries instigated by the dilemma of conquest. ■



María Mondragón-Valdez’s family have been multi-generational residents of the Sangre de Cristo Land Grant, though some of her ancestral roots stem from the Taos and Chama valleys. Mondragón-Valdez earned a Ph.D. from the University of

New Mexico’s Department of American Studies. She served on the boards of the Land Rights Council and the Regional Development Planning Group. Her activism was acknowledged in “500 Years of Chicana Women’s History.” Mondragón-Valdez and her husband, Arnold, live on a family farmstead in the Río Culebra Basin.

NEW MEXICO'S FARMING PROBLEM HAS A REGENERATIVE SOLUTION

My name is Chili Yazzie, and I'm a farmer here in Shiprock, New Mexico, located in the northwest corner of the state. I have worked for this community in the Navajo Nation for 45 years in various elective and administrative capacities. Recently, we formed a farmers' group called Toohnii Binahneest'a' Altaas'ei Alliance, which translates to "much produce grown by river edge people." The acronym is ToohBAA, pronounced *Tob-BA*, which in itself means "river edge." Our community is situated along the perennial San Juan River, from which we draw our irrigation water.

We have approximately 250 acres of land worked by our member farmers, irrigated using the traditional flood method, with water flowing down narrow furrows running through the crops. In the last two years, we've transitioned to an underground valve system.

We have six Navajo communities along the river with over 12,000 acres of irrigable farmlands. The sad fact is that, currently, only 15 to 20 percent of this land is being farmed annually. There are many factors as to why this is the case, including irrigation and soil degradation, among others.

Three of the main challenges that we've encountered and continue to face are the availability of farm labor, rampant weeds and unwelcome pests. In an effort to find ways to minimize these problem areas, we started looking into regenerative farming. We very much like the concept, mainly because we know that once we have it established, it's proven to make an impact. Ideally, we wish to apply these methods to revitalize our fallow acres in coordination with our long-range objectives for ToohBAA. Potentially, we are talking thousands of acres we could impact with regenerative farming.

Regenerative agriculture, permaculture and organic farming were commonplace practices of our Indigenous people before the

Regenerative agriculture, permaculture and organic farming were commonplace practices of our Indigenous people.

advent of modern farming back in the 1940s and 1950s. Prior to that, our farming was essentially what "regen ag" is today. In a way, we are reverting to those traditional practices, of course with a modern spin that we are learning about through our efforts with organizations in the regenerative movement.

We began our regenerative agriculture endeavors by talking with our friends at AgriCultura in Albuquerque. Executive Director Helga Garza introduced us to the Regenerative Agriculture Fund, through which we developed a project called Restorying Agriculture. We received funding to purchase approximately \$8,000 worth of seeds. We planted cover crops on 15 acres to start and anticipate doing another 15 acres this fall. The

We can revitalize our fallow acres through regenerative agriculture.

concoction is a mixture of seven to 10 types of seeds, including alfalfa, pasture, specialty crops and corn.

The problem we noticed early on has to do with our flood irrigation—which wets soil only a foot to a foot-and-a-half wide, leaving the seeds that fall between the furrows dry. We understand that a sprinkler system is the best way to grow cover crops, but we don't have that yet. But we see fewer weeds and pests, and we are having to irrigate less because of the cover that keeps the soil moist longer.

As we continue our progress, I am stepping into the work of the broader policy campaign, Regenerate America™ ([HTTPS://REGENERATEAMERICA.COM](https://regenerateamerica.com)). I'm making efforts to continue spreading the word to other farmers near and far. I think I'm the only Native on the council, so that's where my concentration is—with Indigenous farmers. There are a lot of Pueblo farmers along the Río Grande. I'm reaching out to those I know, along with various organizations, in an effort to get people to understand this larger effort and that regenerative agriculture should not be a stranger to us as Native farmers. For every farm with fallow acres, there's a community that can be better supported. It's through regenerative agriculture that we can revitalize our fallow acres, here in Shiprock Navajo Nation, on other Native farms and throughout rural communities across the nation.

Regenerate America™ is an unprecedented coalition of farmers, businesses, nonprofits and individuals from every corner of our country and all political stripes. Together, we are elevating the voices of farmers and ranchers, demanding that the 2023 Farm Bill shift resources and support regenerative agriculture. Help us take action by spreading the word. [HTTPS://REGENERATEAMERICA.COM/TAKE-ACTION/](https://regenerateamerica.com/take-action/). ■



Chili Yazzie

THE BIOLOGICAL AND SOCIAL FOUNDATIONS OF FOOD SECURITY

Some of us just love to grow and eat our own veggies. Having such an intimate relationship with our sustenance is emotionally, psychologically, philosophically, spiritually and physically rewarding.

We home gardeners grow as much as we can for ourselves, and eventually, after some years, we come to understand and accept the limitations of our particular growing situation. We become resigned to getting food from elsewhere, too. For me, it's carrots, potatoes, onions and sweet potatoes that I regularly import.

Since I live off the grid with rain as my only water supply, I can only grow so much. My greenhouses help immensely. Water is an obvious limitation in this dry region, but there are others. We also need biomass for good compost. Our time and attention have their limits, and we only have the location-based knowledge gained by our life experience or what has been passed on to us by those who have known the same land and climate.

Those of us who live in very dry regions may feel the need to make some plans.

The place where I live, north of the Ortiz Mountains, is not known for its agricultural production. At one time Ancestral Puebloans did live sustainably here, but that was in the 12th century when the climate was cooler and wetter (and private property lines did not restrict movement). Perhaps we shouldn't be living here now, as the climate cannot sustain our food needs. But this is where I could afford to put down roots a couple decades ago. Many others ended up here the same way.

There are other factors too. At some point we realize that with the current economy, and current life/relationship configurations, there is only so much we can grow. We have other needs and responsibilities. This realization can happen at many scales—from the front porch container gardener to those managing a substantial farm. This is a reality based on our planet. Our resources are limited.

Food systems are dependent on accumulated, practiced knowledge of how to be in good relationship with the living beings around us.

Yet, the dominant economy is based on unlimited growth and continual extraction. This discrepancy cannot coexist forever. We see the results of this every day in the headlines. In years past I would have felt the need to explain how the extreme weather events exacerbated by human-induced climate change are a natural result of the dominant economic paradigm being inconsistent with the Earth's natural limits. Anyone paying attention to it now can easily see how important oil and gas extraction is to the creation of products that quickly cycle through our homes, heating and cooling, and even the production, maintenance and repair of renewable energy infrastructure.

Like everyone else, even those of us who dedicate our lives to developing better ways of living in harmony with the cycles of the Earth are constrained by current economic realities. But these realities are shifting. Long-distance transportation will always exist, but the price is beginning to catch up with its true costs. Like it or not, our lives will become more localized. Those of us who live in very dry regions may feel the need to make some plans.

When we strategize to support local food economies, there are some biological and geographical limitations to acknowledge first. For growing food, we need water. If we wish to invest in long-term food security, thinking of future generations, we need our farms to be located in places that have renewable aquifers. Ask the well-drillers and hydrologists and they will tell you where the aquifers are being steadily depleted. The wells are needing to be continually dug deeper, and the geology of these areas does not allow for recharge of the deep aquifers. That's an example of a place where relying on a well for farming is just not a very long-term investment.

I live in an area like that, where the aquifer is only going down. However, just a mile or so away is a completely different hydrological situation. The Galisteo River has a large watershed. Snow-melt from the mountains and even small, localized storms can contribute to the recharge of the aquifer surrounding this river for miles downstream. The health of small desert rivers like the Galisteo is not always indicated by large and constant water flows but by the riparian area and wildlife-supporting floodplain that surrounds it. Underground water that the cottonwoods and willows are tapped into is replenished by snow-melt from the upper reaches of the watershed, high in the Sangre de Cristo Mountains. When we tap into this renewable water supply (depending on precipitation and seasonal temperatures) we can function as a part of the wildlife community—becoming a part of and extending the riparian area if we use certain beneficial farming practices. This is why farm location is very important for long-term local food security. It's based on hydrological and biological realities.

If we wish to invest in long-term food security, we need our farms to be located in places that have renewable aquifers.

Another limited resource related to food security is regenerative farming practice knowledge and know-how. It takes years (at least) for a farmer

to get to know how to grow a certain crop in a certain location, in a way that is not depleting the soil. And just when you think you've got it figured out—the right time to plant, frequency and duration of watering, weeding and successional planting and crop rotation needs—the climate changes. Now we need both knowledge—accumulated from generations of farm-based relationship with the land—and adaptability that can only come from networks of people helping each other.

All this points to the need for building relationships of trust within our communities and in our foodsheds. To me it makes sense to begin to build, or continue to strengthen, mutually beneficial relationships between farmers in localized areas, while identifying current and potential locations with more renewable water sources.

There also needs to be attention given to food justice. When the resources—whether it's money or transportation or water or food—are not equally distributed (they never are), effort must be made to continually redistribute. Thank goodness for the people running the food pantries, the county and state funded organizations, nonprofits and mutual aid groups that get food and water to those who need it. As the economy changes, we must stay adaptable and responsive to the needs of our fellow humans and other creatures.

I look forward to the time when people change their perspective about where food comes from. It's not just the store, it's not just the farmers at market, it's actually the biological and hydrological community.

Like it or not, our lives will become more localized.

Food systems that our children and future generations will benefit from are dependent on accumulated, practiced knowledge of how to be in good relationship with the living beings around us—like the wildlife that are also relying on these precious riparian areas with sustainable water supplies. The trees stabilize the shallow aquifer and the water they transpire out to the leaves creates more humid growing conditions for plants we grow. The pollinators, the burrowing creatures, the tree dwellers—we must work on good relationships with them all. Any farmer knows this is not easy. But the human-centered economic paradigm has run its course. The economy I refer to here is not just about gross national product, inflation and currency. I speak about what we need to lean into for the future: a care-based exchange of goods and services with all our relations. This may seem impractical and unrealistic to some people. But I have not seen a plan for a livable future that is more realistic. We need to employ our ethics along with a deep understanding of the land and the beings with whom we share this watershed and foodshed. ☺



Amanda Bramble is the director of Ampersand Sustainable Learning Center. She and her husband Andy built their home off the grid in the Cerrillos/Madrid area of New Mexico and it grew into a demonstration site for sustainable living. [HTTPS://AMPERSANDPROJECT.ORG](https://ampersandproject.org)

DEC. 3, 9 AM–12 PM

ARID LAND RESTORATION

Online via SF Community College

Heal degraded landscapes through mulching, seeding, erosion control, water harvesting. Amanda Bramble will show ecological restoration projects at Amperand Sustainable Learning Center. \$49. SFCC course #2445. 505-428-1676, [SFCC.EDU/CE](https://sfcc.edu/ce)

Using Hempcrete for Building Emergency Shelters

hempwool. The interior was carefully designed to accommodate two sleeping platforms, a countertop with a propane range-top and sink. Under the lower level platform, a 40-gallon tank is located, as well as a dry composting toilet and batteries for the photovoltaic system. The walls and roof are covered with metal panels designed to capture rainwater.

CONSTRUCTION

The frame has to be solid and sturdy to support the hempcrete infill and for transporting to a site. The floor is built out of 2-by-6-inch lumber with half inch OSB sheathing. The cavity is insulated with hempcrete. Wall frame consists of 6-by-6-inch wood post and beam with intermediate 2-by-6s for creating wall cavities for the hempcrete infill. Roof framing consists of a ridge beam with a pitched roof of 2-by-6-inch rafters. All exterior sheathing for the walls and roof is rough-cut 1-by-6. The exterior of the wood sheathed walls is covered with a layer of house wrap and 15-pound felt paper. Metal panels are the finish surface for both the walls and roofs. The metal skids that support the building extend four feet past the entry door, creating a deck as an entry platform and a place to sit.

The experience of building the casita was a learning process for myself and those who came to help via workshops and as volunteers. Working with hempcrete was a bit of a challenge due to having to hand-mix the ingredients of hemp hurd, stabilizer, lime and water to form a consistent mix and density. The walls required setting up and removing forms and multiple pours of the mix. Insulation of the roof however, was fast using hempwool insulation batts. The interior walls are finished with plaster and hardboard, while the ceiling is tongue-and-groove wood.

SUMMARY OF PROCESS

The hemp casita was built over a period of about one year in between my farming tasks. Construction of the basic shell was within the allotted budget of \$5,000, with an additional \$3,000 for the water, PV system, solar wall and composting toilet. The windows, open-web trusses and PV system were donated. The casita features two Trombe or solar-collector walls between the door. Backup heat is a small wood stove. A gutter collects rainwater from the roof and diverts it to a 55-gallon storage barrel. The roof also supports a photovoltaic panel, which sends power to two 12-volt batteries and a 1,500-watt inverter, providing 120-volt AC. A dry composting toilet built from recycled bee hive cabinets provides a waterless waste disposal system. By having the capability of capturing solar energy and rainwater, and with solid waste disposal, the versatility of the basic shelter is extended to provide a greater level of self-sufficiency.

The hempcrete shelter provides a cost-effective, energy-efficient solution to emergency shelter needs. It can be built locally to utilize hempcrete and hempwool for insulation in areas where hemp is grown and processed. ■

Arnold Valdez, of Valdez & Associates and Rejolana Farm, San Luis, Colo., has an M.A. from the University of New Mexico. In 1999-2000 Valdez was the recipient of Harvard Loeb Fellowship. In 2008 he was recognized as a George Pearl Fellow for work with the UNM Historic Preservation and Regionalism Graduate Certificate Program. As an adjunct associate professor at the UNM School of Architecture and Planning, he taught courses in alternative materials and methods of construction, cultural landscape planning, preservation technologies and adaptive reuse.

NEW MEXICO RECEIVES \$74 MILLION TO BOOST SMALL BUSINESS INVESTMENT

In October, the New Mexico Economic Development Department (EDD) announced that the state has received up to \$74.4 million from the U.S. Department of Treasury's State Small Business Credit Initiative (SSBCI) to boost capital assistance and invest in SEDI (socially, economically, disadvantaged individuals) business owners.

The EDD had submitted a grant application. EDD's 20-year Strategic Plan, *Empower and Collaborate: New Mexico's Path Forward*, specifically addresses the scarcity of investment capital available to very small businesses and those from traditionally underserved communities.

"Small businesses are the backbone of many New Mexico communities, but they often have difficulty finding and qualifying for the assistance they need to grow and create jobs," Gov. Michelle Lujan Grisham said. The federal funding augments the Lujan Grisham administration's initiatives to bolster small businesses, including the first GRT tax cut in 40 years; \$1.5 million in direct assistance to businesses affected by wildfires; a \$200-million grant program under the LEDA program; and a \$500 million low-interest loan program for hard-hit businesses using funding from the state's Severance Tax Permanent Fund.

Under the grant agreement, \$9 million has been specifically allocated to EDD's Collateral Assistance Program (CAP), which boosts private lending to small businesses by bridging collateral requirements at banks and financial institutions. CAP gives preference to business owners who are women, U.S. veterans, ethnic minorities, or part of other underserved groups. Eligible businesses must be located in New Mexico and may use the loan proceeds for asset purchases, start-up costs, working capital, franchise fees, equipment, inventory, or even bridge loans leading to permanent financing.

WHAT'S GOING ON

ALBUQUERQUE / ONLINE

NOV. 5, 9 AM-10 PM

INDIGENOUS YOUTH CELEBRATION & YOUTH POWWOW

Albuquerque Convention Center

Activities promoting traditional wellness. Gratitude walk/run, Indigenous games and dances, land-based learning, cultural enrichment activities, vendors. Free. 505-375-4587, CABQ.GOV/OEL/EVENTS

NOV. 10, 6:30-8 PM

INTERFAITH POWER AND LIGHT FALL GATHERING

First Congregational United Church, 2801 Lomas Blvd. NE and Online on Facebook

"Choosing Mother Earth." Awards, panel with young adult leaders.

CARLOS@NM-IPL.ORG

THROUGH DECEMBER

FRONTERA DEL FUTURO

National Hispanic Cultural Center, 1701 Fourth St. SW

"Art in NM and Beyond" A transformative look at pop culture, religion, tradition and identity. Intersections of art, science, technologies, cosmic musings, future-oriented visions. \$6/\$5/18 & under free. NHCC.ORG

THROUGH JAN. 29, 2023

WIT, HUMOR AND SATIRE

Albuquerque Museum, 2000 Mountain Rd. NW

More than 50 artists. Photography, prints, painting, ceramics and sculpture from the permanent collection. ALBUQUERQUEMUSEUM.ORG

THROUGH FEB. 12, 2023

NICOLA LÓPEZ AND PAULA WILSON: BECOMING LAND

Albuquerque Museum

Contemporary interpretations of NM desert landscapes that embody an ecological perspective and emphasize relationships between humans and their environment.

ALBUQUERQUEMUSEUM.ORG

APRIL 17–21, 2024

77TH ANNUAL INTERNATIONAL SOCIETY

OF ARCHITECTURAL HISTORIANS CONFERENCE

Albuquerque Convention Center

Architectural and art historians, architects, museum professionals, preservationists and those working in allied fields will share research on the history of the built environment. Paper sessions, keynote talks, social reception, tours. WWW.SAH.ORG

TUESDAY–SUNDAY, 9 AM–4 PM

INDIAN PUEBLO CULTURAL CENTER

2401 12th St. NW

“Gateway to the 19 Pueblos

of N.M.” Museum galleries, exhibits and restaurant.

Tickets \$10/\$8/\$7. 505-843-7270, WWW.INDIANPUEBLO.ORG

SANTA FE / ONLINE

NOV. 2–5

LA COSECHA DUAL LANGUAGE CONFERENCE

SF Convention Center and nearby hotels

Our cultures, our languages—Nuestra identidad comunitaria e igualdad educativa.

Conference for teachers by teachers. [HTTPS://LINKD.IN/GAB9WIBK](https://LINKD.IN/GAB9WIBK),

WWW.LACOSECHACONFERENCE.ORG

NOV. 4–7

FRED HARVEY HISTORY WEEKEND

NM History Museum, 113 Lincoln Ave. / Online

11/4: Dinner & auction at La Fonda Hotel, 11/4-5: talks, presentations. \$40.–\$150.

Optional railway excursion and events in Santa Fe, Lamy and the Castañeda Hotel in Las Vegas, NM. Benefits the NM History Museum.

FREDHARVEYHISTORY@GMAIL.COM, FREDHARVEYINFO.COM

NOV. 5, 8:30 AM–3:30 PM

STEM PATHWAYS FOR GIRLS CONFERENCE

Santa Fe Community College

Open to 5th- to 8th-grade students in northern NM. \$25. 505-570-5402,

WWW.STEMSANTAFE.ORG/PROGRAMS/STEM-PFG

NOV. 5, 11:30 AM–2:30 PM

BUSINESS DAY CLEAN-UP ON THE CAJA

Caja del Río, Santa Fe County

Guided hiking tour and community-wide clean-up of the Caja. Help protect an ecologically rich and culturally significant landscape. Meet at La Cieneguilla Petroglyphs parking lot off Hwy. 56. BLACKA@NWF.ORG, CAJADELRIO.ORG

NOV. 5, 1–4 PM

NATIVE AMERICAN STUDENTS & FAMILIES COLLEGE FAIR

Buffalo Thunder Resort

Presented by the NM Higher Education Department. [HTTPS://HED.NM/GOV](https://HED.NM/GOV)

NOV. 5, 2–5 PM

WOVEN TOGETHER – AN ART SHOW

Randall Davey Audubon Center, 1800 Upper Canyon Rd.

A sale of cards, prints, calendars, plants and more to benefit Many Mothers and Colores United.

NOV. 11–13

RECYCLE SANTA FE ART FESTIVAL

SF Convention Center, 201 W. Marcy St.

Trash Fashion & Costume contest, juried art exhibit, student art exhibit and make-and-take activities. \$5 general admission, \$8–20 fashion show.

RECYCLESANTAFE.ORG

NOV. 12

ARTSMART NM FALL GALA

Bishop's Lodge, 1297 Bishop's Lodge Rd.

Auction, fine art, food, celebration. Benefits arts education in SF's public schools and surrounding communities. \$85/\$250. 505-227-2787, ARTSMARTNM.ORG

NOV. 12, 5:30–9:30 PM

HUNGRY MOUTH FESTIVAL

Scottish Rite Temple

Cookoff with local chefs benefits St. Elizabeth's homeless shelters and supportive housing.

WWW.STESHELTER.ORG

THROUGH NOV. 13, 11 AM–5 PM (EXCEPT MON.)

UN-KNOWN PATHS

Ellsworth Gallery, 215 E. Palace Ave.

Paintings of land around Santa Fe exploring themes of pathways, stillness and listening.

Special events Nov. 6, 11, 5 pm. ELLSWORTHGALLERY.COM

NOV. 18–20

FALL FIBER FIESTA

Scottish Rite Temple, 463 Paseo de Peralta

Weavings, jewelry, hats and other gift items crafted by Espanola Valley Fiber Arts Center textile artists. Free admission. EVFAC.ORG/SHOWS

NOV. 19–20, 10 AM–5 PM

19TH CONTEMPORARY CLAY FAIR

SF Women's Club, 1616 Old Pecos Tr.

Showcase of regional ceramic art; 20+ ceramicists offering functional and decorative

works. CONTEMPORARYCLAYFAIR.COM

NOV. 26, 9 AM–5 PM; NOV. 27, 9:30 AM–4:30 PM

TRADITIONAL SPANISH MARKET ARTIST SHOW

SF Convention Center, 201 W. Marcy

DEC. 7, 5–7 PM

LOWRIDER CULTURE AND ITS LEGACY IN NM

Community Gallery, SF Community Convention Center, 201 W. Marcy St.

A presentation by founding members of the NM Lowrider and Arte Culture organization.

The “Neon & Chrome” exhibition is open through December. 505-955-6707, RDLAMBERT@SANTAFENM.GOV

THROUGH JAN. 6, 2023

INSPIRED CREATIONS, ART WE ENJOY

Poeh Cultural Center, 78 Cites of Gold Rd.

Featured works selected by PCC staff. 505-455-5041, POEHCENTER.ORG

THROUGH JAN. 15, 10 AM–5 PM

#MASK: CREATIVE RESPONSES TO THE GLOBAL PANDEMIC

Museum of International Folk Art, 706 Museum Hill

\$7/\$12 505-476-1200, INTERNATIONALFOLKART.ORG

TUES., SAT., 8 AM–1 PM

SANTA FE FARMERS' MARKET

1607 Paseo de Peralta

505-983-4098, SANTAFEFARMERSMARKET.COM

WEDS.–SAT., 10 AM–6 PM; FRI.–SAT., 10 AM–6:30 PM

SANTA FE CHILDREN'S MUSEUM

Interactive exhibits, play areas, weekly programs. Masks required for ages 2 and older.

\$10/\$8/\$7/\$3/one & under free. 505-989-8359, SANTAFECHILDRENSMUSEUM.ORG

ONGOING

“HERE, NOW AND ALWAYS”

Museum of Indian Arts and Culture, 710 Camino Lejo

Admission \$12 with discounts available. INDIANARTSANDCULTURE.ORG

STATE MUSEUMS

Museum of International Folk Art (10 am–4 pm), Museum of Indian Arts and Culture (10 am–4 pm), N.M. History Museum (10 am–4:30 pm), N.M. Museum of Art (Tues.–Sun., 10 am–4 pm). NEWMEXICOCULTURE.ORG/VISIT

YOUTHBUILD / YOUTHWORKS!

Paid training for Youth 16–24. Construction, Culinary, GED. 505-989-1855, WWW.SANTAFEYOUTHWORKS.ORG/SANTA-FE-YOUTHBUILD/

TAOS / ONLINE

DEC. 9–11

EARTHSHIP BIOTECHTURE

Seminar by Michael Reynolds. Lectures, tour. \$500. OUTREACH@EARTHSHIP.COM, [HTTPS://LNKD.IN/GQTMFQGD](https://LNKD.IN/GQTMFQGD)

THROUGH JAN. 29, 2023

“SOUTHWEST REFLECTIONS: IN BETWEEN SHADOWS OF THE LAND”

Millicent Rogers Museum

Nine NM artists as documentarians of the land. A diverse exploration of environmental relationships conveyed through shadows, reflections and movements.

CON ALMA HEALTH FOUNDATION KITCHEN PROJECT

A project to bring back producers and bring in new producers who lost income during the pandemic. The project helps individuals evaluate product ideas, market-test products, write a business plan. [HTTPS://TAOSECONOMIC.WPENGINE.COM/TAOSKITCHEN@TCEDC.ORG/](https://TAOSECONOMIC.WPENGINE.COM/TAOSKITCHEN@TCEDC.ORG/)

HERE & THERE / ONLINE

NOV. 2–4

REGENERATE CONFERENCE

Denver, Colo. and Online

Cultivating Restorative Economies. Explore the intersections of ecology and economy through the lenses of agriculture, science, conservation, economics, racial justice, policy and culture. Presented by The Quivira Coalition, Holistic Management International and the American Grassfed Association.

[HTTPS://REGENERATECONFERENCE.COM](https://REGENERATECONFERENCE.COM)

NOV. 5, 3–8 PM

RÍO GRANDE AGRICULTURAL LAND TRUST 25TH ANNIVERSARY

Cinco Estrella Chile Farm, Lemitar, NM

Dinner, live music, barn dance, hayride farm tour, pony rides, auction. Early bird tickets: 2 for \$100. After Oct. 15 – adults \$60, kids under 12 free. WWW.RAGLT.ORG

NOV. 5–6

41ST ANNUAL DIXON STUDIO TOUR

Dixon, NM

Diverse group of local artisans, craftspeople and makers, participating local organizations, businesses and nonprofits. Embudo Valley Arts Association.

WWW.DIXONARTS.ORG

NOV. 9, 11 AM–12:30 PM

THE RIGHT SEEDLING FOR REFORESTATION

Online

Science for Managers Webinar: Success, Partners and Policy. Forest regeneration in a changing climate, Part 2. Co-hosted by Rocky Mountain Research Station and SW Ecological Restoration Institute. [HTTPS://NMFWR.ORG/CONTACT/](https://NMFWR.ORG/CONTACT/)

NOV. 13, 2:30 PM

CAMINO DE PAZ MONTESSORI SCHOOL & FARM

1 Camino de Paz, Santa Cruz, NM

Middle School open house. 505-231-2819, WWW.CAMINODEPAZ.NET

NOV. 13–19

ROC YOUR MOCS 2022

Social media event held annually during National Native American Heritage month in the U.S. Indigenous people symbolically wear moccasins to honor ancestors and Indigenous peoples worldwide. WWW.ROCKYOURMOCS.ORG

NOV. 14 APPLICATION DEADLINE

SUSTAINABLE AGRI RESEARCH GRANTS

Grants from the National Institute of Food & Agriculture encourage research furthering knowledge that enhances soil quality/productivity, conserves water, energy, natural resources, wildlife habitat, protects health and safety and increases employment. [HTTPS://WWW.GRANTS.GOV/WEB/GRANTS/VIEW-OPPORTUNITY.HTML?OPPID=343321](https://WWW.GRANTS.GOV/WEB/GRANTS/VIEW-OPPORTUNITY.HTML?OPPID=343321)

THROUGH NOV. 19 (EVERY OTHER SAT.)

POST-FIRE LAND RESTORATION WORKSHOPS

Querencia in Action. NM Forest and Watershed Restoration Institute and Luna Community College help landowners with tips and techniques for reducing erosion and restoring forests in burned areas. Free. 505-454-5308, LUNA.EDU, [HTTPS://NMFWR.ORG](https://NMFWR.ORG)

NOV. 22 APPLICATION DEADLINE

REGIONAL FOOD BUSINESS CENTER PROGRAM

USDA program to “support a more resilient, diverse and competitive food system.” Eligible entities: producer network or association, food council, tribal governments, state agencies or regional authorities, institutions of higher education, nonprofit corporations, economic development corporations.

WWW.USDA.GOV/SERVICES/LOCAL-REGIONAL/RFB/CP/APPLY

NOV. 25, 7 PM

49 LAUGHS COMEDY

Farmington Civic Center

\$25–\$35. 505-599-1148, www.onthestage.tickets

THROUGH NOVEMBER

ROCKY MOUNTAIN YOUTH CORPS

Hiring crews to work in forestry conservation. Bi-weekly stipend. Training, scholarship award. ANGELIQUE@YOUTHCORPS.ORG, WWW.YOUTHCORPS.ORG

DEC. 1–4, 2022

RIGHT HERE, RIGHT NOW GLOBAL CLIMATE SUMMIT

Online

Some of the world’s foremost human rights, scientific, political, educational, cultural and industry leaders may commit to specific outcomes that address the adverse effects of climate change on human rights. Presented by UN Human Rights and the University of Colorado, Boulder. [HTTPS://WWW.COLORADO.EDU/GLOBALCLIMATESUMMIT/](https://WWW.COLORADO.EDU/GLOBALCLIMATESUMMIT/)

DEC. 5 APPLICATION DEADLINE

FILM PRIZE JUNIOR NEW MEXICO

Middle and high school students compete for scholarships and grants. Each film must designate a teacher sponsor, a student lead and a school or program to host filmmaking activities. 4/1: Statewide youth film festival. 4/2: Award ceremony in ABQ.

FILMPRIZENM.COM

DEC. 6, 5:30–6:30 PM

SOIL STORIES WITH LYLA JUNE

Online

Indigenous soil management practices, past and present.

[HTTPS://WWW.NMHEALTHYSOIL.ORG](https://WWW.NMHEALTHYSOIL.ORG)

JAN. 17, 2023 APPLICATION DEADLINE

LANL FOUNDATION’S 4-YEAR SCHOLARSHIPS

Open to northern NM students pursuing a BA degree in any field of study.

[HTTPS://LANLFOUNDATION.ORG/SCHOLARSHIP/4-YEAR-UNDERGRADUATE-SCHOLARSHIPS/](https://LANLFOUNDATION.ORG/SCHOLARSHIP/4-YEAR-UNDERGRADUATE-SCHOLARSHIPS/)

MARCH 14–15, 2023

HEALTH & ENVIRONMENTAL RESILIENCE AND LIVABILITY IN CITIES

Online

2nd international conference on sustainable urban systems design, livability at the heart of a city’s urban planning, environmental quality, wellbeing and comfort, innovations in Smart Cities. [HTTPS://LNKD.IN/DA4FAJRX](https://LNKD.IN/DA4FAJRX)

MARCH 31, 2023 APPLICATION DEADLINE

FUNDING TO CLEAN UP LEGACY POLLUTION

Bipartisan Infrastructure Law funding available to catalyze economic opportunity by reclaiming abandoned coal mine lands. Open to state and tribal governments and some organizations.

[HTTPS://WWW.OSMRE.GOV/SITES/DEFAULT/FILES/INLINE-FILES/BIL_NOFO.PDF](https://WWW.OSMRE.GOV/SITES/DEFAULT/FILES/INLINE-FILES/BIL_NOFO.PDF)

CLIMATE INNOVATION CHALLENGE

CAVU’s free STEAM program built on a six-lesson science and storytelling curriculum designed to cultivate student leaders who think innovatively and communicate about adapting to our changing climate. Cash prizes in annual competition. May 10, 2023 student showcase. CLIMATEINNOVATIONCHALLENGE.ORG

NAVIGATE a life with **LESS WATER**

 savewatersantafe.com



Reduce your water footprint in the City Different!

BECOME A
Certified
Waterwise
Business

by the City of Santa Fe

Pilot project participants include 71 restaurants, 5 hotels, 19 small businesses, one shopping center and one museum that have become Certified Waterwise by the City.

Since 2018 the City's Certified Waterwise pilot project saved 2.1 million gallons of water each year. Now a permanent program, it's estimated that tens of millions more can be saved by Santa Fe businesses who choose to participate in the free water usage assessment.

savewatersantafe.com/waterwise-business