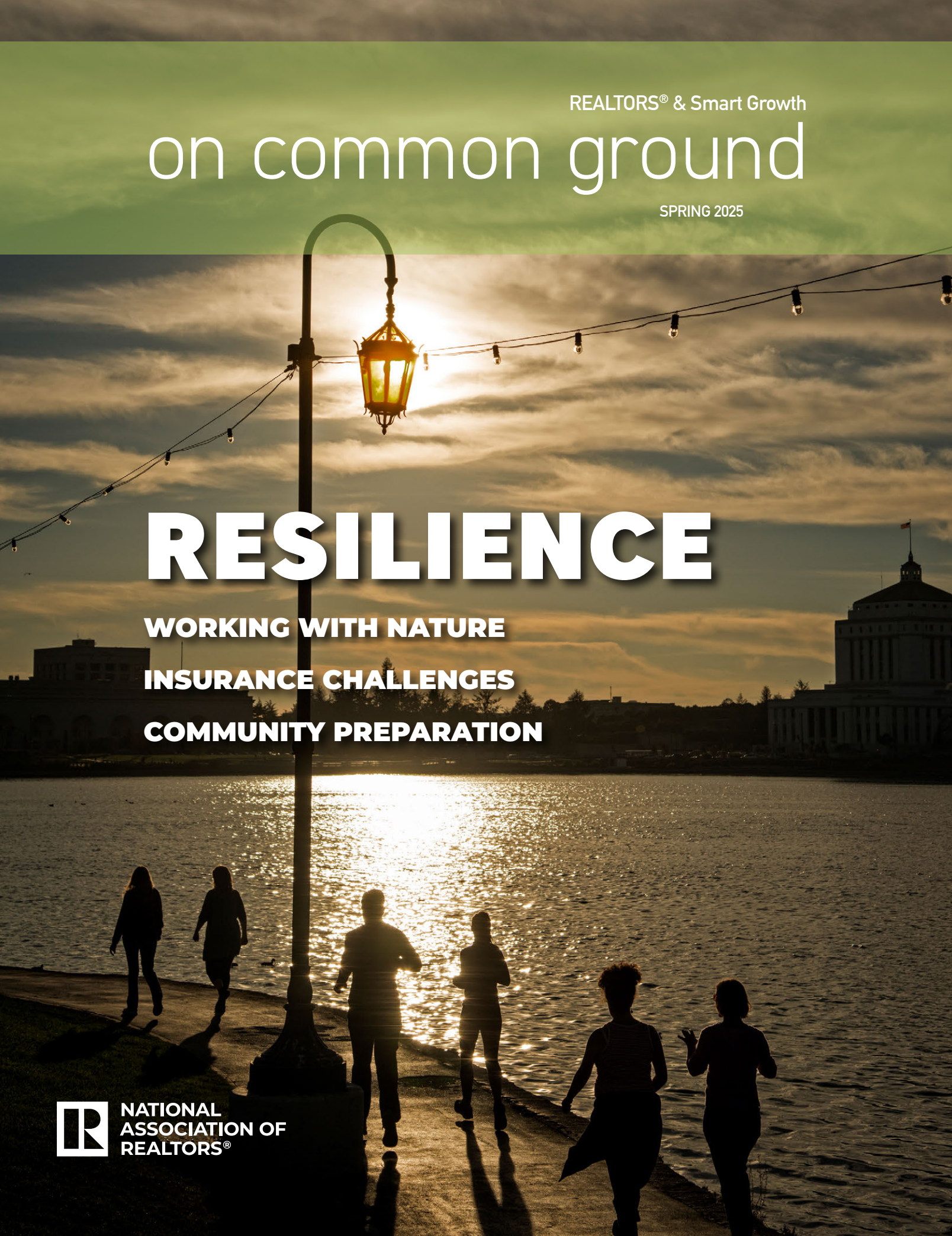
REALTORS® & Smart Growth

on common ground

SPRING 2025



RESILIENCE

WORKING WITH NATURE

INSURANCE CHALLENGES

COMMUNITY PREPARATION

NATIONAL ASSOCIATION OF REALTORS®

The Road to Resiliency

Resiliency. It is a word that implies hope during struggle; preparedness; fortitude; and determination when dealing with life's challenges. Not long ago, our nation faced disease and economic hardship from widespread job losses, revealing a resilience in those who emerged from these challenges stronger than ever.

Now, increasingly, the word is being used as we, all 8.2 billion inhabitants of planet earth, come to grips with a growing frequency of extreme weather events in a changing climate. One's risk of peril depends, generally, on one's geography. While it may feel like no place is without risk, people can decide which challenge they're most prepared to face, relocating to areas where they feel more confident adapting to known conditions.

However, in a world where no location is spared from some aspect of intensified weather or its collateral impacts, resiliency comes in shades. Some impacts are easier to predict, prepare for and defend against. While others, such as the indirect consequence of sustained drought creating vast acreage of dried tinder, increasing the chances that a lightning strike or cigarette butt tossed out of a car window will ignite the tinder, are all but impossible.

In this edition of ***On Common Ground***, we explore the many dimensions of resilience in the face of growing hazards. We examine these challenges through various lenses — structural, residential, commercial, financial and purposeful design. We also consider community-wide preparedness strategies and how to strengthen our

increasingly strained insurance system. Resilience also often begins at home. Reinforcing your roof, whether by securing it against hurricane-force winds or choosing fire-resistant materials to protect against wildfire embers, can make a critical difference.

In some ways, this is a very exciting time. Collectively, we are learning a lot, very quickly, about how to fortify structures against a variety of perils, and REALTORS®, found in every community, are quickly becoming knowledgeable about local impacts and preparations for them. Developers have built entire communities where the houses have survived hurricanes; where the lights stayed on and people remained connected because powerlines and cables are buried; and the community remained above water due to flood adaptation planning. It feels like a miracle. We will need many more such miracles — or resilient strategies — to cope with the ever-changing environment.

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On Common Ground

Spring 2025

Exploring Resiliency and Sustainability Design 4
by Steve Wright

Community Preparedness and Resilience 10
Keys to Surviving Natural Disasters
by Brian E. Clark

Housing Resilience 20
Challenges and Best Practices
by Steve Wright

Commercial Real Estate Mitigation for Hazards 28
by Michele Lerner

Nature Is Becoming a Critical Element in Building 34
by G.M. Filisko

Insurance Battles 40
After natural disasters, insurance challenges are increasingly harder to navigate
by Brian E. Clark

The Economy of Hazards 46
The direct and indirect economic impacts of recovery and resiliency
by Brad Broberg

Transportation Resilience 52
Laying the groundwork for a clean get-away and a rapid recovery
by David Goldberg

Living on the Water's Edge 60
Extreme weather events exacerbate inequity
by Joan Mooney

REALTORS® Take Action 66
California Wildfires Relief: REALTORS® reach out to help communities

Courtesy of City of Cuyahoga Falls, Ohio and The Nature Conservancy.

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Exploring Resiliency & Sustainability Design

By Steve Wright

For centuries, vernacular building techniques used local materials and a knowledge of local conditions to create buildings that were naturally resistant to disastrous weather.

Somewhere in the mid-20th century, conventional building was reflected in suburban sprawl building patterns and mass production with materials sourced from far away.

When LEED was introduced in 2000 by the U.S. Green Building Council, sustainable building and the long-term financial rewards of investing in sustainable building became part of our vocabulary.

Today, more brutal (in terms of loss of life and billions in property) natural disasters are happening more frequently. Wildfires, hurricanes, floods and other disasters threaten all that we hold dear.

Planners, architects, builders, developers, REALTORS® and even insurance companies are rallying to get a handle on resilient design.

From protecting individual buildings to entire communities, the professions that shape our built environment and way of life are searching for best practices that will prepare us for and protect us from extreme-weather impacts.

Areas devastated by flooding and windstorms are looking to the nature-based resiliency and self-sufficient sustainability of Florida's Babcock Ranch — which has survived a hurricane that virtually destroyed nearby Gulf Coast communities. See Babcock Ranch information on page 24.When communities rebuild after wildfires and other disasters, the president elect of the American Institute of Architects and a leading Disability/Aging in Place/Environment advocate, Illya Azaroff, champions the benefits of Universal Design. Residential and commercial space that is designed to accommodate all ages and abilities adds flexibility, durability and cost efficiency — similar to green building. See Universal Design sidebar on page 26.

Wildfires and other disasters exacerbating insurance crisis

Costar, a real estate data and analytics company reported "the most destructive wildfires in California history are expected to send insurance rates surging, adding another headwind for owners of multifamily properties in Los Angeles and potentially hindering affordable housing goals."

The report notes that The American Property Casualty Insurance Association has lobbied Congress to pass more laws to address wildfire risks — such as the Fix Our Forests Act that seeks to increase the pace and scale of forest management and establishes a program to better coordinate federal agencies to reduce wildfire damage to properties.

"Even before the fires, a shortage of affordable housing in Los Angeles created a pall on overall economic growth … Renters in Los Angeles County need to earn $48.04 per hour — nearly triple the minimum wage — to afford the average monthly asking rent of about $2,500, according to the California Housing Partnership. That average is about 45 percent higher than national rents …" stated the report by Costar.

Planners, architects, builders, developers, REALTORS® and even insurance companies are rallying to get a handle on resilient design.

Courtesy of Built Green; Photo by the Cottage Company

Courtesy of Urban Design Associates

Building back affordably is a higher priority for disaster survivors than building back to be fire resistant.


Courtesy of Blue Flamingo Marketing

How to design resilient and build back better

Barry J. Long, Jr., AIA, LEED AP, is principal and president of Urban Design Associates (UDA), a Pittsburgh-based firm that has a national practice of helping communities recover from disaster. UDA worked to rebuild Paradise, Calif., where a 2018 fire destroyed more than 18,000 structures, including over 14,000 homes, and killed 85 people.

Long noted that more than six years after the fire, Paradise is only about 25 percent built back. Businesses have been slow to come back, because there's not enough population to support them.

"When you think of just the economic piece — the town of Paradise lost their tax base in a day," Long said. "They had to get outside funding to backfill their tax roll to 2055. They had naturally occurring affordable housing in a three-county region — but much of that will be lost because of the high cost of rebuilding."

Long said building back affordably is a higher priority for disaster survivors than building back to be fire resistant. He said many cities push back on building codes that require more than the International Wildland-Urban Interface (WUI) code, which sets minimum regulations for safeguarding life and property from the intrusion of wildfires.

He said the code helps, but it doesn't ensure a property is insurable. UDA creates resilient design that helps make properties insurable, while mitigating the costs of insurance in high-risk areas. After UDA's work, Paradise adopted its own wildfire ordinance to require that people maintain their lots to reduce combustible material. "Paradise has very strong code enforcement now." Long said.

"There is no such thing as a fireproof home," Long said. "You can harden by having a fire-resistant roof, closing up vents to keep embers out and using windows that don't melt and fall out. Fireproofing the lot means nothing combustible within five feet of the structure. Set aside the [aesthetics] of plants and mulch around the foundation, and don't build wood fences up to the side of a home."

Long said tree canopies need a clear zone under them. Ladder fuels are combustible vegetation that lead a fire to a structure. "What you surround the house with — is like setting a campfire around the structure."

"Developers are being proactive. They have to ensure their developments are insurable," Long said. "This is not just in western states; it's a national issue."

The American Institute of Architects looks at resiliency standards

Jessica Orlando, AIA, DBIA, WELL AP, is an associate principal at Perkins & Will who is leading the extensive recovery efforts for the AIA Pasadena & Foothill chapter.

"There are a lot of conversations about what we should be rebuilding — to look at resiliency standards," she said. "When it comes to protecting homes that were not built to resist fires, "Fire Safe Marin" [California] is a great guide for retrofitting with some very simple and cost-effective approaches."

Orlando said the AIA also is looking at what it can do for working-class families that lost their homes to fires in the Altadena area. She said many multigenerational families were living in housing that was uninsured or under insured. Those families lost their source of generational wealth.

"Resiliency includes making sure we're building back equitably. There are some very early discussions of collaborations with community land trusts, one way those families' assets can be rebuilt," she said, noting that the cost of rebuilding is out of reach for many.

Ten principles for building resilience

The Urban Land Institute (ULI), a global organization of more than 40,000 real estate and urban development professionals, summarizes its resilience work since Hurricane Sandy in its 2018 Ten Principles for Building Resilience publication. Highlights include:

- **Accurately Price the Cost of Inaction:** Recent extreme weather events suggest that the costs of not investing in resilience and risk reduction are dramatically increasing.
- **Design with Natural Systems:** Designing resilience relies upon an understanding of the function and geography of natural systems and how they can help strengthen man-made systems and communities.
- **Redefine How and Where to Build:** Building resilience entails identifying and investing in places and infrastructure that are the most likely to endure.

HOAS and condo associations can't ignore risks and repairs

Dawn M. Bauman is chief strategy officer at Community Associations Institute (CAI) and executive director of the Foundation for Community Association Research. CAI is the leading international organization representing the condominium, homeowners association and housing cooperative sector. The CAI says this is the fastest growing type of housing in the world and represents at least 30 percent of housing worldwide.

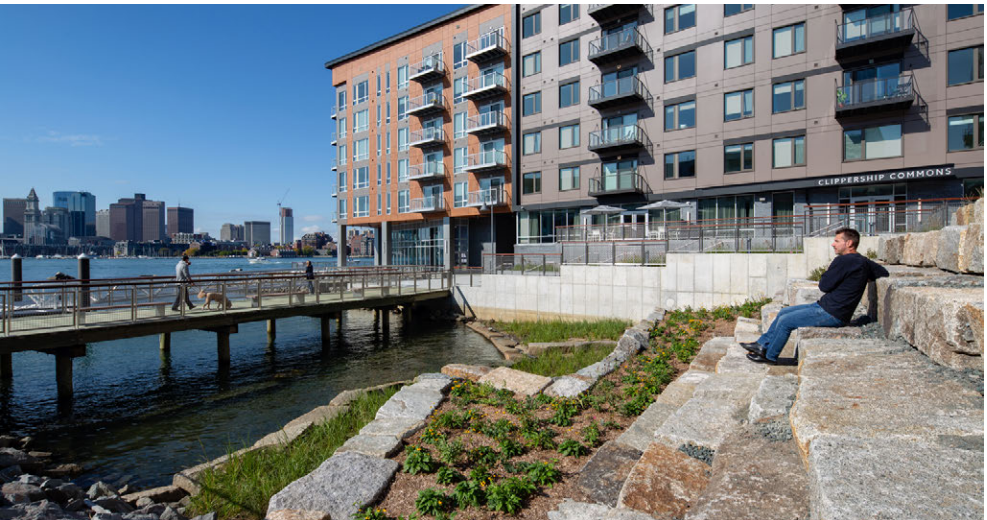
"Knowing what we know now, we are encouraging community associations to incorporate mitigation practices when it comes to wildfire, flood, hurricanes, etc.," Bauman said. "[CAI] helps associations to understand that with a reasonable investment, they'll be able to experience a return — whether it's a more resilient building, lower insurance premiums, less maintenance cost, or greater sustainability."

Since 98 people were killed in the collapse of the Champlain Towers South condominium building in Surfside, Fla., Bauman has led efforts on the local, state and national level to develop policy changes for safer condominium buildings.

"For condominium buildings, owners must make sure that regular maintenance is happening. Regular, scheduled maintenance must identify building vulnerability so modifications can be made to make a safer, stronger building," she said. "Environmental sustainably can be as simple as changing windows so they are more secure and more energy efficient. That can make a huge change in the cost of maintaining a building with a relatively small investment."

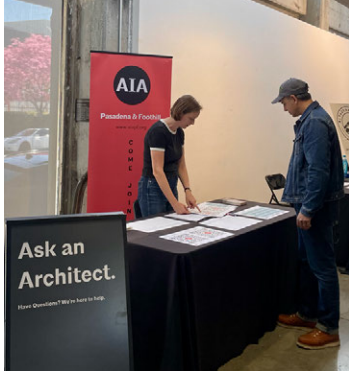
CAI is helping with the LA wildfires recovery, especially helping homeowner associations (HOAS) to navigate insurance claims and future coverage concerns. As rebuilding takes place, "we will be working with our communities to mitigate fire hazards, to avoid tragedy," Bauman said.

"REALTORS® are so valuable, because they can educate purchasers on what they're purchasing and what they need to know about an HOA or condo associations," she said. "They can ask the associations if there is regular



We are encouraging community associations to incorporate mitigation practices when it comes to wildfire, flood, hurricanes, etc.

Clippership Wharf in Boston uses a living shoreline and elevated buildings to reduce risk from coastal storms and sea level rise. Photo by Ed Wonsek



Photos (left and middle) courtesy of Pasadena AIA; and (right) Rendering of the Paradise town square provided by Town of Paradise, CA & Urban Design Associates.

maintenance, major repairs outstanding, a reserve fund, a reserve study?"

AI analyzing the climate risk of every neighborhood in the United States

AI is a partner in analyzing the risk of different areas for residential and commercial real estate. Parag Khanna, an author, speaker and innovator known for his analysis and macroeconomic forecasts, created Climate AlphaGeo — an AI-powered analytics platform.

AlphaGeo uses data to track trends in migration, the changing climate and finance to know which locations are most resilient and profitable as the world faces new weather-related challenges. The company offers location, investment and resilience strategies.

Resilient communities — looking beyond individual properties

The early 2025 Los Angeles County wildfires caused at least 29 deaths and destroyed 16,000 structures — with an initial estimated cost of more than $50 billion.

Neal Payton, FAIA, FCNU, leads the Los Angeles-based west coast office of Torti Gallas + Partners, an urban and architectural design firm. Long before the wildfires the firm was transforming urban and suburban spaces with pedestrian-friendly environments with transit-oriented development and public housing renewal.

"The LA fires saw a significant number of commercial properties destroyed, including 135 small apartment buildings and 145 retail buildings. About 75 percent of the multifamily buildings destroyed or damaged contained 20 units or less and averaged 70 years of age. Most of them were owned by individuals or local investors and might rightfully be labeled as missing middle housing, also known as workforce housing," Payton said. "This dispersed and finely grained ownership pattern poses both a challenge to the redevelopment of these fire-damaged areas but also provides an opportunity."

Payton said while fires destroy buildings and leave the ground beneath them fallow, they do not erase property lines, or municipally owned rights-of-way, which he refers to as "facts on the ground." He said reconciling a diffuse land ownership pattern is key to any successful and transformative redevelopment.

"Any rebuilding effort must begin by acknowledging these facts and then by going farther by asking some rather simple questions: 'Why can't we put apartments above the rebuilt retail spaces? Why can't some of the small apartment buildings provide opportunities for ground floor office, maker spaces, or retail?'" he posited.

Payton said more resilient and equitable communities can rise from the ashes. "As charming and beloved as the historic centers of Pacific Palisades and Altadena were, the opportunity to reconsider the single-use land-use pattern of both locales stares us in the face. In the Palisades, some of the commercial space was organized in a car-centric pattern, with parking dominating the streetscape. So, in the case of the Palisades, we might ask, why can't the new construction

Wildfire Adaption Principles

REGIONAL SCALE

1. Actively manage the forest
2. Create firebreaks
3. Harden infrastructure (electrical, water, sewer, storm)
4. Create redundant emergency notification systems
5. Provide multiple ingress and egress routes and a regional emergency evacuation plan

COMMUNITY SCALE

6. Prohibit dead-end streets
7. Foster neighborhood fuel reduction and places of refuge

HOME SCALE

8. Codify defensible space
9. Require fire-resistant building shells
10. Encourage aggressive code enforcement

LOTSAR provided resources for rebuilding and applying for state and federal disaster assistance.

be built to frame and embrace generously sized sidewalks and relegate parking to a less visible location?" he said.

Payton said disaster rebuilding is an opportunity to create a pedestrian-friendly, mixed-use environment that can be served by transit. This would better serve the 30 percent of people who do not drive.

"While land-ownership patterns and infrastructure tend to be fixed, zoning itself is mutable. Because of the small increment of property ownership characterizing both Palisades Village and Altadena, rezoning would allow for a delightfully more robust mix of uses and a finer grain of development than might be found in large lot efforts that are more the norm in redevelopment," he said.

Payton said it is difficult and cost prohibitive for individual property owners to seek rezoning, so more sweeping changes to the existing zoning is necessary for walkable and mixed-use neighborhood centers to emerge. He said California has a somewhat unique tool to achieve this, called a Specific Plan, which allows a rezoning across multiple properties under disparate ownership.

This approach, used in California or exported to other disaster-struck parts of the country, could prevent bland, uniform, mega developments created by master developers brought in to spur rebuilding. Payton said a revised Specific Plan can help restitch a community by allowing individual parcel owners to rebuild at slightly higher densities.

"By allowing such rebuilding, the city would provide these small-parcel owners the incentive to hold onto their land and rebuild, thus ensuring the kind of village texture that is such an important part of these neighborhoods, to remain," he said.

Asheville Area REALTORS® aiding short- and long-term Helene recovery

Asheville, N.C., often cited as one of the most livable cities in America, was hit hard by Hurricane Helene in September 2024. The Category 4 hurricane caused more than $50 billion in damage in the city of about 95,000. Asheville's River Arts District was largely ruined. Asheville is the county seat of Buncombe County — the hardest hit county in North Carolina, where 42 storm-related deaths were confirmed.

Matthew Allen, J.D., is director of Professional Development and Government Affairs for the Land of the Sky Association of REALTORS® (LOTSAR), which covers the Asheville area. LOTSAR sprung into action for disaster recovery.

Allen noted that the National Association of REALTORS® and NC REALTORS® combined to contribute more than $1 million in recovery grant funding. LOTSAR provided resources for rebuilding and applying for state and federal disaster assistance. It also got heavily involved in presenting information on water testing — because for weeks after the disaster, city water was mostly undrinkable.

LOTSAR is collaborating with a member that is an affordable housing developer and has designed 700-square-foot, temporary-housing cottages. These relief cottages are currently in the process of getting funding and being placed.

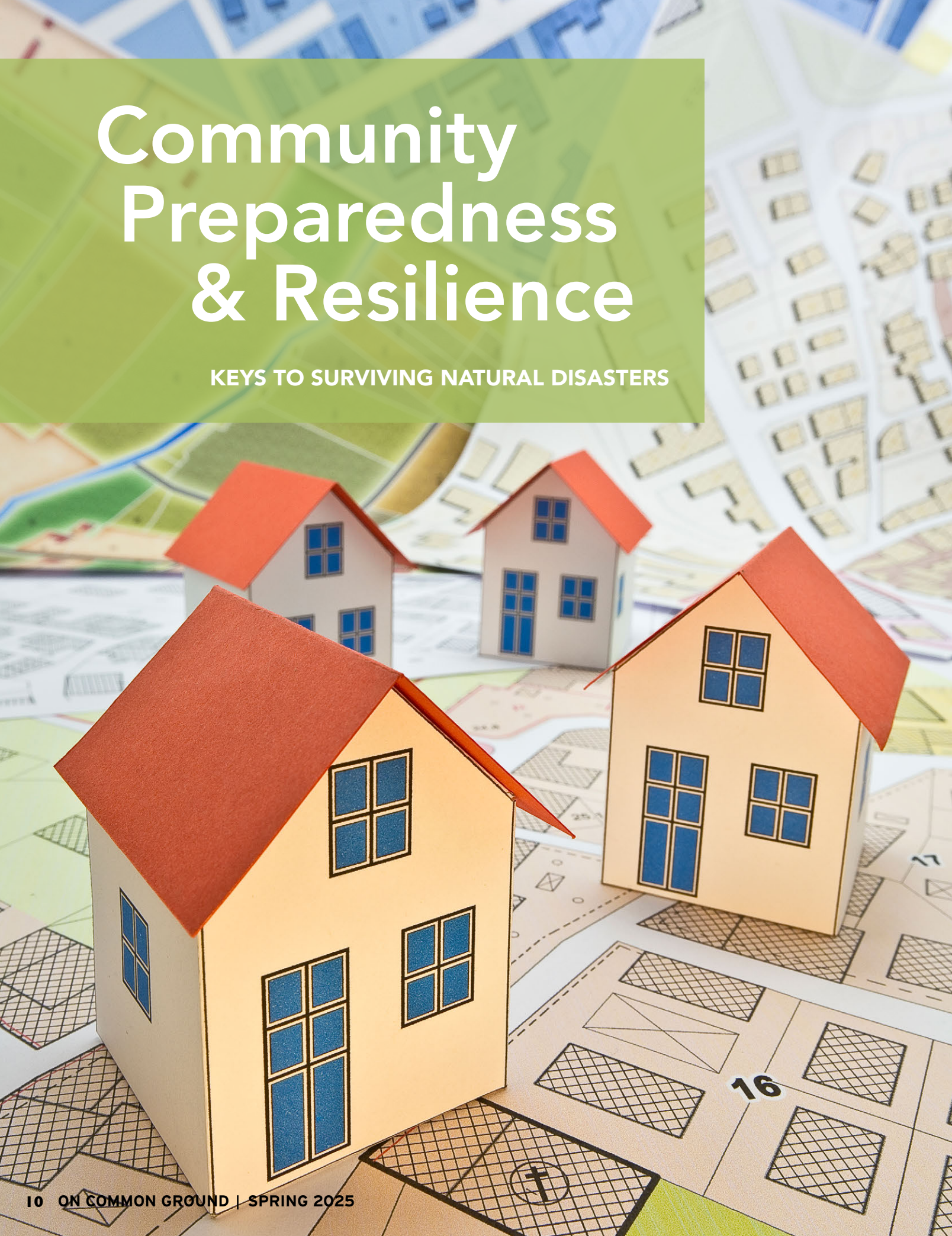
Allen said LOTSAR, along with other stakeholders, was involved in discussions with the city of Asheville on updating their flood regulations and will similarly weigh in when Buncombe County's regulations are updated. He said local officials know some people will have difficulty rebuilding in flood prone areas and the community is working together on a good solution for all.

LOTSAR recently held a rebuilding session addressing flood zones, natural habitat, affordable housing, and possible zoning changes that could allow more density with infill projects to accommodate hundreds of dwellings and businesses that were lost. LOTSAR will continue to be a convenor of these important discussions. ●

Steve Wright @stevewright64 is a writer, educator, disability rights activist, and marketer of planning services. He has contributed dozens of stories to On Common Ground, which focus on best practices plus diversity, equity, inclusion and accessibility. He travels throughout the country and abroad lecturing on Universal Design. Based in Miami, Steve Wright blogs daily at Urban Travel and Accessibility, http://urbantravelandaccessibility.blogspot.com

Community Preparedness & Resilience

KEYS TO SURVIVING NATURAL DISASTERS



101 S. Main, Greensburg, Kan., after tornado. Photo courtesy of Rocky Preble.

By Brian E. Clark

South Main Street, Greensburg, Kan., after tornado. Courtesy of FEMA.

When Stacy Barnes returned to Greensburg, Kan., in May 2007, after a powerful EF5 tornado nearly wiped her former hometown off the map, she was stunned and saddened.

Yet she was also grateful. "My parents went through it and fortunately survived," recalled Barnes, who drove into town at first light and was overcome by the devastation. The twister was on the ground for more than 28 miles and lasted 65 minutes with a maximum width of 1.7 miles.

"It was indescribable to drive around and try to find the places that were once so familiar and were just, well, gone," she said.

"I thought I knew all the streets and who lived where. But moving around town, I felt lost," said Barnes, who graduated from Greensburg's Kiowa County High School in 2000. "Nearly 18 years later, it's still hard to describe, to fathom."

Greensburg is just one of scores of cities and towns that have been hard hit by natural disasters in recent decades, ranging from fires to floods to tornadoes to hurricanes.

Most have rebounded to come back stronger and more resilient. Many have taken advantage of the federal Building Resilient Infrastructure and Communities (BRIC) and Hazard Mitigation Grant programs to reduce their risks and develop strategies to mitigate the worst aspects of natural disasters.

In addition, some are relying on a 2018 study from the Urban Land Institute (ULI) study dubbed "Ten Principles for Building Resilience." The report was produced six years after Hurricane Sandy ravaged the Caribbean and U.S. Mid-Atlantic region, causing an estimated $70 billion in damage and killing several hundred people. It encourages stakeholders to address vulnerabilities and enhance resilience.

Ten Principles for Building Resilience

- Understand vulnerabilities
- Strengthen job and housing opportunities
- Promote equity
- Leverage community assets
- Redefine how and where to build
- Build the business case
- Accurately price the cost of inaction
- Design with natural systems
- Maximize co-benefits
- Harness innovation and technology

100 Block S. Main, Kiowa County Untied Retail Center, Greensburg, Kan., after rebuilding. Courtesy of Kiowa County Media Center.

Recovery plans need to reflect the needs of stakeholders and leverage local knowledge.

(Right) Courtesy of Kiowa County Media Center.

Others have redefined disaster preparedness, creating what they call "first aid" survival kits, or programs, to survive the initial days, weeks or months so they can recover quickly. These kits include food, power and alternative communication and a community pantry that contains all the essentials of life.

Now, these communities hope they'll be more prepared for the next big one. And for good reason. Nichole Wissman, a business professor at the University of San Diego, said the changing climate is anticipated to heighten the frequency and severity of natural calamities, including wildfires, floods, rising sea levels and tornadoes. That increased risk is prompting more preparation.

Wissman said resilience means building communities using a "strong collective approach" in which all members can bounce back after a climate shock like a fire or a stressor such as a heat wave. Most important, she said recovery plans need to reflect the needs of stakeholders and leverage local knowledge.

One idea, she explained, is to use special financing tools to create districts that require climate-resilient infrastructure to reduce the harm from risks such as floods or fire. In California, these districts are legally established entities that can help drive regional climate adaptation and mitigation efforts. They can secure public and private funding, apply for grants and collaborate with local governments.

Greensburg, Kan.

In Greensburg, where 95 percent of the town was destroyed and nearly half its residents left, the community has been busy rebuilding from the ground up. Its population before the calamity was around 1,300. Now, it's 800 and growing, said Barnes, who has served as the town's city manager for the past six years.

"We have a childcare facility that just broke ground in March," she said. "And we have a business park that is ready to go, so we are reaching out to prospective businesses about locating here."

The tornado, which packed winds of more than 200 mph, claimed 11 lives in the town and injured many others. Fortunately, sirens blew for 20 minutes before the tornado hit, sending most residents into basements for safety.

Some thought Greensburg was gone forever. Many moved away. But Barnes said community members who stayed dug deep to find a pioneering spirit and help the town recover from a disaster that destroyed and damaged more than 1,000 homes and businesses.

In response, President George W. Bush declared Greensburg a major disaster, triggering federal resources from several agencies including the Federal Emergency Management Agency (FEMA), the U.S. Small Business Administration and the U.S. Environmental Protection Agency.

(Left) Aerial view of Greensburg, Kan., showing the devastation from the tornado. Courtesy of FEMA. (Right) FEMA trailers for local residents. Courtesy of the City of Greensburg, Kan.

Community members helped the town recover from a disaster that destroyed and damaged more than 1,000 homes and businesses.

More than $100 million in federal assistance arrived for emergency response, temporary housing, assistance to residents and businesses, as well as for repairing or replacing government buildings, schools, emergency facilities and a hospital.

Other federal agencies — from the Agriculture Department to the Rural Development Program to the Department of Energy — played key roles in the recovery. A grass-roots community rebuilding effort, guided by a FEMA long-term recovery team, worked through many visioning meetings to develop a plan to chart Greensburg's future and jump-start rebuilding.

Countless voluntary agencies and private-sector partners also contributed food, time, money and materials to support rebuilding. In May 2007 alone, the American Red Cross served 39,172 meals. And more than 7,600 volunteers registered via AmeriCorps to help clean up and rebuild Greensburg. In addition, workers hauled out of Greensburg nearly 80,000 truckloads of tornado-generated debris that totaled more than 800,000 cubic yards.

Barnes moved back to her hometown after the tornado struck to help it rebuild. "I've worked for the city in different capacities since then," she recalled. "I wanted to be part of that recovery."

Barnes said she is proud of how the residents responded and learned to work together as a community while "staying true to our identity. And of course, we are very grateful for all the aid that we received from volunteers to nonprofit organizations to government agencies. We wouldn't be where we are today without that and it's very humbling."

Barnes called rebuilding a town from scratch a rare opportunity. "But that's a club that you don't want to necessarily be a part of," she quipped. "However, we're seeing it more often in our modern times with natural disasters of all kinds happening.

High school gym after the tornado in Greensburg, Kan. Courtesy of the City of Greensburg, Kan.

More than 7,600 volunteers registered via AmeriCorps to help clean up and rebuild Greensburg.

Courtesy of FEMA

Courtesy of USDA, photo by Jim Mackensen.

Greensburg, Kan., facing east, after rebuilding efforts. Courtesy of Kiowa County Media Center.

Kiowa County Commons. Courtesy of Kiowa County Media Center.

Leaders decided to erect strong, energy-efficient public buildings that will withstand future storms.


Kiowa County Memorial Hospital. Courtesy of the City of Greensburg, Kan.

(Left and below) The Big Well museum. Photos courtesy of the City of Greensburg, Kan.

"Over the years, we have had many communities reach out to us to ask about lessons learned. We really see it as part of our job to pass along that knowledge because there are so many decisions that have to be made on a daily basis, and you're not going to get everything right. It's really easy to look back and say, 'Oh, I wish we would have done this and that, or done things a little bit differently, or that was a really great thing we did.'

"But when you're in the midst of a disaster, it's an incredibly stressful period. You're making hundreds of decisions, so you just do the best you can with the information you have at the time and take steps forward."

In addition to having a well-developed recovery plan in place, she advises other communities not to rush and make possible rash, short-term mistakes. She tells them to review and update their emergency management schemes regularly and not let them gather dust on a shelf.

"You really need to make thoughtful decisions because what you do will affect your community for years and decades down the road. So don't just throw something up to get going again."

In rebuilding Greensburg, she said leaders decided to erect strong, energy-efficient public buildings with poured insulated concrete-form block walls that will withstand future storms and be standing 100 years from now.

"Maybe even handle another EF5 tornado, though I hope we don't have to find that out," she mused. "Then the windows might get blown out, but the main structure would still be standing."

She said Greensburg is proud of its attractive new buildings, which range from the school to the hospital to the city hall, to county facilities. The community even built an arts center.

"And our original claim to fame prior to the tornado was the big water well structure that was dug by hand in the late 1800s. It was a tourist attraction for us. We rebuilt a new museum around it that tells about our recovery, in addition to the well's story."

Matt Christenson, Greensburg's mayor and the Kiowa County administrator, is another native. He was away in college working on a master's degree when the tornado hit.

He returned that summer to help his parents restore the family home, which was badly damaged but not destroyed. They survived the tornado by sheltering in their basement. He never left Greensburg after that. "It's now been 18 years and counting," he said.

(Above) Greensburg, Kan., officials placed a giant circus tent in a city park to hold public meetings during the rebuilding process. Courtesy of FEMA.

Christenson was elected to the city council in 2008 and has been involved with city and county government since then. He said Greensburg — which has an economy based on agriculture, oil and gas, as well as a growing number of wind and solar farms — has rebuilt smarter, beginning by planning for the long run.

"That was the start," he said. "We basically wanted to make sure that our city plan and all of our related codes and zoning rules and regulations were going to fit our needs, not just in the rebuild, but far into the future as well.

"We actually had a couple of different master plans drawn up. One was done by FEMA as part of their recovery efforts after the storm. We also employed a Kansas City planning and architecture firm to do another one for us, and we've ended up using that one for the past 18 years."

Christenson said keeping residents in the loop on rebuilding plans was key. "Absolutely," he said. "Community input was a very high priority because at the end of the day, the town government is there to serve the needs of its residents.

"But we had a kind of a unique challenge after the storm because we had no suitable facilities to hold meetings. Even just keeping in touch with our friends and neighbors was hard.

"This was 2007, before the iPhone and Facebook existed. But we ended up having a series of meetings over that summer and fall. We actually brought in a giant circus tent, put it in one of the city parks and held our meetings there."

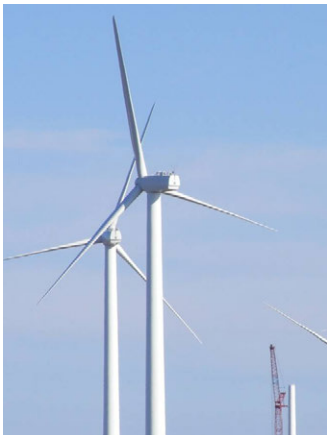
He credited the county's emergency management personnel who, prior to the disaster, gave residents plenty of warning. Many took cover in community shelters.

"It's not unusual at all to hear a storm siren in Kansas, but this went on and stayed on for a long time, so people were able to find cover," said Christenson, who noted that there is a museum 90 miles west of Greensburg in Liberal, Kan., that is dedicated to the famous "Wizard of Oz" movie.

In its updated building codes, Christenson said Greensburg considered, but did not require, basements. That was largely because leaders did not want to make the cost of new homes prohibitive. "Basements can add 20 to 30

Keeping residents in the loop on rebuilding plans was key.

Arts Center. Courtesy of Kiowa County Media Center.



(Above and below) Wind and solar generation was incorporated in to Greensburg, Kan., rebuilding. Photos courtesy of the City of Greensburg, Kan.

percent to the cost of a house. ... We did not want to turn away anyone who couldn't afford to do that," he said.

The demographics of Greensburg have changed since the tornado. "We are now a much younger community," he said. "When older folks' houses were blown away, those people whose children had graduated and moved out of town, they often followed them to be with relatives.

"But with younger families, if you had a job here, if you had kids in school here, almost without exception, they all returned to rebuild their homes and businesses. Though we're less than 70 percent of the size we once were, our town's school enrollment is actually higher than before the storm."

Panama City, Fla.

Panama City, in the northwest corner of Florida, was, like Greensburg, also heavily damaged by a natural disaster.

In Panama City's case it was Hurricane Michael, a Category 5 (the worst possible) tempest that packed 155-mph winds when it hit in Oct. 2018. Michael swept away 95 percent of the city's tree canopy and damaged 90 percent of downtown buildings.

The hurricane also brought with it a 14-foot storm surge, which, combined with the winds, smashed the city's two marinas, tossing hundreds of sailboats onto land like broken toys.

Jonathan Hayes, the city manager of Panama City, grew up in the Panhandle community. The city is the largest community in the area and also the county seat of Bay County. Although he was living in the Washington, D.C. suburbs at the time, members of his family were in town when Michael struck. It wasn't long before he'd moved home to help with the recovery.

One of the big lessons from the storm, he said, is that a city can never be too prepared. The city had a population of 38,000 before the storm. It has bounced back to nearly the same number now, but priorities needed to change.

"We needed to reassess our city, the damage that had been done and prioritize our resources going forward," he said. "Of course, the biggest thing at first is getting the debris cleared so that you can move around safely on roads and throughout neighborhoods." Some estimates put the amount of waste from the storm at 5.7 million cubic yards.

"Next is getting the power restored and then potable water flowing again," he said. "Those are the three most critical things."

The disaster overwhelmed Panama City's small engineering department, which dealt with recovery projects that would require tens of millions of dollars, Hayes said. "So, the city wisely brought in an outside engineering firm to assess all of our utilities, water, sewer, stormwater …

Hurricane Michael swept away 95 percent of the city's tree canopy and damaged 90 percent of downtown buildings.

(Above) Harrison Avenue in downtown Panama City conditions in 2024 after revitalization; view from 4th Street intersection toward the waterfront.

(Right) Harrison Avenue and 4th Street intersection conditions in 2019 following the hurricane.

Photos courtesy of Dover, Kohl & Partners.

to create what we call the heat map so staff and elected officials could make the most objective decisions as possible about where to focus our resources on rebuilding."

The city also worked closely with emergency managers from the state, FEMA, and the federal Department of Housing and Urban Development through a Community Development Block Grant Disaster Recovery (CDBD-DR) program.

Two years later, Hurricane Sally, a Category 2 tropical cyclone, hit the city and caused widespread flooding. That led to more rebuilding.

"We're probably a third of the way through the recovery process now," he said.

The result from their efforts? Hayes said Panama City is much more resilient than before Hurricane Michael. Among the accomplishments, the city updated its emergency operations plan clarifying the sequence of events that should occur before, during and after disasters.

It also remodeled and fortified its city hall to serve as a resilience hub. Staffers now can shelter there while running emergency operations. They added a generator that can power the entire building, including its multiple kitchens and other assets to deal with future disasters.

Wissman, the University of San Diego professor, said resilience hubs are beneficial before, during and after natural disasters because they offer centralized resources that the community has ideally been involved in developing.

"Before disasters, resilience hubs can function as community centers that strengthen overall public connections and provide training and resources to improve disaster preparedness," she said. "We also know that after disasters, community networks often respond to fill in the gaps left by governments, so fostering community cohesion is a key function of resilience hubs.

"During a disaster, they can serve as a vital hub with shelter and essentials for the community. After a disaster, they can provide critical infrastructure to help streamline access to essential goods and offer services such as assistance with applying for and accessing recovery funds."

Another change Panama City made, was to require buildings that were damaged more than 50 percent by the hurricane to be raised two feet above base flood elevation as they are rebuilt. The old requirement was one foot.

The city also has planted thousands of trees to restore its canopy and zeroed in on its downtown in the reconstruction process.

"Our downtown definitely took a hit," Hayes said. "But one of the things the council was told was that when you want to revitalize and recover from something like this, you really need to start downtown, invest there and let it spill out from that point.

"So now we have a much more vibrant downtown — full of activities and cultural events — than we did prior to Hurricane Michael," he said.

It features new streetscapes, plus a circle and a plaza in its primary intersection. The plaza's highlight at Fourth Street and Harrison Avenue is a four-sided clock recovered from an old bank building. It has become a popular spot for wedding photos.

In 2020, Dover Kohl & Partners won a Charter Award for creating the city's recovery plan. Revitalization of Harrison Avenue, a primary downtown street, is a centerpiece of that effort. Amy Groves, a principal and senior project director at Dover Kohl, said the aim is to make downtown

The city required buildings that had more than 50 percent hurricane damage be raised two feet above base flood elevation.

(Right) Harrison Avenue rendering of proposed conditions by Dover, Kohl & Partners. The new design replaces angled on-street parking with parallel parking to widen sidewalks and provide more space for on-street dining. The street is lined by trees planted in soil cells providing beautification and shade as well as stormwater management. Courtesy of Dover, Kohl & Partners

more attractive by slowing traffic and inviting pedestrians and cyclists.

The design features low curbs, widened sidewalks, paving bricks rather than asphalt, new trees and landscaping, as well as crosswalks with alternating-color pavers.

She said it also promotes housing adjacent to downtown, complete neighborhoods that promote walkability, resilient open spaces and a waterfront promenade that fortifies and protects against storm surge.

Groves said Dover Kohl came to Panama City six months after the storm to aid with the recovery action plan. "A big part of what we did was host scores of community meetings to find out how people wanted to rebuild," she said. "And yes, we started with the downtown area because that is the center of community life in Panama City. We were a little nervous, honestly, at first, that people wouldn't be ready to talk about visioning for the future when they had just gone through such a big hurricane.

"But what we found was having these meetings and listening sessions and looking toward the future was actually part community therapy."

And while streetscapes filled with trees are attractive, she said the plans also include soil cells under those trees that will help with the stormwater drainage and reduce flooding.

"This is an example of rebuilding infrastructure that is, as you say, aesthetically pleasing, but also better designed to make the city more resilient. A lot of positive things have happened in Panama City in the past couple of years."

Kaydee Albritton, CEO of the Central Panhandle Association of REALTORS® (CPAR), agreed with Groves about Panama City's rebound.

"We'd never experienced a hurricane of this magnitude," she said. "There were a lot of lessons learned, and it presented new opportunities and regrowth for our community and local government."

Albritton emphasized the importance of resilient infrastructure that is properly funded and maintained. Another key is strengthening and enforcing stringent building codes.

As for emergency communications, she said breakdowns during the hurricane were particularly troublesome. "All of us who had Verizon were without communication for around two weeks, so I ended up buying a 'burner phone,'" she said.

The community has since implemented alternative solutions that send geo-targeted emergency alerts to all mobile devices within an area. She noted that transportable satellite systems such as Optus's SatCat can restore 3G and 4G coverage in needed areas.

"Organizations like Télécoms Sans Frontières can help by setting up satellite-based networks in disaster zones," she added. "And amateur radio operators, or 'hams,' can play a key role when conventional systems are down."

Albritton praised Bay County's emergency management program for providing first-aid-kit instructions on what communities should do to prepare for natural disasters and where to find resources, including sandbags. She also lauded "Alert Bay," a county notification system that can provide public information, such as where to get food, water and other necessities.

After Michael hit, she said many local groups stepped up such as her REALTORS® organization, which collaborated with members to assess property damage and share vital information to clients and other residents. By bridging property owners and emergency services, she said, CPAR facilitated damage assessments and expedited repair processes.

In addition, REALTORS® from around the state arrived "to be the boots on the ground," said Albritton, handling basic tasks such as spreading tarps on damaged roofs and helping with phone calls and email.

Paradise, Calif.

In Paradise, Calif., the devastating Camp Fire swept through town in Nov. 2018. It killed 85 people, lasted 18 days and consumed 18,804 structures.

It all but destroyed the nearby Butte County communities of Concow, Magalia Butte and Creek Canyon — an area known locally as "The Ridge."

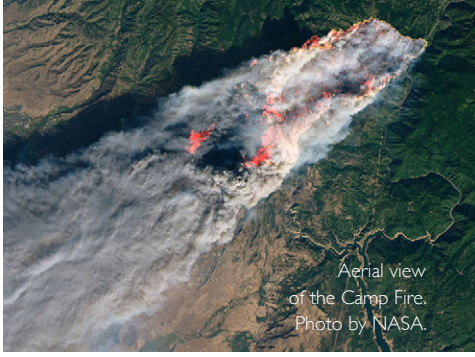
Paradise has rebounded since the inferno. The town grew by 16.1 percent in 2023, making it the fastest-growing town in the state for several years in a row. Its population is now around 12,000, according to the California Department of Finance. Prior to the Camp Fire, it had 26,500 residents. Within months, all but 4,000 had left.

Warren Bullock, a real estate broker and president of the Sierra North Valley REALTORS® Association, said growth has slowed somewhat from its hectic pace.

"The first couple years out of the gate, we had lots and lots of new builds and new permits, but we're down to 70 percent now of what it was in, say 2020, though that's still a bunch," he said.

Photo by California National Guard.

Official White House Photo by Shealah Craighead.



Aerial view of the Camp Fire. Photo by NASA.

Photos courtesy of the town of Paradise, Calif.

Photo by Rebuild Paradise Foundation.

Photo by Rebuild Paradise Foundation.

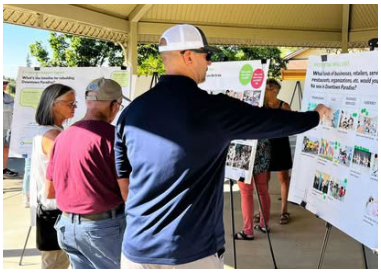


Photo by Rebuild Paradise Foundation.

"Initially, we had a lot of people who wanted to return home. Many of them have done so, and now we are shifting to more new residents," he said.

Bullock, a Paradise resident, thinks his town is now better prepared for the next disaster. His home was damaged in the blaze but not destroyed. His rental properties, though, were incinerated.

His advice to other communities, especially in fire prone areas? "Try to be prepared for the unexpected, which is obviously a hard thing to do," he said. And for individuals, "think outside the box and think of what could happen to you, your home, your bills, your family photos, your insurance policies.

"Don't just have a grab bag, but have things copied and stored on a remote server so you can continue living your life if you had to leave tomorrow, or immediately."

Colette Curtis, the town's recovery and economic development director, said soon after the fire, officials aimed to recover and eventually to survive and thrive. They established three ways to increase resilience:

- Adopt building standards that surpass state codes and follow guidelines for homes in wildland areas.
- Enforce strict rules to limit and manage weeds, brush and trees, promoting neighborhood participation in a Firewise community program.
- Create buffer zones and green spaces on the edges of the community to slow future wildfires.

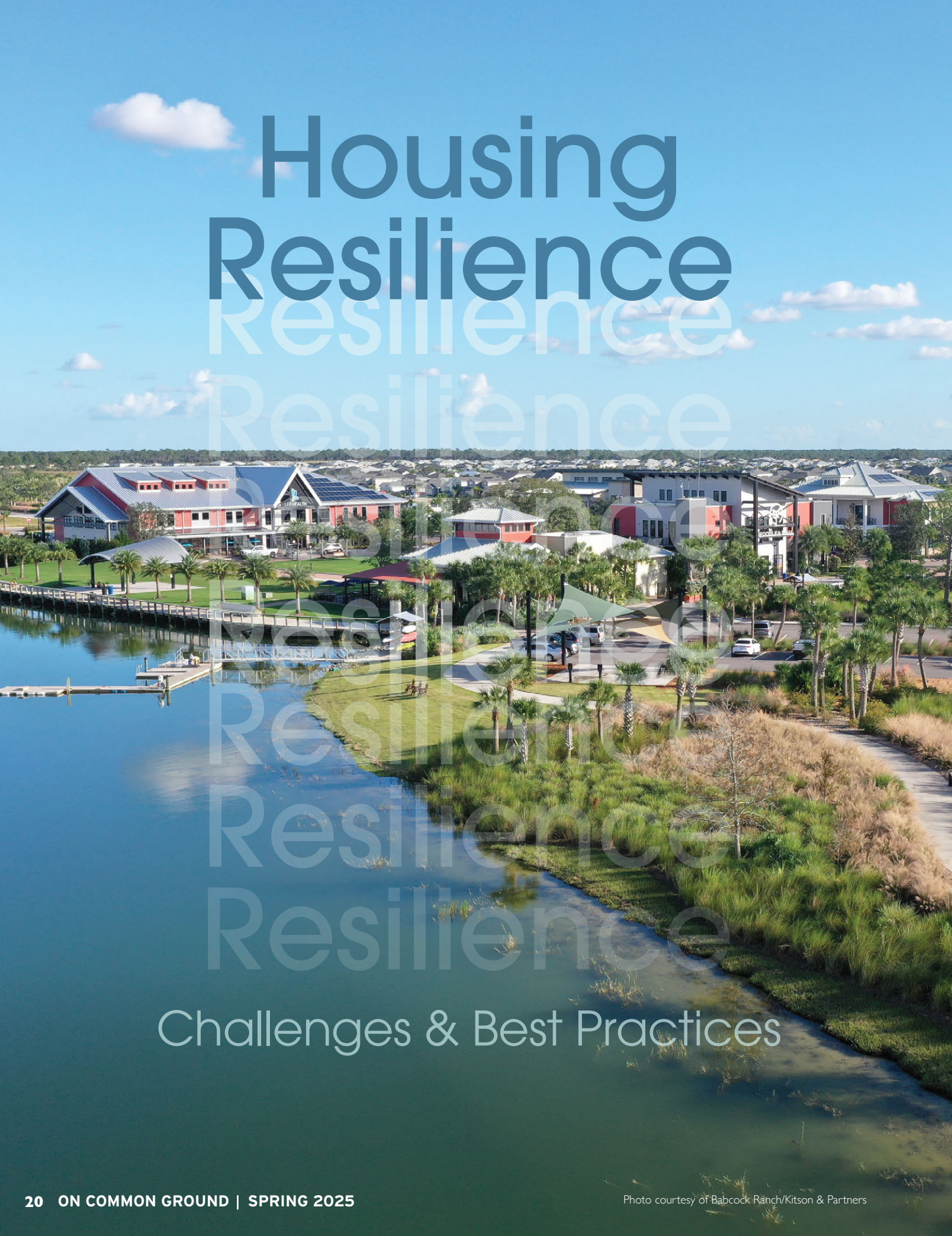
Curtis said the city is much more resilient than prior to the Camp Fire and has made additional changes. "All our traffic signals have backup generators. We've installed evacuation sirens which have underground power, solar battery backup, connection to satellites, and our utilities and telecommunications are all being put underground."

To prepare for a natural disaster, Curtis advises other communities to "plan for the worst-case scenario you can imagine, and then educate your residents on what to do."

Added Curtis: "We learned many things from the fire, but most of all, that our community is worth the work it takes to rebuild and live in this beautiful place. It's our home, and while we will always face fires, we have learned to live resiliently."

Brian E. Clark is a Wisconsin-based journalist and a former staff writer on the business desk of The San Diego Union-Tribune. He is a contributor to the Los Angeles Times, Chicago Sun-Times, Milwaukee Journal Sentinel, Dallas Morning News and other publications.

Housing Resilience



Challenges & Best Practices

Photo courtesy of Babcock Ranch/Kitson & Partners

By Steve Wright

Experts from the fields of architecture, engineering, planning and insurance have figured out how to harden houses against the threat of myriad natural disasters including fire, wind and flood. The issue is many communities are built out and retrofitting is very costly.

Many people are shocked to find out that there is little federal disaster aid to pay for temporary housing when a disaster makes the dwelling they own or rent uninhabitable for months, if not years.

In a political reality when programs are being cut or reduced and not that many people support paying more taxes to fund resiliency, many are searching for answers.

While communities wrestle with how to rebuild better and how to avoid being the next victim of wildfires or wind and water, best practices are worth examining.

Illya Azaroff, FAIA, founding principal of +LAB Architect PLLC with offices in New York and Los Angeles, is a leader in climate adaptation, mitigation, resilient planning and regenerative design.

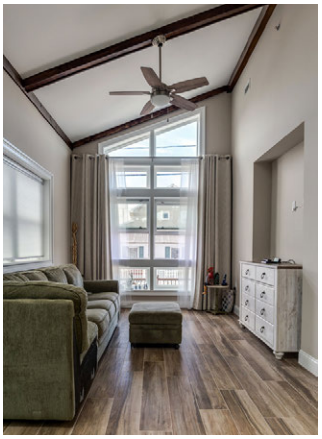
"The question we often hear is how can we afford to pay for resiliency? When the reality is we cannot afford not to," he said.

Azaroff, the president-elect of the American Institute of Architects, worked on rebuilding after Hurricane Sandy. He said a lot of working-class people, with modest savings, never expected to be ravaged by the type of storm normally associated with the tropics, but Sandy devastated a lot of small 1950s and 1960s houses in the Far Rockaway neighborhood in Queens, N.Y.

"Existing federal guidelines for replacement housing following disasters does not focus on building back better to address the future shocks and stressors of climate changes," he said. "But we wanted to prove that for the same cost as conventional building, you could rebuild a completely resilient home. In one place, we saved 83 percent of the insurance costs — because the home was built to withstand disasters. That is a lot for an area with retirees and modest incomes."

Azaroff, who has worked on post-disaster building efforts around the world, said rebuilding is a combination of innovation plus vernacular architecture that responds to regional wind, water and heat extremes. He said working with nature, not against it, also is a big part of creating resilient homes.

Azaroff's +LAB studio combined resilience, environmental regeneration and Universal Design in its Cranberry House in Massachusetts with features that include: a small building footprint that preserves and restores a wetland and wildlife area on the four-acre site; a fully accessible house that allows aging-in-place; a tornado safe room built to FEMA standards; rebuilding with harvested old timber on the foundation of an 18th-century building; solar power that allows the residence to be powered off the grid; and a system for harvesting rainwater.



After Hurricane Sandy devastated the community of Breezy Point in Queens, N.Y., architect Illya Azaroff designed a home built specifically to stand up to hurricanes and related hazards in the oceanfront neighborhood. Photos courtesy of +LAB Architect.

For the same cost as conventional building, you could rebuild a completely resilient home.

IBHS is the only lab in the world that can test full-scale one- and two-story residential and commercial buildings in a controlled, repeatable fashion for highly realistic windstorms, wind-driven rain, hailstorms and wildfire ember storms. Photos courtesy of Insurance Institute for Business & Home Safety

Research has found what materials and actions guard against a disaster. ... Resilience is going to become a much more heightened asset for homeowners.

We know how to harden homes against disasters

Ian Giamanco, Ph.D., the managing director of Standards & Data Analytics and lead research meteorologist at the Insurance Institute for Business & Home Safety (IBHS) said, that while some areas grab headlines for being more prone to devastating wildfires and hurricanes, every region in the United States is vulnerable to some kind of natural disaster — be it caused by fire, wind, flood, hail or earthquake.

He said in many places, building codes have not kept up with the hazards homeowners face. While the cost in dollars can wipe out savings and put people in debt who had paid off a home that now must be razed and rebuilt — the human toll is higher.

"People don't realize … the devastation," Giamanco said, speaking in terms of loss of all household appliances, articles and one-of-a-kind mementos — along with living in cramped, substandard replacement housing because rebuilding can take many months. "For those who don't experience it, it's out of sight, out of mind. But believe me, when you talk to people going through the trauma of losing your home, your neighbors, your community — you don't want to go through what they have."

Giamanco said the good news is IBHS and other research has found what materials and actions guard against a disaster. He said the other good news is that some mitigation requires simple DIY — not a monumental project such as shoring up and elevating a home several feet above a flood plain.

"For wildfire mitigation, make sure the first five feet around the house does not have any combustible material. For the house, a metal or tile roof or asphalt shingles works, along with the first six inches from the ground up made on noncombustible material," he said. "Metal mesh screens over attic and crawl space vents keep embers from getting inside your home."

From a government standpoint, Giacamo said stronger building codes are needed. "During Hurricane Ian, we estimated the Florida building code saved $1 billion to $3 billion in structural damage avoidance alone."

"For buying or selling a home in Florida, one of the most important things is looking at how resistant the house is to hurricanes and what insurance is required to cover it," he said. "Resilience is going to become a much more heightened asset for homeowners."

Giacamo praised government grant programs, such as the Strengthen Alabama Homes program that awards up to $10,000 to owners of existing homes to upgrade them with stronger roofs, windows, doors and other features to prevent wind and rain damage. He said the program has resulted in huge insurance savings for those who have retrofitted their home — stabilizing the insurance market for tens of thousands of coastal dwellings.

Risk mitigation may be the only way to keep insurance affordable

Austin Perez, a senior policy advisor for the National Association of REALTORS®, emphasizes the importance of homeowners actively mitigating risks to make their homes

insurable and to reduce insurance rates. He notes that federal disaster aid programs offer limited assistance for basic needs immediately after a natural disaster. "FEMA aid is not intended to make homeowners whole and is not a substitute for insurance," Perez explains, citing examples where FEMA provided an average of $4,000 in disaster assistance, leaving households to rely on Small Business Administration loans with interest.

Perez points out that the increasing frequency of natural disasters is driving up insurance costs and causing some insurers to exit the market in some high-risk areas. "Many states have kept insurance costs low for decades, leading people to move to more affordable but riskier areas," he says. "This disconnect from true risk pricing has resulted in unexpected insurance cost increases that do not cover the full cost of rebuilding."

He explains that real estate markets function best when buyers have accurate information about the total cost of homeownership, including insurance. "When buyers qualify for mortgages based on subsidized insurance rates, they face significant increases in insurance costs after a disaster," Perez notes. This hidden cost leads to buyer's remorse and market instability.

Perez advocates for making homes safer rather than focusing on affordable insurance. He suggests that federal and state mitigation grant programs and tax incentives can help reduce the risk and cost of insuring homes. "Grants and tax incentives for elevating homes above flood levels, installing hurricane-resistant roofs, and community-wide wildfire building standards can help reduce insurance costs."

Single-family rental and build-to-rent industries' investment in resiliency

Augie Williams-Eynon, a manager with Urban Land Institute's (ULI) Randall Lewis Center for Sustainability in Real Estate, was the lead author of ULI's "Sustainability in Single-Family Rental and Build-to-Rent" study.

"The challenge for large portfolio owners — acquiring or building then managing tens of thousands of homes — is that each house faces a different risk profile. They are not just looking at operating efficiencies through low-energy appliances, LED lights and better windows/insulation (for lower heating/cooling costs) — they are making sure these homes are built and [located] in places with reduction of risk to disaster," Williams-Eynon said.

(Above) Babcock Ranch hurricane shutters. Courtesy of Babcock Ranch/ Kitson & Partners.

> Real estate markets function best when buyers have accurate information about the total cost of homeownership, including insurance.

William-Eynon hopes the lessons learned by large investors in single-family rentals can be passed on to individual homeowners — though individuals cannot match the economy of scale of building hundreds to thousands of units in the same phase.

"They are building a structure that's well connected and fastened from room to floors to foundation. They are designing roof and exterior walls to survive impact and not be ripped off in high winds," he said. They are building for floodproofing with elevated mechanicals. Single-family,

build-to-rent developments have underground utility lines, which keep a property up and running after a severe storm.

The ULI report notes that the single-family rental and build-to-rent sectors are among the fastest growing segments of residential real estate. They accelerated during the COVID-19 pandemic and show continuing signs of growth and demand.

"This will be a big driver of real estate. Resilient buildings are more valuable buildings," Williams-Eynon said. "Resilient homes make securing financing easier; they attract a high-quality tenant and when a disaster strikes, they reduce losses."

Babcock Ranch: A marquee example of sustainability

Florida's Gulf Coast has been battered by multiple hurricanes. Babcock Ranch, in Charlotte and Lee Counties near Fort Myers, was designed to be a sustainable, environmentally friendly planned community hardened against crushing windstorms and floods.

Hurricane Ian, a Category 4 storm with wind gusts up to 150 mph, made a direct hit on Babcock's 5,000 residents in September 2022. It was the supreme test of a 27-square-mile community with a huge nature preserve, nature-based stormwater controls, buried electrical lines and solar electricity.

By the time Ian left Southwest Florida, 149 lives were lost and $112 billion in property damage was done. Babcock Ranch, surrounded by disaster, was virtually unscathed.

"We carefully selected a team of homebuilders with a shared commitment to creating an innovative, responsibly developed hometown that exists in harmony with the environment. Focusing on both resilience and sustainability, all homes in Babcock Ranch are built to minimum of Bronze level Certification by the Florida Green Building Coalition's Green Home standards, meaning homes are not only more energy efficient, they are also designed to withstand 160-mph wind loads," said Syd Kitson, former NFL player and leader of Florida real estate development firm Kitson & Partners.

Many things contributed to Babcock Ranch's resilience. When Kitson negotiated for the massive site, it planned to sell 74,000 of its 91,000 acres to the state of Florida. The sale created the largest conservation buy in state history. Stone quarries were tailored to blend with natural water features to create extensive water retaining ponds to handle storm surge. It is located 30 miles inland from the Gulf of Mexico and natural fill built it up to 30 feet above sea level to reduce the risk of flooding.

As the first solar-powered community in the United States, it uses more than 650,000 solar panels to power homes through underground power lines that are not susceptible to windstorm damage. On-site water and wastewater utility facilities are elevated above the 100-year flood plain and underground fiber optic lines provide data connectivity during extreme weather events.

Heather McGowan, manager of Association Archives for the National Association of REALTORS® (NAR), wrote about Babcock's nature-based resilience in the report "A Case Study on Building Communities with Sustainability and Resiliency at the Forefront."

"Babcock Ranch was successful because they designed and developed to work with the environment. They worked with canals, lakes and marshlands to absorb water when it could flood," she said. "It's cool that they never brought in artificial fill. That was environmentally sensitive and sustainable."

Resilient buildings are more valuable buildings.

(Left) Rancho Mission Viejo uses a variety of wildfire design techniques to reduce risk, such as clustering homes in lower-risk areas, using roads as firebreaks, and requiring noncombustible construction materials. Courtesy of SWA Group. (Right) Babcock Ranch/ Kitson & Partners

McGowan said being very intentional about master planning for sustainability and resiliency paid off for Babcock, while surrounding communities built to conventional subdivision standards suffered huge losses. Babcock also proves that resilient design can be attainable for many people. The median listing price for a resilient Babcock Ranch home is $415,000, while a conventional built home in nearby Fort Myers is listing for a median of $380,000.

"There was little evidence that Babcock had just spent eight hours under a hurricane. Some newer trees had fallen over, some signs were damaged, and a few roof tiles had been dislodged, but the town was not flooded, native vegetation remained intact, and the electricity and water never went out," McGown's NAR report stated. She encouraged communities to incorporate green building standards and to search for ways of funding part of that cost.

Kitson stressed that land-use patterns that support walkability are also an important part of community sustainability. He noted that Babcock residents can easily walk or bike to parks and shopping and dining destinations. More than 50 percent of the development, which is still being built out, is dedicated to greenways, parks and lakes.

"While Babcock Ranch is designed uniquely to its location and ecosystem, we're seeing consumers, counties and builders alike begin to take the progressive steps to adopting a new standard for climate resilience to meet their needs across the globe," Kitson said of Babcock's exportable resilience model. "From building codes to technology and other innovative adaptations. Babcock Ranch might have been an early adopter, but the tides are changing, and builders/developers are reacting differently today than they did 10 years ago.

"Babcock Ranch was intentionally developed to include stewardship, sustainability, preservation and restoration as key design features. More than 90 percent of the town is built on already impacted pasture, farm and rock-mined land. Water conservation is woven into its green infrastructure, from landscaping with native, low-impact plants to construction of a weir [small dam] system to rehydrate surrounding wetlands.

"Sustainability has been a passion for me since college and developing Babcock Ranch has become a lifelong project that illustrates to the world that building with, not against, nature is possible, scalable, and financially accessible to all. I wanted to create a new city that works in harmony with nature. Babcock Ranch serves as an inspiration for communities around the world seeking to leave a positive impact on the planet."

(Above) Courtesy of Babcock Ranch/Kitson & Partners.

Babcock Ranch was successful because it was designed and developed to work with the environment.

Template for government support: Mecklenburg flood buyout program

In North Carolina, which experienced massive flood damage from Hurricane Helene, the Charlotte-Mecklenburg area has a Floodplain Buyout Program. The buyouts are voluntary, no owners of homes or businesses are forced to sell.

Mecklenburg County states that "buying and removing buildings in the floodplain is one of the most cost-effective ways to reduce long-term flood damage and create many other community benefits."

"Local floodplains are meant to flood during heavy rains. It's mother nature's way of slowing down water to reduce damage caused by raging rivers. Floodplains also filter stormwater pollutants by temporarily storing floodwater. However, many communities including Charlotte-Mecklenburg, have developed within the floodplain, putting homes, businesses and other property in areas meant to flood," explains the program's website.

The buyout program started in 1999 and first sought FEMA grants. It also is paid for by the county's stormwater utility funds billed to residential and commercial properties. "Once we purchase the properties, we maintain them — keeping the grass mowed and planting some

Courtesy of Jonathan Beller.

Mecklenburg is working to prevent people from suffering great damage from a disaster.

trees. Some become park greenways or community gardens, a lot are one-offs," said Jonathan Beller, who runs the program.

The county also funds elevating houses out of the flood plain. Homeowners must get three bids for soil testing, engineering, mechanical/electrical/plumbing and the actual lifting of the home. The county reimburses 75 percent of the cost.

There are variables, such as the cost of masonry work, but elevating a roughly 2,000-square-foot house cost the county about $150,000 in reimbursement. For a total buyout, the total expense would have been $500,000. Since the program was launched, Mecklenburg has purchased about 500 properties in the flood plain, removed them and mitigated more than $50 million in future hazard losses. Additionally, the buyout program has created 185 acres of undeveloped public space, enhancing community resilience and reducing flood risk.

"Never let a good crisis go to waste is attributed to Winston Churchill," Beller said. "We never want a disaster to go to waste, so we are working to prevent people from suffering great damage when a disaster hits. After Helene, the program made buyout offers on 27 damaged homes and 15 in the flooded area are interested in being elevated."

Steve Wright @stevewright64 is a writer, educator, disability rights activist, and marketer of planning services. He has contributed dozens of stories to On Common Ground, which focus on best practices plus diversity, equity, inclusion and accessibility. He travels throughout the country and abroad lecturing on Universal Design. Based in Miami, Steve Wright blogs daily at Urban Travel and Accessibility, http://urbantravelandaccessibility.blogspot.com

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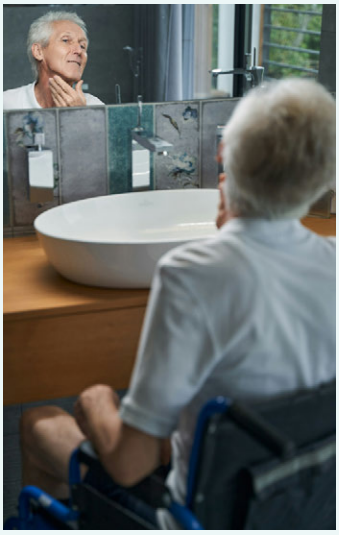
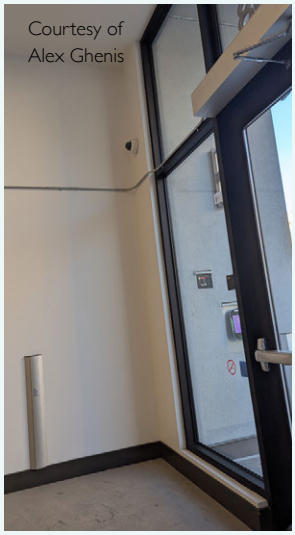




Courtesy of Alex Ghenis

THE KEY TO REBUILDING SUSTAINABLE COMMUNITIES THAT ACCOMMODATE AND SERVE ALL

Universal Design is the practice of designing products and environments so that they can be used by as many people as possible, without the need for specialized adaptation. That definition comes from the concept's creator, the late architect, planner and leader Ron Mace, who used a wheelchair for mobility.

While communities build back from devastating wildfires, floods and hurricanes, many leading planners and architects suggest that the flexibility, durability and sustainability of Universal Design is the best approach for new commercial and residential buildings.

Illya Azaroff, founder of +LAB Architect PLLC, president-elect of the American Institute of Architects, and professor at New York City College of Technology, advocates for Universal Design. "Universal Design is a part of sustainability. Accessibility must be a part of all design projects, so people with disabilities can have quality of life and [the built environment] allows aging in place. No one person or building is static. Architects are positioned as collaborators who can create buildings that can change use and function while accommodating all abilities. It's a part of sustainable, healthy building."

Universal Design creates flexibility. A dwelling unity can grow with the occupants and support aging in place.

Alex Ghenis, a quadriplegic who uses a wheelchair for mobility, is an Oakland-based climate and disability justice advocate and disability rights consultant.

"There's a huge benefit to developers to ensure that new apartment buildings have units with accessibility features. Building can be done in a way that convenient features can easily become accessibility features. A walk-in shower can be converted to an ideal roll-in shower. Modified sinks can work well for wheelchair users and all residents," said Ghenis, who publishes deep dive articles in accessibility and the environment.

"I think there is a market-based argument to developers having more accessible features — such as Universal Design throughout apartments," he said, noting the huge demand for barrier-free and age-friendly units as the U.S. Census forecasts that by 2034 there will be more people 65 years and older than under the age of 18 for the first time in history.

"In California, where the housing crunch is awful, we do not have good accessible welcoming apartments and condos that seniors would want to downsize into or the kinds of apartments that people with disabilities can move into and automatically have a roll-in shower," Ghenis observed, noting that the lack of accessible, aging-in-place housing is failing to put family-sized houses back on the market because seniors have a lack of accessible, small units to move to. "I hope to address climate resilience and disability through land use and the built environment. We have to be recognizing that we need to build up accessible housing in places that are hospitable to people with disabilities and have a certain amount of built-in climate resilience."

Public/private partnerships also must create accessible, affordable and attainable housing. When Ghenis was the chair of the city of Berkeley's Commission on Disability, he saw how opposition to density reduced the opportunity for affordable/accessible housing at a pair of sites by BART and Caltrain transit stations located near vital services. One was adjacent to the Ed Roberts Campus, a Universal Design award-winning complex for independent living and other disability-positive nonprofits.

Ghenis said more than 1,000 new apartments with proximity to regional transit and myriad daily services would be ideal for people with disabilities. Opposition to density means fewer units are being built, which drives up the cost of housing due to not enough supply to meet demand. It limits housing for people with disabilities and senior citizens who could meet their daily needs via walking, rolling or transit.

Municipalities and states need to encourage Universal Design in new development, Ghenis said. "Basic access could be codified. Not everyone wants to take a sponge bath because they can't access their tub."

> Universal Design can be used by all people without the need for specialized adaptation.

COMMERCIAL REAL ESTATE MITIGATION

PLANNING, RETROFITS AND NEW SYSTEMS FOR RESILIENCE TO EXTREME WEATHER AND TO MAINTAIN OPERATIONS DURING NATURAL DISASTERS

By Michele Lerner

Whether you're building or investing in a healthcare facility, an office building, a warehouse, a school, a data center, a cultural building or a mixed-use development, safety and durability are at the top of the list of necessary attributes. In the face of increasing threats from hurricanes, tornadoes, earthquakes, wildfires, floods and extreme temperatures, building scientists and architects employ design practices and new technology that demonstrate how human ingenuity can keep these significant real estate investments profitable and businesses operational.

"Every building owner or investor needs to start with a risk assessment that includes scenarios for the top five or six risks that could impact them," said Stet Sanborn, a San Francisco-based vice president and director of climate impact for SmithGroup, a 170-year-old architecture and planning firm.

Data analytics firms such as ATTOM Data Solutions, First Street, and Cotality (formerly CoreLogic), as well as insurance companies can provide insights by address about the probability of an impact on that location from fire, wind, water or extreme temperatures. Corporations are evaluating the costs associated with these risks as well as the benefits of retrofitting buildings to make them more resilient to climate-related effects.

"Normally, real estate represents 4 to 5 percent of a company's profit and loss, but now costs have gone up so high they can be 10 to 15 percent of profit and loss, particularly for space that needs to be retrofitted for resilience," said Kevin Dollhopf, a corporate real estate advisor and CEO, ExcelCrest LLC, based in Winston-Salem, N.C. "That means companies need to consider consolidation or reconsider their use of space."

Weather-related disasters cost nearly $3 trillion between 1980 and January 2025, according to the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI) 2025 U.S. Billion-Dollar Weather and Climate Disasters Report, which only includes disasters that generated losses and repair costs of $1 billion or more in 2024 dollars.

Corporations are evaluating the benefits of retrofitting buildings to make them more resilient.

(Below) Considered to be one of the world's most sustainable and resilient buildings, the Brock Environmental Center's (Virginia Beach, Va.) design protects against 130-mph winds, storm surge and flooding. Elevated 14 feet above sea level on cast-in-place concrete columns and spread footings, it exceeds FEMA elevation requirements for both 500-year flood and sea-level-rise projections. The curved roof design and building materials contribute to wind and water resilience, while its net-zero energy, water and waste design allow it to serve as a community resource and haven following disruptive events. **Additional project info.** Courtesy of SmithGroup, photographer Prakash Patel.

Site Selection for Resilience

As companies grow and communities expand and need more public buildings such as hospitals, schools and other municipal buildings, they search for new locations to either build new facilities or retrofit existing properties.

"Climate has always been part of risk management, but over the past 15 years or so companies are more prudent about site selection because of natural hazards and the likelihood of natural disasters to hit a particular area," Dollhopf said.

However, companies looking for industrial space and other commercial needs must consider their inputs and outputs along with their network of suppliers and accessibility, which outweighs climate risk for industries, Dollhopf added.

"Offices need to be near a labor pool with the greatest abundance of the skill sets their company needs," said Jim Hazard, a Dallas-based managing principal of Cresa, a global commercial real estate advisory firm. "Industrial sites need to be in the most effective place to distribute their goods. A company that provides a lot of products to clients in Jacksonville isn't going to relocate to Tennessee — they will just do what they can to mitigate hurricane risk."

Data centers and some critical manufacturing businesses may be able to locate in an area at lower risk from climate disasters, Hazard said, but for the bulk of companies, climate risk is just one factor among many when it comes to site selection.

Designing for Resilience

Depending on the location and the risk, some buildings must be built or retrofitted to meet specific code requirements for resilience. For example, in California, all new buildings are built to higher standards to hold up to a seismic event, said Steve Bellitti, a senior executive vice president for logistics and transportation solutions based in Ontario, Calif., with Colliers, a global commercial real estate services company. Regulations are also in place to retrofit older buildings to be more resistant to earthquake damage.

Regardless of whether it's mandatory or a smart way to protect a company's assets, risks that can be mitigated include:

- **Floods and rising sea levels.** Moving electrical and mechanical systems above the basement level can reduce risk of damage to buildings from water. A more costly but effective option is to elevate the entire building.
- **Hurricanes and tornadoes.** Aerodynamic building designs can lower risk, along with the installation of hurricane-rated windows and doors, and structural improvements for roofs. In addition, safe rooms can be designed to protect employees during a storm.
- **Wildfires**. Commercial buildings are typically less prone to wildfire damage because they are less likely to be built of wood or have eaves or attic openings that can introduce fire inside. Site management to reduce debris or plants that spread fire are common practices.
- **Extreme temperatures**. More warehouse and office building owners are investing in air conditioning despite the cost in order to attract and retain employees. High-performance insulation, white or cool roofs to reflect the sun, green roofing to mitigate heat, geothermal heating and cooling systems, highly efficient HVAC systems, and solar panels with battery storage to mitigate extreme temperatures are also being used depending on how much a company wants to invest.
- **Earthquakes**. Structural reinforcement, which is mandatory in California, can include reinforced concrete and steel frames.
- **Power outages**. Solar power with battery storage and onsite generators are a necessity for healthcare facilities and other critical infrastructure, but many companies are investing in these features for employee safety and operational benefits.

Henderson Center in La Quinta, Calif., built for resilience to seismic events with RSG 3-D. Courtesy of Palm Desert Chamber of Commerce; Photo by RSG 3-D.

Cape Cod Hospital Cancer and Cardiology Expansion (Hyannis, Mass.) has close proximity to Lewis Bay and the Atlantic Ocean. The new cancer center and patient tower at Cape Cod Hospital is designed to address sea-level rise, wind-borne projectiles and provide hurricane storm-surge mitigation up to a Category 4. All emergency generators are located above the anticipated flood level and the site is elevated to keep the first floor out of the 500-year flood zone. Courtesy of SmithGroup.

"The building process is all about mitigating the forces of nature from seismic events to fire, water and sunlight," said Zoltan Pali, founder and design principal of SPF:a, an architecture firm based in Los Angeles.

At WE3 at Waters Edge, an office complex at Playa Vista on the west side of Los Angeles, Pali was asked to design a building for a potentially higher water table due to rising sea levels.

"Instead of designing the parking basement above a 19-foot water table, we had to design it for the possibility of the water table being just 9 feet below grade," Pali said. "In that case, we worked with structural engineers to design a building that would be heavy enough to resist the upward pressure of rising water. We also drilled 900 piles filled with concrete with pads underneath to create a hard surface for earthquake resilience."

Construction Techniques that Work

While building scientists and engineers continue to work on innovations to increase the resilience of commercial buildings, the structural concrete insulated panel building system known today as RSG 3-D has been used for 30 years in 20 countries without sustaining any damage from hurricanes, typhoons, seismic events, wildfires, structural fires, floods or hail, according to Ken Calligar, CEO of RSG 3-D, headquartered in Old Westbury, N.Y.

"The key to our panelized system is the combination of the insulated panel with a steel truss system that together weigh less than concrete but has more strength," Calligar said. "The materials are fire and flood resistant, plus the truss system creates a monolithic structure so that stress from hurricane force winds or an earthquake is spread throughout the building. Our track record is a significant indication of the level of resilience and risk mitigation this system provides."

RSG-3-D can be used for both residential and commercial applications.

"Businesses are scrambling to address the financial risk inherent in risks to their buildings, and they're painfully aware of the higher insurance costs that come with a higher risk assessment," Calligar said. "Our costs are comparable to traditional building and sometimes even less expensive."

Because RSG 3-D provides the structure for buildings, it can't typically be used for a retrofit. However, it can be used for an addition to an existing building.

"We've built shopping centers, municipal buildings and warehouses, and we have a sizeable pipeline ahead of us," Calligar said. "For maximum structural integrity it's best to install an RSG 3-D roof on every building, but it's heavier than a traditional roof. Commercial buildings that have a big expanse of roof are sometimes built with a light gauge steel roof with RSG 3-D walls, which isn't quite as good as one built fully with RSG 3-D but comes close."

Technology to mitigate risk continues to evolve, including building materials such as Arclin's Firepoint, a new sheathing system demonstrated at the 2025 International Builders Show that slows the spread of flames and provides up to 53 percent more fire resistance than code requirements. Firepoint withstood fire for up to 90 minutes in testing.

WE3 at Water's Edge in Los Angeles is sited on the last developable lot in the Playa Vista Specific Plan. WE3 features four stories of creative workspace in the commercially robust and rapidly developing area of Westside LA colloquially referred to as "Silicon Beach." WE3 is the third and final structure of a sprawling 6.5-acre campus and represents a refined take on both the practical and aesthetic possibilities of the modern workplace. Photo by Mike Kelley.

(Above and left) Brock Environmental Center, Virginia Beach, Va. Courtesy of SmithGroup, photographer Prakash Patel.

Insurance companies price their coverage based on risk assessments.

(Left and below) SmithGroup's AIA-award winning design for DPR's Sacramento, Calif., office adaptively reused an existing building to exceed state net-zero-energy requirements and provide a range of resilience benefits, including an onsite microgrid and battery system for emergency power backup, an outside-air pre-cooling labyrinth to improve performance during extreme heat events, and operable windows and glass walls to support natural ventilation. **Additional project info.** Courtesy SmithGroup, photographer Chad Davies.

Financial Factors of Resilience Planning

For commercial property owners and developers, cost is always an important factor, particularly to balance the need to attract and retain tenants who don't always want to share the extra expense required to increase resilience, Dollhopf said.

When SmithGroup works with building owners, they plan for future adjustments such as extra electrical capacity in case additional coolers will be needed. Flexibility can help owners address the financial burden of building and retrofitting for resilience, allowing incremental expenditures as improvements are phased in, Sanborn said.

Other financial issues developers need to address include:

▶ Insurance

"The biggest concern for the institutional owners that I deal with is the change in the cost of insurance, particularly in Southern California," Bellitti said. "Every company is required to have earthquake insurance, but over the past three to five years premiums have increased 350 percent."

While an automatic discount on insurance premiums for resilience is not guaranteed, insurance companies price their coverage based on risk assessments. Building owners that invest in resilient buildings and retrofits may be offered better rates. More importantly, some buildings without retrofits such as hurricane-resistant windows or structural modifications to stand up to seismic events are uninsurable, Hazard said.

"Since retrofitting for resilience has been happening for just the last five years or so, there's not really enough evidence for insurance companies to provide widespread deep discounts yet, but they are looking into it," Sanborn said.

▶ HVAC upgrades

While some companies resist installing air conditioning, it can become a necessity to retain employees in response to extreme heat.

"In San Francisco, a lot of office buildings aren't designed with air conditioning because the peak temperature used to be 89 and now it's 99," Sanborn said. "But if you have to send employees home, that can impact productivity and the lease-ability of the building. Plus, increased utility bills play into lease terms."

In warehouses, it's fairly common not to heat or air condition space unless the products being stored require it, Hazard said.



"Air conditioning can cost $12 per square foot to install, but with labor shortages, more companies are investing in it to attract and keep labor," he said.

Utility companies in some areas are investing in demand-side energy management, which building owners can benefit from if they can reserve their largest use of power for off-peak hours when the price is lower, Bellitti said.

"One company looking for an 800,000-square-foot building wanted to add air conditioning, but the power company wouldn't guarantee a power use upgrade," Bellitti said. "The company moved five miles to a different location that had the power availability they needed."

▶ Code compliance

Retrofitting buildings for resilience to a seismic event is just the cost of doing business in California, Bellitti said.

"Most companies have to have a presence in California: 40 percent of the products that come into the United States pass through one of the two ports in California, plus 25 million live here," he said. "Locating outside of California isn't an option."

Investing in Retrofits

In commercial real estate, approximately 80 percent of buildings already exist, which means retrofits are likely to be necessary for many building owners, Dollhopf said.

"Most building owners recognize that investing in resilience is necessary to maintain the long-term value of their property," Sanborn said. "Retrofitting can be more costly and complicated depending on its function. For example, if you have an office with multiple tenants you may have to do piecemeal retrofits. Retrofitting a hospital with 24/7 occupancy is far more complicated than a university building that's empty in the summer."

Still, there are some lower cost retrofits that can keep a building operational and protect employees. "For example, mitigating poor indoor air quality because of wildfire smoke can be done by sealing air leaks in a building, which can take a couple of hours," Sanborn said. "There are also specialized air filtration systems that can be manually added."

A more challenging problem to solve is damage from high wind events such as tornadoes and derechos, Sanborn said. "You need to get behind the walls to see if there are tie-downs and how well the walls are attached to the roof," he said. "That can be labor intensive and costly."

Installing stronger windows can also be costly, but there is a payback in terms of higher levels of energy efficiency and lower utility bills.

"The most effective, least intrusive way to improve resilience in an existing building to seismic events is to upgrade the walls with sheets of carbon fiber that bond to the existing concrete and can be refinished," Pali said.

Redundancy Requirements

In addition to the hardening of buildings to be resilient to climate impacts, companies need to address operational logistics that follow a disaster.

"Businesses need a contingency plan to address access to their site, power outages, data management and critical employees," Dollhopf said.

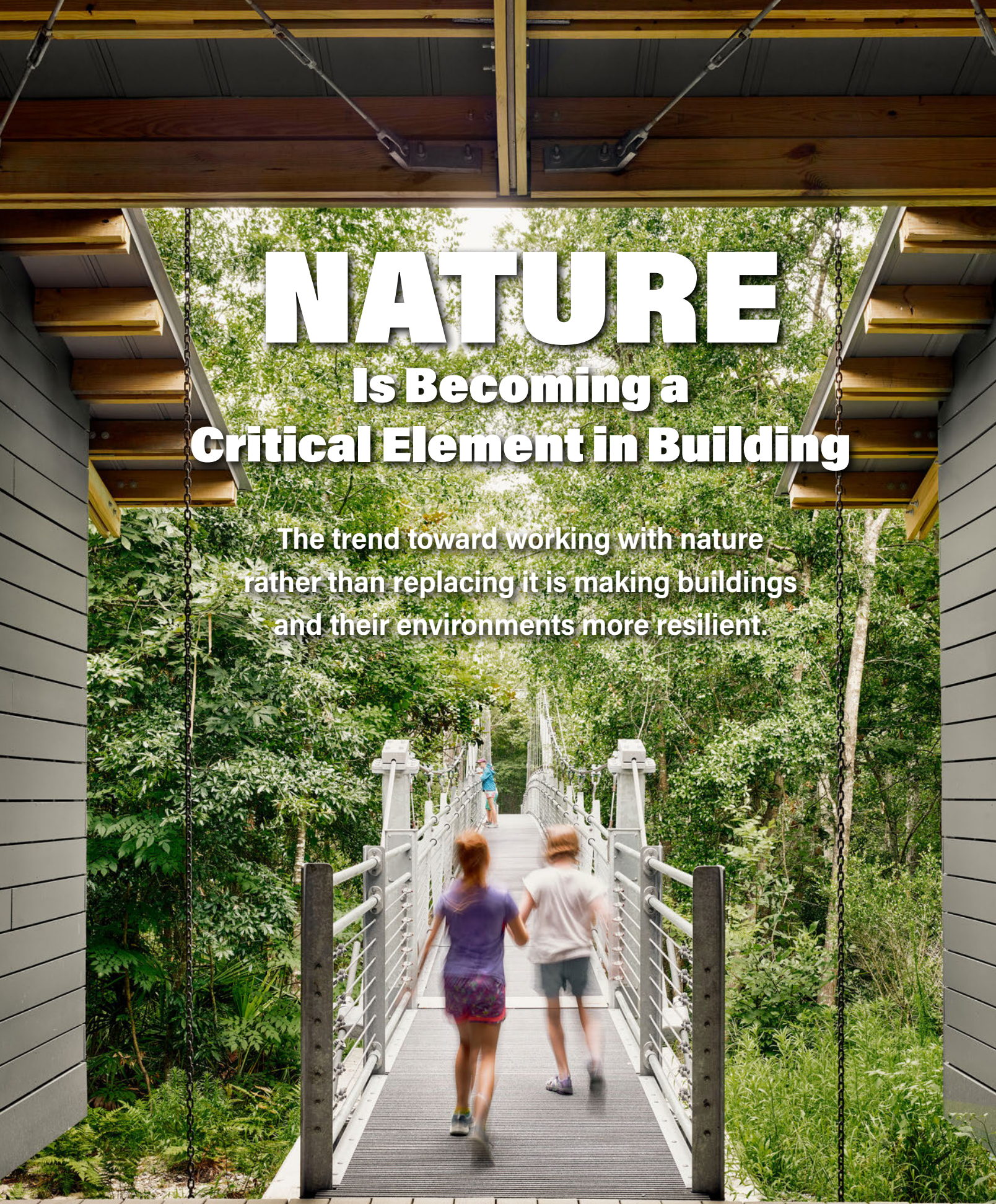
Every company needs to think about what they need to keep operating and what they could do without, temporarily, Sanborn said.

"For example, a waste treatment facility near a coast needs to be prepared for what would happen in a flood with cots for their staff if people can't use the roads," he said. "Hospitals need 72 to 96 hours of back-up power and clean drinking water."

Risk assessments should be done for every piece of real estate a company owns, along with a list of what retrofits can help, what they cost and any potential savings on insurance or other expenses, Dollhopf said.

"There's no silver bullet to solve all climate risks, especially as buildings get more complex," Pali said. "There are systems and materials we can put in place to lower risk, particularly when you take the time to predict what can happen in any given location." ●

Michele Lerner is an award-winning freelance writer, editor and author who writes about real estate, personal finance and business topics. Her work has been published in The Washington Post, USA Today, and Urban Land magazine, among others. She is frequently interviewed as an expert source on housing topics and her books have assisted homebuyers, planners, lenders, housing counselors, and real estate agents.



NATURE Is Becoming a Critical Element in Building

The trend toward working with nature rather than replacing it is making buildings and their environments more resilient.

Courtesy of Lake Flato Architects; Photo by Casey Dunn

By G.M. Filisko

Lee Clippard is playing a key role in a movement he probably never anticipated he'd join — that of creating resilience in today's buildings and landscapes.

"The Lady Bird Johnson Wildflower Center is part of a growing group of organizations trying to figure out how to create healthy, resilient, regenerative landscapes around human development," explains the Austin, Texas,-based botanical garden's executive director. "It's about having our cities and communities grow responsibly, be supportive of the environment, and use fewer resources."

Another player is Bob Harris, FAIA, LEED Fellow, and a San Antonio-based partner at Lake Flato Architects. His team is partnering with Clippard's to build a system that helps the center recapture rainwater on a vastly more massive scale than it does today with its 30-year-old setup.

"We know that the long term is changing," states Harris. "As conditions change, we know buildings need to be resilient to withstand the negative impacts of climate change while also being able to adapt and thrive."

The range of resilience

Developers, architects, landscape designers, and the clients of those professionals are studying nature and using it to their advantage. Often, they're also restoring it to a healthier state because it makes economic sense for the projects they're creating.

"Resiliency means a lot of things," explains Harris. "At the very base, I feel it means designers, builders and owners are taking care during design and construction that the dollars and resources expended today will pay back and be useful over the long term.

"The American Institute of Architects has an awards program for sustainable buildings and resilient design," he notes. "One measure is long life so that, for every material and financial resource you put in, you get the longest possible benefit. Resiliency also means a loose building. That means a building is flexible and adaptable to accommodate a variety of conditions in terms of its use or the climate outside."

Landscape designer Robb Berg, president of Design Workshop in Denver, is another force in this movement. "We have to start thinking about planning smart landscapes,"

As conditions change, we know buildings need to be resilient.

Photos courtesy of the Lady Bird Johnson Wildflower Center.

The Lady Bird Johnson Wildflower Center in Austin, Texas, uses native plants and a rainwater-recapture system to mitigate environmental challenges, such as water scarcity, for better resiliency.

he says. "We have studios in Texas where we deal with hurricanes, flooding and stormwater. We have a studio in Raleigh, N.C., that does a lot of work on sea-level rise and coastal mitigation. In our line of work, we have to be adaptive and adjustable to all these conditions."

The Nature Conservancy has been advocating for this type of approach for decades. Thankfully, says Nate Woiwode, climate adaptation strategy lead for the organization's northeast division, discussions about this issue today are easier than in the past. Ten years ago, TNC created Naturally Resilient Communities, a partnership that promoted the use of nature in community planning, often in response to a natural disaster.

"We were really focused on the need to promote investment in nature and nature-based solutions," he explains. "Now I don't find that people are questioning that premise as often. Today the questions are: What are the realistic options, and where's the money going to come from? The biggest challenge is balancing the need to recover from a disaster with creating the time to make the choices for what a community might look like. When you're able to take that time, investing in a more natural future makes the case for itself."

That's because resilient buildings and landscapes can be smart financial investments over the long term, whether it's in terms of maintenance, resistance to weather extremes, or tamping down ever-increasing insurance costs. "It's a calculation that's made formally or informally," says Harris. "What's the value takeaway from the resources invested, and how does that pay off for the client's needs?

"We have a project we're working now, and in anticipation of a future need, we're increasing structural conditions to withstand tornadoes to a higher level than currently required. As we do that, we can look at the material cost and impacts of designing to a higher level than otherwise required. In the past, I'm not sure it was considered. It was more building to the industry standard and what codes told us."

Woiwode says communities that work with nature, particularly when they're forced to start over because of a disaster, are not only more resilient in the long term, but they're also places people love to live in.

"The biggest takeaway I've had — and I live on Long Island, so I have firsthand experience with superstorm Sandy and the recovery from that — is that when people have the opportunity to slow down and ask themselves: What's the world I want to live in and what's the community I want to be a part of? Investment in parks, natural coastlines, and rivers rise on the list," he says.

"The world is less skeptical about this need," he states. "Broadly speaking, these ideas are well accepted. It's more about: How do we do this, how do we do this well, and how do we do this in a timely fashion so people feel safe in their homes and can see a future that feels really good and positive?"

Resilient buildings and landscapes can be smart financial investments.

Photos courtesy of the Lady Bird Johnson Wildflower Center.

When design puts nature to use

All these experts are on the ground creating projects and working on community-building efforts that creatively mesh development and nature.

"A project we completed a few years back is particularly interesting because it tells the story full circle from Hurricane Katrina," recalls Harris. "The University of Southern Mississippi's Gulf Coast Research Laboratory had a facility in Biloxi that was roughly eight feet above sea level but completely destroyed by Katrina."

"A number of years later, after they'd gathered the money to rebuild, they chose a different site in Ocean Springs, just up the coast, that was 19 feet above sea level," he notes. "They were going from something that was a complete loss at eight feet to something a bit higher than what future storm surges would need.

"It was a wooded site, largely left in its native state. It was a pristine example of the coastal habitat in southern Mississippi with a huge variety of wonderful native plants, from palmettos to native oaks. We consulted an ecological expert who evaluated how we could work with the site rather than change it."

"There was one area on the site that had been occupied, and the natural systems had been disrupted enough to provide a natural site for us," he explains. "It was also the highest ground, at 19 feet. Previous designs would have plopped a building on the site. But we had research that found that invasive species and trees weren't doing well there. So, we wrapped a building in where the trees were the least viable and basically enclosed the highest ground for human activities."

The team used helical pier foundations for the building. "Imagine a large, steel corkscrew drilled 20 to 40 feet into the ground — as far as it needs to go to find its bearing strata, or the stable part of the site," he explains. "That allowed us to get tighter in with the trees and not disrupt the root system so their canopies could stay interlocked with each other. It was a narrow footprint for the facility that allowed for uninterrupted forest. That created a symbiotic relationship between the building and the forest.

"By taking away some of the weaker trees and those with insect damage and creating a new wooded area, those trees will now buffer the winds. When they're in that condition, they'll withstand something like Katrina more readily. Since the project was completed, the university has been tracking the health of the ecosystem. Not only have native plant systems thrived, but the ecosystem's diversity has increased. And not only is the building resilient, but it's also a beautiful facility that people really want to go to. There's a high degree of interaction between the indoors and outdoors. People think they're in a special place."

Today, Harris is working with Clippard to create a huge increase in the amount of rainwater the Lady Bird Wildlife Center captures. "When we opened in 1995, we had the largest rainwater-capture system in north America — and that's saying something," says Clippard. "At that time, we were a 42-acre botanical garden. We have 300 acres now,

The team created a symbiotic relationship between the building and the forest.

The University of Southern Mississippi's Gulf Coast Research Laboratory in Biloxi was completely destroyed by Hurricane Katrina. It has been rebuilt in partnership with nature and its natural resiliency features to withstand weather-related events and designed with a symbiotic relationship between the building and the forest. Courtesy of Lake Flato Architects; Photos by Casey Dunn.

and we've probably quadrupled the number of staff. We've also gone from 40,000 visitors to almost 300,000 now. The pressure on our systems has grown substantially."

"About a year ago, we started thinking about what the next 30 years looks like for us," he explains. "We know more drought, water scarcity, extreme weather conditions, and just changing climate in general will change some of the qualities that will allow us to grow plants. We also expect we'll continue to grow with Austin. Maybe 5 years from now, 500,000 visitors will come through That's a lot to think about in Central Texas where water resources are scarce.

"Our rainwater capture capacity now is about 65 gallons of water, which is basically nothing. We're starting to really think about how we can capture and store every last drop of rainwater across all facilities and even parking lots. More broadly, we're thinking about how we can create buildings, infrastructure and facilities that can help us reduce our water use. It's almost like carbon neutrality; in the same way, we'd have water neutrality."

The project has challenged Harris to think about water capture in new ways. "We can collect a good amount of rainwater from rooftops, but that pales in comparison to what can be collected on the site," he says. "How do we take an entry plaza, garden space, and hardscape and channel water to retain as much as possible in terracing as it falls but also to store it as it falls? This involves really understanding how much a role landscape can play in this process."

Landscaping that preserves and regenerates

Berg says landscape design today falls into two buckets. "We've been talking about sustainable landscapes for decades," he explains. "That means things like using the right amount of water for your climate zone or not using a lot of water if you live in the desert.

"The other bucket is resilience," says Berg. "That means the landscape has the ability to resist or come back in times of stress caused by things like fire, extreme drought, and inundations of stormwater. It's designing a landscape that can be resilient through a myriad of conditions."

The Houston Arboretum is a project Berg has worked on for about 10 years with the goal to make the campus more resilient in the face of increased heat and less water. "It's located within an extremely large park development, and the arboretum is right along the bayou, the drainage infrastructure for the city during large rain events," he explains.

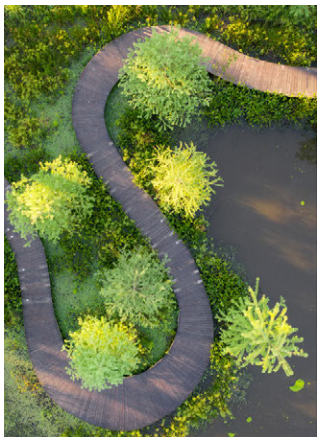
"The arboretum has suffered serious issues," says Berg. "It has lost a large component of tree canopy — and an arboretum by definition should have a lot of trees. Our work starts with an investigation of the appropriate landscape before we start to talk about aesthetics and pick plants. It's the same process for a fire-prone area.

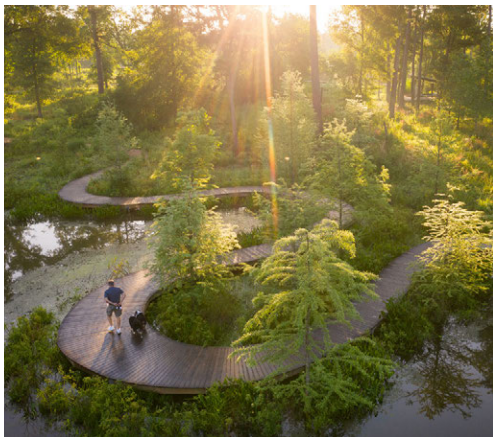
"We have an incredible client who's on board with a long process. Typically, landscape might take a couple of years for design and construction. But this is the story of regeneration and bringing the true, honest, authentic landscape of the arboretum to life. That takes probably decades in terms of growing trees and sustaining life.

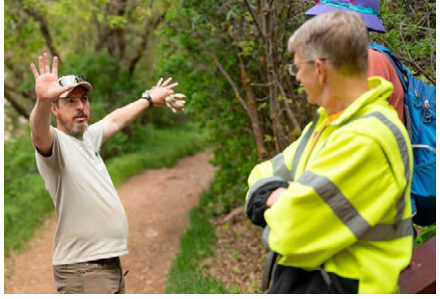
"We started with the low-hanging fruit, which was to weed out all the invasive species. What was really fun was that we employed a team of goats, and they did a phenomenal job — they eat literally everything. The unintended consequence was that the goats' grazing created a bit of a petting zoo and education area for children.

"Then we had to deal with frequent flooding along the bayou and designing landscaping that could fluctuate with the everchanging conditions, which was a super-challenge. We created a series of walkways that are designed to withstand floodwaters and can be easily hosed off to welcome people.

The Houston Arboretum and Nature Center is a Design Workshop project with the goal of making the campus more resilient since it is located right along the bayou, the drainage infrastructure for the city during large rain events. Courtesy of Design Workshop; Photos by Brandon Huttenlocher.






Photos courtesy of The Roaring Fork Outdoor Volunteers

"We're also adding landscape shelves where we're adjusting the species based on the gradient of water. One area might have a plant that likes wet feet and can stand being in water for a period of time versus another area with something that can be submerged for a few days at a time. This approach doesn't work with every client. But when we get the right client, we get to experiment, and we're learning what works and doesn't."

Almost always, the challenges are aesthetics and money. "I've learned from 20-plus years in the practice that it's not fair," says Berg. "Architects on ribbon-cutting day get to show off their building, and it'll look perfect. But our landscape looks like hair plugs for the first few years. This takes time because it's a living, natural design we're delivering. Some clients are looking for that instant gratification, so we'll space plants closer to get that day-one impact. Those situations are challenging."

"Also, good landscape design is front-loaded in costs," he says. "You're paying not for just the aesthetic but also for the science that goes behind choosing the right plants for the right place. It's about understanding what year 1 and year 25 are going to look like.

"We explain to clients that they're paying a little more up front, but ideally, they're getting a far greater return in the long run. We measure the impact of what we do. We'll have a post-completion review at years 3, 5 and 15 to see that this worked and this didn't or that this didn't work as well as we thought.

"That information is helpful in designing new projects. We can walk into a project meeting and suggest that, by using this approach to plants and design and by using these types of plants, we can save X percent on irrigation costs over time. We can show real savings."

Perhaps that's why Berg says his job has gotten easier. "I started in this profession in 2000, and I've seen a noticeable change in clients who come to us already pre-educated in things like native landscapes, resiliency and stormwater management," he says. "I don't know when that shift happened, but it definitely has happened. The idea of designing with nature as opposed to fighting nature has really taken off."

Real estate professionals lead on the preservation of public lands

Who better to understand the value of nature to those who live and work nearby than real estate agents and brokers? In Colorado, real estate professionals have staked out a part in the preservation of regional public lands through Real Estate Professionals for Stewardship, a membership program in the Roaring Fork Valley.

"Real estate agents have a very direct role in helping people engage in this community in terms of finding homes," says Kelsey Brasseur, development director of the Roaring Fork Outdoor Volunteers. "This program gives them a mechanism to support the stewardship of regional public lands."

"The Roaring Fork Outdoor Volunteers was founded around annual trail maintenance," says Brasseur. "We work with local, state and federal land managers to get volunteers together to go out to those trails to do things like dig drainage that prevents erosion, build rock steps, repair bridges, and cut back corridors so trails are open and safe. We also do a lot of wildfire adaptation work, which is reducing the amount of potential wildfire fuels and mitigating the effects of previous burns."

Real Estate Professionals for Stewardship supports that effort primarily with funding. It was spearheaded by REALTORS® on the outdoor volunteer group's board, Randy Gold and Victoria Thomas, who continue to serve as liaisons and ambassadors. Its 10-20 members provide gifts starting at $250 and reaching $5,000, with several real estate companies participating in matching programs.

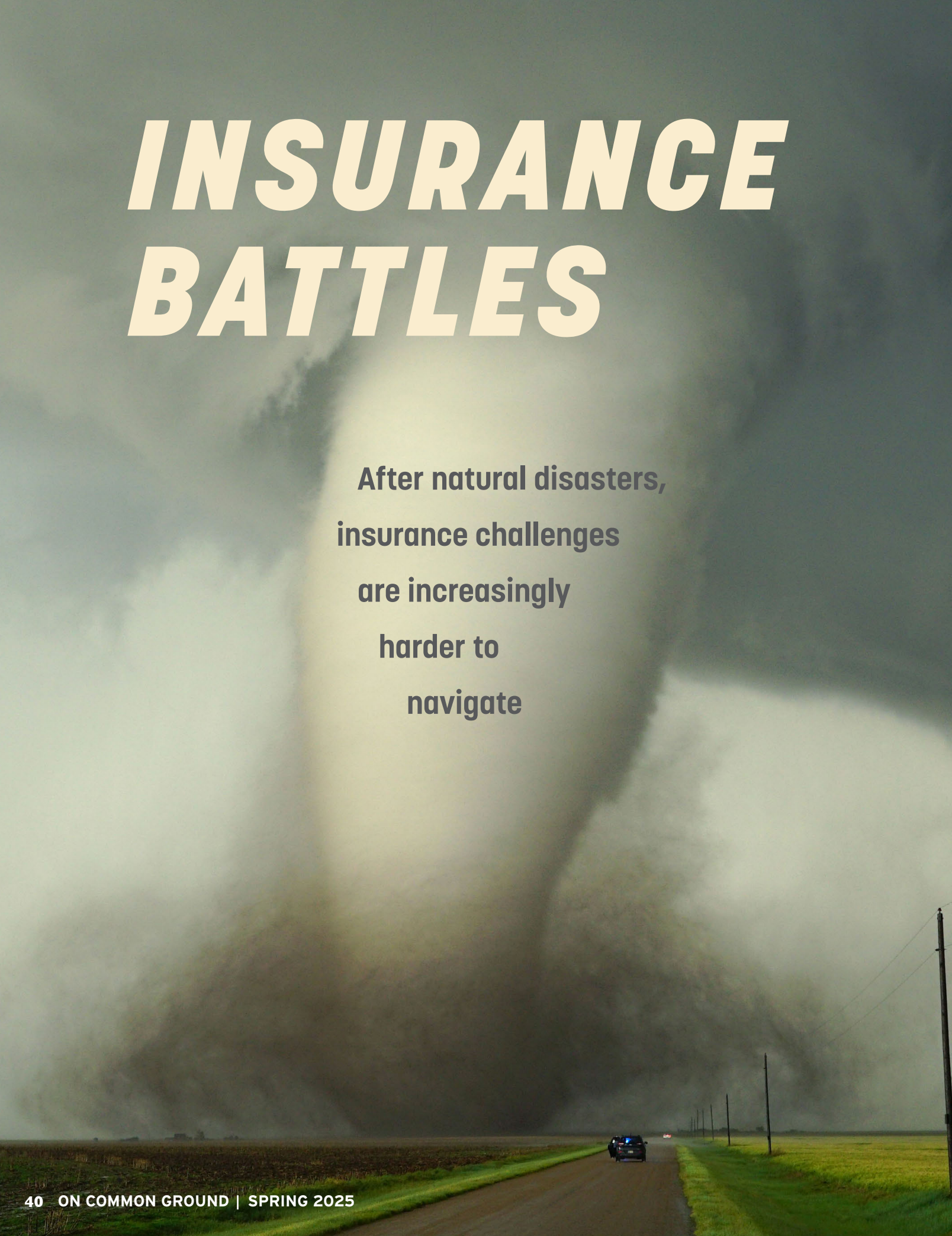
As of March, the Real Estate Professionals for Stewardship 2025 campaign had raised nearly $30,000 from real estate agents and brokerages, reports Brasseur.

"Just having their personal or the company's brand associated with conserving public lands is really powerful because of the amount of business they do in the community each year," she says. "To have real estate professionals stand up and say, 'We support the conservation of our public lands,' that's inherently valuable." ●

G.M. Filisko is an attorney and freelance writer who writes frequently on real estate, business and legal issues. Ms. Filisko served as an editor of NAR's REALTOR® Magazine for 10 years.

INSURANCE BATTLES

After natural disasters, insurance challenges are increasingly harder to navigate



By Brian E. Clark

For the first three months after the 2018 Camp Fire destroyed Linda Reynolds' 1948 Craftsman home in Paradise, Calif., she had vivid, terrifying nightmares.

"I'd picture myself burning up inside my house," recalled Reynolds, whose Harley Davidson motorcycle also was reduced to ashes, melted plastic and steel. Fortunately, her pet dog survived.

"Sometimes, to be honest, I just wanted to die," she said. "It was big time PTSD."

But Reynolds, who is 71, hung in there after the inferno, which destroyed 14,000 homes, killed 85 people and devastated her community.

Afterwards, she dueled with her insurance company and her mortgage holder. She prevailed, though, and now has a new, fire-resistant cement block home with a small greenhouse on one end and a flower-filled yard that she said is on this year's Paradise community home tour.

She also received a settlement that helped her rebuild from Pacific Gas & Electric, the California utility that admitted its poorly maintained electrical transmission lines were responsible for the fire. (*The Guardian* June 16, 2020)

However, her $700 annual insurance rate has ballooned to $3,500, reflecting the cost of living in a fire-prone region. And rates will continue to go up as companies stop writing policies or leave the state.

To avoid painful rate increases like Reynolds', upfront insurance prices in high-risk areas need to reflect the full cost of owning a home, including the insurance, said Austin Perez, a senior policy advisor for the National Association of REALTORS® (NAR).

"Unfortunately, this is what happens when states cap or control rates to keep insurance affordable in high-risk areas" he said. "Homeowners face a one-two punch: they lose everything to a natural disaster and then discover the real cost of insuring their home in disaster-prone areas."

In California, the Tokio Marine America Insurance Co. and Trans Pacific Insurance Co. recently submitted filings to the state's Department of Insurance stating they will not renew 12,556 homeowners policies, according to a recent Los Angeles Times article.

(Above and right) Linda Reynolds' home and greenhouse after the Camp Fire in Paradise, Calif., and what was left of her Harley Davidson motorcycle. Photo by Linda Reynolds.

(Above and below) Linda Reynolds' home was rebuilt in the Craftsman style with fire-resistant materials in preparation for the next natural disaster. Photo by Linda Reynolds.

Also not being renewed are 1,624 dwellings' fire and liability policies typically sold to owners of rental properties, as well as personal umbrella coverage.

Several major insurers, meanwhile, including State Farm General, Farmers and Allstate, have limited their exposure in the Golden State by cutting back on the number of new policies they issue or tightening underwriting standards. State Farm, for example, announced in March it would not renew 72,000 policies.

"It's like rent control, but for insurance," Perez said. "States can hold down rates and make insurance affordable in risky areas. However, if insurance companies can't cover their costs, the insurance won't be available."

State Farm, the Golden State's largest home insurer, estimates its total claims from this past January's Pacific Palisades and Altadena fires will approach $8 billion, though it said payments from reinsurers to State Farm will pare its net costs to a little over $600 million.

Those losses have prompted the company to seek a 22 percent emergency rate hike for its homeowners policies even as its claims-handling practices are being scrutinized, according to the LA Times. State Insurance Commissioner Ricardo Lara initially turned down the request but is considering additional financial information submitted by the insurer.

His reform plan to make homeowners insurance more available gives insurers financial and policy concessions in exchange for a pledge to write more policies in risky neighborhoods.

Perez said it is imperative for REALTORS® to advise clients to talk to an insurance agent and ask for the full-risk rate before buying a home in a high-disaster-risk area.

REALTORS® can also add value by connecting customers with disaster risk experts like the local fire department or pointing to credible third-party sources like FirstStreet.org, which connects financial risk and changes in the climate. NAR has also provided consumer guides for home insurance and wildfire coverage.

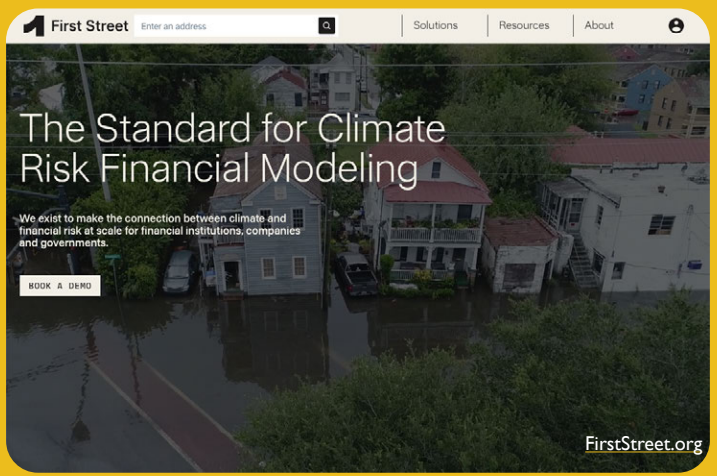
That could make some homes in higher risk areas unaffordable for some buyers, explained Perez. "This may mean guiding clients away from higher risk neighborhoods where the cost of homes, including insurance, exceeds their budget," he explained.

"It's not about making insurance cheaper. It's about ensuring clients have the information they need, including the disaster risks, to make fully informed decisions."

Reynolds' tale ended well, but she said people she knew who were underinsured or had no insurance at all were left impoverished. Some moved away to live with relatives and start over.

Elsewhere around the country, there are similar stories, especially where people dwell in areas prone to fire, flooding, tornadoes and other natural disasters.

In mid-March this year, violent tornadoes tore through parts of Arkansas, Missouri, Georgia, Texas, Louisiana, Mississippi, Alabama and Kansas, killing more than 30 and causing millions in damage.



It is imperative for REALTORS® to advise clients to talk to an insurance agent and ask for the full-risk rate.

As for Reynolds, she barely escaped after trying to rescue a friend among the smoke and fire. She said she was trapped on a road leading from town for six hours, but eventually made it out. So did her friend, but others were not so lucky.

"I kept my windows rolled up as I sat there and ran the air conditioning, but there were so many ashes inside my car the next day that the dashboard looked like a dustbin," she said.

The fire burned for nearly two weeks and it took Reynolds even longer to see what was left of her home, her motorcycle and several outbuildings on her one-acre property.

"There was nothing but those dreadful ashes," said Reynolds, who moved to Paradise in 1993 and spent her career working as a designer.

"Just one damn metal garbage can survived," she said, chuckling bitterly. The house she lost was 1,750 square feet. Her new home is somewhat smaller at 1,475 square feet. But it is fire resistant and made of Insulated Concrete Form (ICF) blocks. It was rebuilt in the Craftsman style, which she said she adores.

She credits a program called Project Porchlight for helping her navigate the recovery and rebuilding process. Porchlight is a free effort staffed by HUD-certified housing counselors, designed to assist disaster survivors recover financially by providing counseling and resources.

"We help survivors navigate housing repairs, mortgage lender issues, insurance claims or appeals and other related financial challenges," said spokesman Thomas Nitzsche. "Before we stepped in to help Linda, she missed a deadline to receive aid from the federal Small Business Administration."

Reynolds said the Camp Fire left her bewildered. "I was so confused about everything after the fire," she said. "I didn't know what I could afford and what the insurance was going to give me. Project Porchlight gave me hope and the confidence that I could continue. I was living on Social Security and not much more.

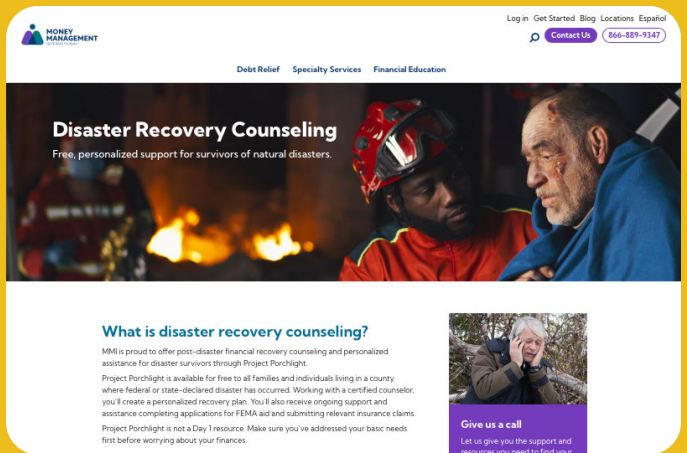
"Eventually I got every penny I was insured for. Other people I knew got scared, gave up and moved away."

She said she was reduced to tears by several insurance agents she dealt with, but eventually found one who was helpful. Her advice to others who are recovering from a natural disaster? "For starters, make sure your insurance is adequate," she said. "And then after fire or earthquake, tornado or whatever, stay on top of things as hard as it may be. I checked in weekly with my insurance company and wouldn't take no for an answer."

Geoff Brown, a senior housing counselor at Porchlight, said "for those that have insurance and are making claims due to a disaster, having things go well with their insurance company is the exception.

"The biggest issue after the wildfires in California, Hawaii, and Colorado is that the payout amounts are not enough to cover the rebuild cost. This can be in part to being under insured, but more common with a disaster impacting thousands of properties all at once, there being a limited supply of architects, contractors, etc. in an area.

We help survivors navigate housing repairs, mortgage lender issues, insurance claims or appeals and other related financial challenges.



Project Porchlight

"So, you have limited supply and high demand, a basic economic recipe for higher costs, which are not factored into the payout equation."

In addition, he said many survivors use funds from their overall insurance payout to rebuild and then must find other ways to replace furniture and personal items.

Then they often turn to retail credit cards, which are less difficult to obtain. Some cards come with attractive introductory rates, such as 0 percent for 12 months, and then balloon to as high as 30 percent. See information from the Consumer Financial Protection Bureau.

Perez also said insurance rules vary widely from state to state. "Standard home insurance and separate hurricane policies generally don't cover flooding, but most policyholders don't read the fine print and find this out the hard way."

Another key factor is that after a disaster, some people are not able to afford the increased premiums or have difficulty finding insurance in the private market

According to a study by Harvard University's Joint Center for Housing Studies, 12 percent of homeowners do not have homeowners insurance.

At the same time, the share of homeowners without a mortgage, which has an insurance requirement, remains above 40 percent. Many people also lack insurance for their home's contents.

As a result, more than two-thirds of states have created Fair Access to Insurance Requirements (FAIR) plans to function as insurers of last resort, said the report, which was authored by Steve Koller.

The total amount of asset value insured by state FAIR plans has eclipsed one trillion dollars, and the number of residential policies in the two largest state programs (Florida and California) has more than doubled since 2018, the review said.

A recent report for the National Conference of State Legislatures (NCSL) said states around the country are struggling with the financial strain caused by the growing frequency and intensity of natural disasters, which tax public resources and challenge the insurance sector's ability to manage escalating risks.

"Legal and regulatory hurdles further increase expenses for insurers, highlighting the need for effective state regulation of property insurance rates," said the report, which was authored by Tom Klein.

Though many states maintain competitive markets, regulations such as rate suppression have been linked to issues with insurance availability and market instability, leading some states to consider reforms, he wrote.

"Some argue that rate suppression, catastrophe backstops and other regulatory measures might disrupt market dynamics, particularly in how private reinsurers and alternative capital markets participate in disaster risk management," he wrote.

In response, insurers and policymakers are advocating for more resilient infrastructure improvements, stricter building codes and expanded risk mitigation initiatives as part of a broader strategy to manage rising disaster risks.

The report also said state policies on land use and insurance design play a crucial role in tackling the growing threat of natural disasters. Approaches that strike a balance between affordability and adequate protection can shape insurance coverage levels and overall market

After a disaster, some people are not able to afford the increased premiums or are having their insurance cancelled outright.

Courtesy of Insurance Institute for Business & Home Safety

Balancing protection, affordability and resilience will remain a central challenge for policymakers and the insurance industry alike.

outcomes. As the risks from natural catastrophes evolve, discussions about disaster preparedness, insurance regulation and resilience are becoming increasingly central to both the insurance industry and state policy.

State Responses

In the past year, Florida has enacted several bills aimed at tackling insurance issues related to hurricanes and natural disasters.

The My Safe Florida Condominium Pilot Program (HB 1029) allows licensed inspectors to assess condominiums for hurricane mitigation improvements and identify potential insurance discounts.

Another bill (HB 1503) changes how surcharges are applied by the Citizens Property Insurance Corp., which provides windstorm and general property coverage for homeowners who could not get insurance elsewhere. The bill also adjusts how the corporation manages its accounts and includes quota share primary insurance in some policies.

In Georgia, new legislation (HB 279) provides insurance premium discounts or rate reductions to property owners who construct new buildings or retrofit existing ones to better withstand tornadoes, hurricanes or other windstorms. The bill encourages safer building practices by offering financial incentives for resilience improvements.

Hawaii has recently focused its efforts on wildfire insurance and risk management. One bill (SR 79) directs the insurance commissioner to coordinate the development of a wildfire insurance compact. Another (SR 160) calls for a comprehensive study on wildfire risk and insurance. The study aims to explore market-based approaches to better address wildfire threats across the state.

Similarly, an Oregon measure (S 82; 2023) requires insurers to send detailed notices to homeowners when canceling or not renewing policies, or increasing premiums on policies, due to wildfire risk. The legislation aims to enhance transparency and inform residents about changes in their insurance related to wildfire threats.

Additionally, some states are exploring the role of utility companies in natural disasters, particularly when inadequate maintenance or outdated infrastructure contributes to catastrophic events.

A California bill (AB 1054; 2019) allows property owners to pursue compensation for damage resulting from natural disasters such as wildfires that are triggered by utility equipment, under the legal principle of inverse condemnation.

As states continue to adapt policies to the evolving risks posed by natural disasters, the NCSL report said the insurance landscape will likely see further shifts in regulation and market strategies. "Balancing protection, affordability and resilience will remain a central challenge for policymakers and the insurance industry alike."

Brian E. Clark is a Wisconsin-based journalist and a former staff writer on the business desk of The San Diego Union-Tribune. He is a contributor to the Los Angeles Times, Chicago Sun-Times, Milwaukee Journal Sentinel, Dallas Morning News and other publications.

The Economy of Hazards

The direct and indirect economic impacts of recovery and resiliency

By Brad Broberg

While not everyone agrees on the cause of a changing climate, the consequences have never felt more real following the recent wildfires in the city of Los Angeles and catastrophic flooding in the North Carolina mountains.

At best the road to recovery will be long, hard and expensive, requiring hundreds of billions of dollars. But some communities battered by extreme weather events might never fully recover.

That's because the damage caused by extreme weather doesn't end when the fires go out and the floods retreat. What remains is a shaky financial foundation that could reshape entire communities. And without resilient planning actions and better land-use decisions, it could be just a matter of time before the full financial burden of disasters is felt in all communities across the country.

Federal Reserve Chairman Jerome Powell recently raised concerns about a tipping point in a Senate Banking hearing.

"Banks and insurance companies are pulling out of some coastal areas and areas where there are a lot of fires," Powell stated. "What that is going to mean is if you fast forward 10 or 15 years, there are going to be regions of the country where you can't get a mortgage."

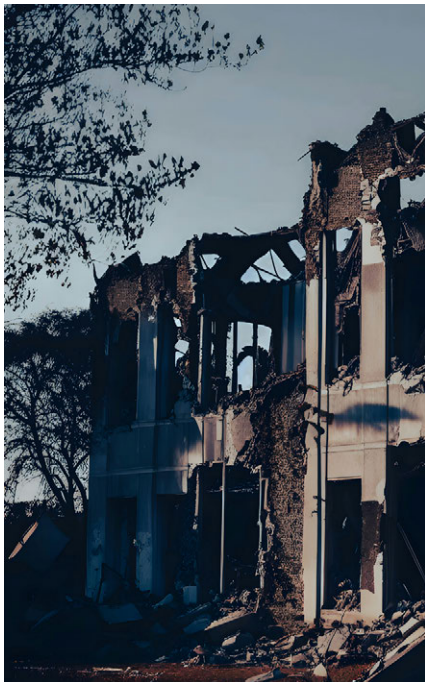
The Hill recently published an article, "Climate change reshapes cities, both environmentally and financially," in which author Sal Elbein examines how a community might arrive at a point of no return.

In what Elbein calls "the anatomy of a death spiral," the retreat of private insurance companies in response to rising climate risk is the first crack in a community's financial foundation.

The escalating losses from extreme weather — both real and anticipated — leave insurers with two choices in high disaster-risk areas: Raise rates or withdraw from the market.

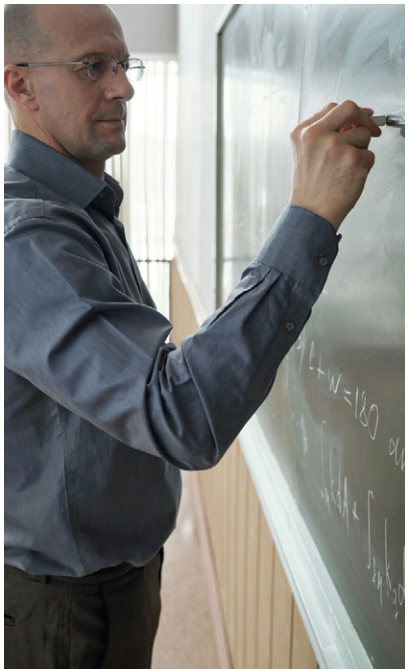
Most homeowners must carry insurance because it is required to obtain a mortgage. If insurance either becomes too expensive or is not available in some areas, mortgage companies may stop lending there.

Some communities battered by extreme weather might never fully recover.



Walterdale Bridge. Photo by Stephen Wong.

Disasters reduce funding for transit improvements, roads and bridges, and essential public services.



If the situation snowballs as lenders stop providing mortgages or people choose to relocate, this could begin to impact property values and an area's tax base. After a disaster, this tenuous situation leaves communities with less money to spend on recovery and essential public services such as schools and public safety.

"This isn't all that complicated," Sen. Sheldon Whitehouse (D-R.I.) stated during a Senate Budget Committee hearing last year. "Climate risk makes things uninsurable. No insurance makes things unmortgageable. No mortgages crashes the property market. Crashed property markets trash the economy."

And the after-effects of a disaster on an already-fragile foundation, don't stop there. When extreme weather events occur, cities and counties need large sums to rebuild roads, bridges and utilities and to become more resilient against future disasters. Municipal bonds are a go-to funding source for those types of projects. However, if tax revenues dwindle, credit rating agencies may downgrade vulnerable municipalities due to the risk of future disasters and doubts about their ability to repay bonds.

And with downgrades, come higher interest rates and increasing borrowing costs, just as communities need the money to rebuild, like what we are seeing in California. After the Los Angles wildfires, S&P Global Ratings downgraded the rating of the LA Water and Power Department by two notches, referring to "the increasing frequency and severity" of wildfires.

"I think we're seeing the beginning of a crack," Alice Hill, a senior director for resilience policy in the Obama administration, told Politico magazine. "We know that with climate change, there'll be bigger and worse disasters that will affect communities' abilities to repay those bonds."

Last year in the United States, there were 27 weather and climate disasters that caused at least $1 billion in damages, trailing only the record-setting 28 events recorded in 2023, according to the National Centers for Environmental Information. Total damages amounted to $92.9 billion in 2023 and $182.7 billion in 2024.

The Los Angeles wildfires threaten to push the 2025 damage toll well past those figures. A report from the UCLA Anderson Forecast estimates that the two largest wildfires — the Palisades and Eaton fires — will be found responsible for $95 billion to $164 billion in property and capital losses once the final bill arrives. The report,

authored by economists Zhiyun Li and William Yu, also predicts a 0.48 percent loss in county-level GDP for 2025, amounting to approximately $4.6 billion.

The devastation offers one small consolation. The fallout from climate disasters exposes a number of shortcomings involving insurance, taxes and development that may finally be addressed.

Insurance rates are an example, according to Austin Perez, senior policy analyst with the National Association of REALTORS®. "Insurance companies set rates based on what they expect to pay out including natural disaster losses to a property so generally, the higher the rate, the higher the risk. However, government policies often cap or keep insurance rates artificially low, disconnecting the risk signal. Although that may sound like good news because lower insurance rates increase the amount people can borrow when applying for a mortgage, suppressing rates hides the true risk of a disaster and the true cost of insurance."

"According to Federal Insurance Office data, some homebuyers are qualifying to live in high-risk areas based on paying 50-80 percent of the true insurance cost," Perez said. "Unfortunately, most don't find this out until after the disaster and their insurance costs have to adjust to reflect the true risk."

Rate caps may keep insurance affordable in the short run, but after claims pour in after a disaster, insurance providers may raise rates if they can or withdraw from the market because they are not allowed to raise rates high enough to cover the true risk and cost.

In the event of a withdrawal by all private carriers, the only alternative for homeowners may be to apply to a state-backed insurer-of-last-resort called a "FAIR" plan that typically costs more and covers less than private insurers.

If rates were allowed to reflect the true risk and cost from the beginning, this would be less of an issue. Insurance providers could continue to make coverage available to those who could afford higher rates while homebuyers could make a more informed decision about where they can actually afford to live.

"Like any other business, insurance companies must cover their costs long term or exit the market," said Perez. "Some insurance companies are in a hole right now and simply can't afford to keep digging."

Escaping the hole won't be easy. First Street, an organization that uses advanced climate science and engineering to evaluate the risk for every property in the country, released a recent National Risk Assessment that estimates that unrestricted risk-based insurance pricing would drive a 29.4 percent increase in average premiums by 2055 — an 18.4 percent correction from current underpricing and an 11 percent increase from growing climate risks.

Compounding the insurance conundrum is the tightening of the reinsurance market. Reinsurance, which basically involves buying insurance for insurance, is a way for insurance companies to offset some of their liability, but reinsurers have upped their prices and stiffened their terms in response to mounting disaster-related losses of their own.

Catastrophe bonds are an emerging alternative that enables insurers and reinsurers to sell short-term bonds to investors. Investors receive high yields but lose their principal if a predefined natural disaster occurs before the bond matures.

One way to cure the insurance headache for good involves some pretty strong medicine: offering federal incentives for communities to move from high-risk areas to safer locations. The buzzword for that is managed retreat. "We already offer incentives in Coastal Barrier Resource Act (CBRA) zones, but eventually, the country may have a broader conversation about where federal assistance should and should not be allowed, but I don't think we're there yet," Perez said.

What should come first is a focus on resiliency to minimize the risks and costs of damage from disasters, a strategy that can address the conflict between the affordability and availability of insurance, Perez said.

Informed homebuyers can make better decisions about where they can actually afford to live.

"Essentially an insurance rate is just the risk and cost of replacing the home," he said. "If you make it less likely for the property to be damaged, and when it is damaged the (loss) is reduced, then the insurance price is going to follow that."

The good news is that making homes and communities more resilient and well prepared has strong bipartisan support from the federal and state governments as well as other authorities. "There are all kinds of programs to empower individuals to harden their homes against disasters," Perez said.

Clearing combustible vegetation from perimeters, installing metal roofs and elevating homes above flood levels are examples of resiliency and preparation strategies that diminish the loss caused by disasters. "Making safe homes affordable should be a national priority," Perez added.

The total payback from investing in resilience and preparedness is impressive. Every $1 spent results in a $13 savings, according to a recent report from the U.S. Chamber of Commerce and Allstate Insurance.

Expanding on an already accepted payback ratio for damage and cleanup costs, "The Economic Benefits of Investing in Climate Resilience" report calculated a payback ratio related to economic losses. It turns out the two ratios are almost identical — a $6/$1 payback related to damage and cleanup and a $7/$1 payback related to the economy in terms of job preservation, income growth and GDP.

The economic benefit ratio is based on models of 25 disaster scenarios ranging from a hurricane in Miami to a tornado in Nashville to a wildfire in Santa Fe. Each scenario compares the total economic cost of future natural disasters both with and without investments in resilience and preparedness.

Those investments could include, protecting critical infrastructure; retrofitting buildings; removing existing hazards; adopting new zoning and building codes; conducting public outreach and education; and installing early warning systems.

In a Nashville example, the report estimates resilience and preparedness investments of $83 million would reduce GDP loss by $683 million, income loss by $464 million, job loss by 5,324, labor force reduction by 1,296 and population loss by 1,498.

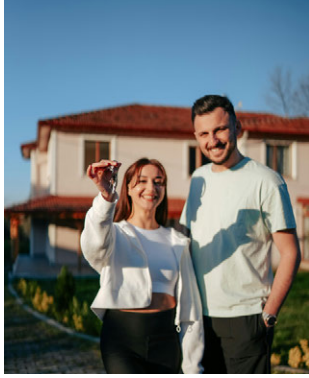
"We know that there are more billion-dollar disasters than ever and we can't just keep looking at the increasing amount of disasters and increasing cost of disasters," said Rob Glenn, vice president global resilience at the U.S. Chamber of Commerce Foundation. "We need to do something about it."

Sometimes that may mean standing your ground, or — getting out. First Street's climate migration projections predict that more than 55 million Americans will voluntarily relocate within the country to areas less vulnerable to climate risks by 2055. The first 5.2 million is estimated to leave this year.

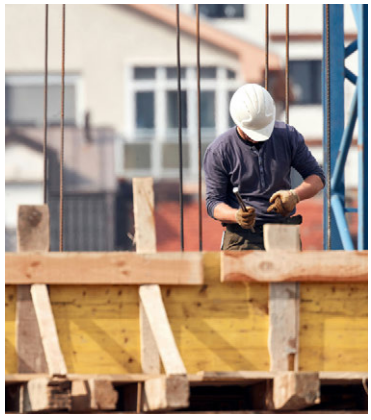
During that same period, First Street estimates that 70,026 neighborhoods (84 percent of all census tracts) may sustain a combined $1.47 trillion in net property value losses stemming from migration and insurance

Courtesy of Insurance Institute for Business & Home Safety

If you make it less likely for the property to be damaged, then the insurance price is going to follow that.



The economy of hazards from extreme-weather events is impacting communities across the nation.



challenges related to climate risk. That will be marginally offset by a subset of "climate-resilient" neighborhoods that stand to gain approximately $244 billion in value.

Choosing between fight and flight is a more complicated decision than it might seem. While it's possible to estimate where disasters are most likely to pose a threat, probabilities are not certainties.

"We're talking about risks and percentages … so this isn't a one-time calculation people have to make. It's an ongoing calculation," said Vanessa Williams, senior fellow at the Brookings Institution. "People are dealing with higher and higher uncertainty."

So are state and local governments. When disaster strikes, their reliance on property taxes for revenue reveals the uncertain nature of that funding source.

One example is the way property taxes reward risky development. Many disaster-prone areas are otherwise very desirable places to live because of the sunny weather, beautiful beaches or nearby wilderness. Since the property values reflect that desirability, cities and counties may allow development in the area because it produces more property tax revenue — until it doesn't.

While a disaster may temporarily depress property values and taxes, many studies find more than a rebound happens. In California, for example, a study of wildfires between 1990 and 2015 found that taxes increased despite the number of homes that were damaged or destroyed. The reason? More properties were sold and assessed at current market values after years of being underassessed due to California's cap on tax hikes.

In places where property values and taxes initially dip after a disaster, municipalities may be able to assist. But that could add to the financial burden already on homeowners due to rising insurance costs.

Gentrification can also be a byproduct of the instability, according to Williams. In one scenario, people choose to move to safer neighborhoods that were not previously viewed as desirable, raising prices and costs for original residents.

In another scenario, people with the means to obtain insurance, make their homes more resilient and pay higher taxes to safeguard the community, choose to move to disaster-prone areas, buying homes at low prices from people who can't afford those costs.

"The risks of these compounding crises are real," Williams said. "It is very serious." The economy of hazards from extreme-weather events is impacting communities across the nation, including direct losses like property damage and indirect losses like business disruptions and long-term economic consequences.

Brad Broberg is a Seattle-based freelance writer specializing in business and development issues. His work appears regularly in the Puget Sound Business Journal and the Seattle Daily Journal of Commerce.

Transportation Resilience

LAYING THE GROUNDWORK FOR A CLEAN GET-AWAY AND A RAPID RECOVERY

By David Goldberg

Wind gusts up to 40 miles per hour were raging on the morning of November 8, 2018, when a transmission line failed in a canyon outside of Paradise, Calif., sparking a devastating wildfire that would burn for two weeks, killing 85, destroying 18,000 structures and laying waste to miles of transportation infrastructure.

"Studies afterward said the Camp Fire burned 80 football fields a minute and traveled 13 miles in a matter of hours," said Marc Mattox, who on that day was — and remains — public works director and town engineer for Paradise. "Embers leapt from canyon to canyon, and we were surrounded by fire on both sides. Our major relief valves are constrained by ridges."

The nature of the town's road network played a large role in the record loss of life in the wildfire, said Barry Long, whose firm, Urban Design Associates, has been assisting the town in planning for recovery and resilience in the face of future threats. "The way the town is laid out, it had a series of ridges and valleys, and all routes out were blocked on the day of the fire," Long said. "They had miles-long, dead-end streets. It's so easy to get trapped on your street if you have only one way in and out.

On the day of the fire, they had a problem with embers landing on cars and people abandoning them and blocking roads … and they had utility poles and trees falling into the streets."

The day before the fire started six years ago, the concept of "transportation resilience" was hardly on the radar, Mattox said. Today, it's nearly all he thinks about. From a transportation standpoint, resilience covers a lot of ground: how we design and maintain specific pieces of infrastructure and the networks they create; laying the groundwork for evacuations before an extreme event while providing for first responder access in the heat of the moment and goods delivery afterward; and planning for the ability to operate transportation systems during a period of recovery. "Everywhere in this country has perils that they face and should be planning for," Mattox said. "I always think planning for transportation resiliency should be top of mind for every community, wildfire prone or not."

Photos above (left and middle) Courtesy of FEMA; photos by Andrea Booher. (Right) Courtesy of USGS; photo by Don Becker.

The trick with designing for resiliency is to balance everyday needs for mobility, accessibility, and safety with features that are useful in the event of a disaster.

"Every place has at least two hazards to consider for transportation resilience," and in most places the threats are rising, said Stephen Wong, a professor at the University of Alberta who leads a collection of researchers in the Resilient and Sustainable Mobility and Evacuation Group (RESUME). States and localities should be planning for natural disasters like wildfires, floods, tsunamis and earthquakes as well as hazards such as train derailments and industrial accidents.

"I think about transportation resilience in three main categories," Wong said. "The first is infrastructure such as highway and transit systems. The key is to think about designing to avoid damage in an event or series of events, and to ensure operability for a long period of time afterward. We are not that good at that, it turns out. When we develop infrastructure projects we focus on efficiency, cost, safety, but rarely on resiliency. In this new normal, that needs to change."

Strong, defensible communities and volunteer empowerment

Wong's next category is evacuation. "Most communities in North America don't have an evacuation plan, and if they do it doesn't talk about the most vulnerable people, and often it is not publicly available. As a result, the public doesn't know what to do."

The third resilience bucket is "community design," Wong said. A key question here is whether people have multiple ways to get around, before, during and after a major event. "Having multimodal options is critical to mitigate some of these hazards.

"In an evacuation in more urban places you might have people without ready access to a vehicle, there might be a lot of tourists and residents who rely on transit. People who have access to vehicles have options that those without don't, and you have to plan for that."

Urban design plays other roles, as well, said Rob Steuteville, director of publications for the Congress for the New Urbanism. Resilience planners often think in terms of "fortifying and defending" a place from wildfire or flooding, walling off a community from potential threats with a fire break or levy wall, for example. "If you have a place that is compact, you can defend it. It becomes very difficult if you have sprawl."

Steuteville pointed to the Louisiana town of Jean Lafitte, south of New Orleans, which adopted a resiliency plan that calls for focusing development and preservation efforts in a town center that can be protected by a "ring levee."

"A compact place is also walkable. That makes for a healthier population, which also helps a community be more resilient," he explained. The trick with designing for resiliency is to balance everyday needs for mobility, accessibility, and safety with features that are useful in the event of a disaster. "Wider streets might help during an evacuation, but if you just make really wide roads, you don't have walkability and it becomes dangerous to kids every day, not just during a natural disaster."

"One thing I've learned from the research is just how much of disaster response is volunteers just showing up and doing what they can do to help people," said Dillon

Fitch-Polse, a professor at the Institute of Transportation Studies at UC Davis. In his research into the role that active, non-car transportation can play in resiliency, he found that while e-bikes might become useless in the event of a prolonged power outage, regular bikes "are a workhorse," because they don't need electricity, are readily available and easily stored, and can haul cargo even when roads are blocked to larger vehicles.

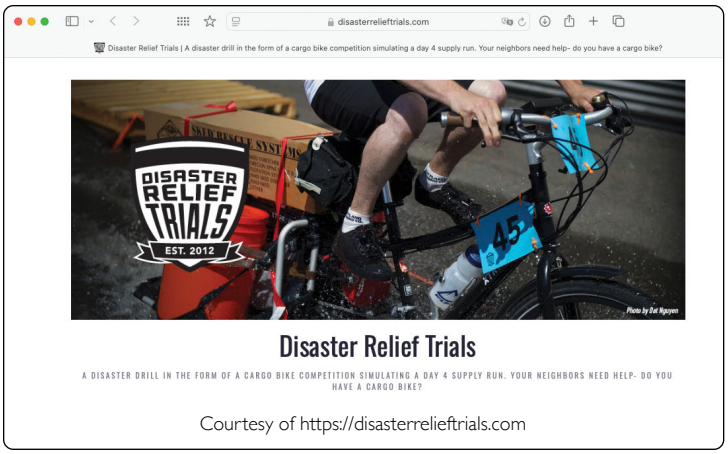
"If we had a plan with trailers stored, and people showed up to volunteer, we could say go get your bike — and then you've created a goods delivery system. There is a lot of planning for getting goods into a recovery area, but not a lot of planning for distributing them. It's a classic logistics problem, but you also have extreme circumstances — blocked roads, fuel supplies shut down," he noted. The concept is demonstrated annually in a roving series of Disaster Relief Trials.

Planning the road(s) to recovery in Paradise

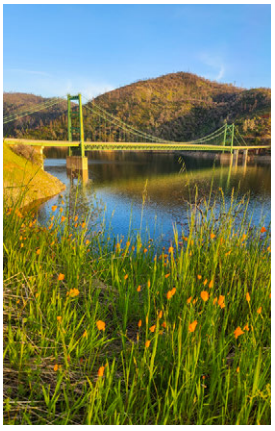
Perhaps unexpectedly, Paradise is incorporating bicycle infrastructure in the transportation master plan that Long helped to create for the town's recovery and future resilience. "The town has adopted a policy to add missing road segments of arterials to complete the grid, and to create a micro-connectivity by linking the long dead-end streets," Long said. "The town didn't have good pedestrian and bike infrastructure before the fire, and what they realized is that if they did have a trail system, it could be used during and after fire for emergency vehicle access. So, they are creating an interconnected path system along the main roads being developed as they rebuild."

"Our community said putting things back like they were isn't good enough," Mattox said. "The transportation master plan was a really important part of the recovery." The plan lays out more than 50 projects to restore and upgrade transportation infrastructure for evacuations and to make the community more resilient to future shocks. As critical, federal and state resources are being made available to get the projects done.

"Right now, we are implementing a three-year capital program of over $400 million in projects. Pre-fire we had a $10-15 million capital improvement program for three years," Mattox said. "A lot of the funds we are using now are really only available after you've been approved as a presidentially declared disaster. The projects we're talking about now could never have been possible absent the fire.



Courtesy of https://disasterrelieftrials.com



Paradise is incorporating bicycle infrastructure in the transportation master plan.

Photos courtesy of Explore Butte County.

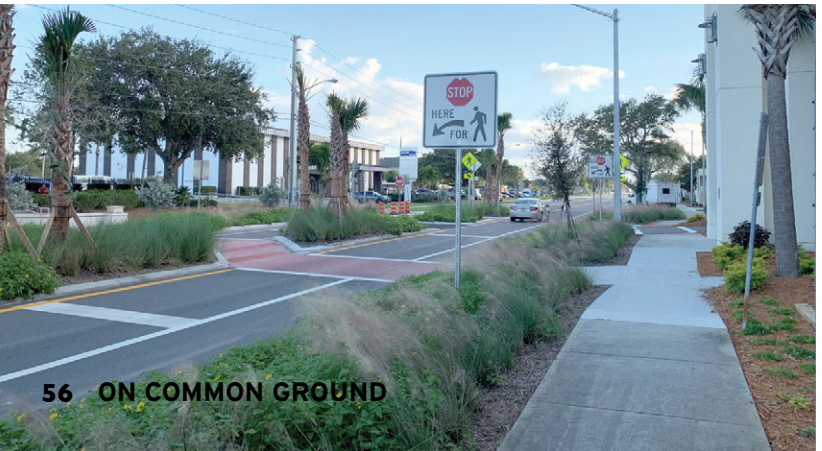
Adding a network of bike-walk trails alongside main roads solves multiple problems.

(Left) Courtesy of Space Coast Transportation Planning Organization.

(Above) A roundabout near the Holmes Regional Medical Center on Hickory Street in Melborne, Fla., is part of the resiliency Space Coast TPO design. In the event of a power outage, the intersection is still able to operate because it does not require a traffic signal.

(Below) Nearly all the parking areas are across the street from the hospital, which makes room for more and adequate bicycle/pedestrian facilities. From a sustainability perspective, the landscape is not just xeric (low-water requirements) and Florida-native, but also specifically selected for the adjacency to the Atlantic Ocean so it will be low maintenance and able to withstand flooding and possible saltwater intrusion.

Photos courtesy of Kittelson & Associates, Inc.; Photos by John Paul (JP) Weesner.



It's a hard reality, because we're talking tens of millions just to connect two streets that never connected before." After the experience of above-ground utility poles burning and crashing onto the roadway, the town is putting all utilities underground, meaning every street has been or will be seeing construction. The electrical utility PG&E — which had culpability in the fire — is paying for a substantial portion of that work.

Adding the network of bike-walk trails alongside the main roads, along with turn lanes, solves several problems at lower cost than merely building bigger roads, Mattox noted. "Using more trails as resilient infrastructure is a great strategy for rural areas. People don't want to live on a freeway, so just adding lanes wasn't the best solution. In times of emergency, the paved trail can become an additional lane to get people out or resources in. We think we're onto something as an affordable approach that people also like and use on a day-to-day basis to get to school and a grocery store."

Planning for transportation resiliency on Florida's Space Coast

Sidling up to the Atlantic Ocean, an hour east of Orlando, is Florida's "Space Coast" in Brevard County, home to the Kennedy Space Center; Cape Canaveral Space Force Station; a key port; Cocoa and other tourist-favored beaches; and a national seashore and wildlife refuge. It also is subject to regular flooding, threats of tropical storms and even wildfire. But the region's 2022 Transportation Resiliency Master Plan actually arose from a jarring look into the crystal ball. A 2016 modeling exercise with NOAA and the U.S. DOT showed that portions of key transportation corridors likely would be inundated by 2040, said Sarah Kraum, senior transportation planner for the Space Coast Transportation Planning Organization (TPO).

"Our board recognized that we are going to see impacts along the way, well before we hit that inundation point," with more frequent flooding from storms, king tides and other events. "We needed to identify the corridors that we need to invest in now." The TPO hired consultants Kittelson & Associates to help create a resiliency master plan and pulled together a 52-member stakeholder committee made up of officials from the 16 cities and towns in the region, from agencies including NASA, Port Canaveral and the Indian River National Estuary.

"We tried to find anyone and everyone with any kind of expertise," Kraum said. "We got everyone together and asked what keeps you up at night?" They began by identifying "shocks" and "stressors."

"Shocks are an immediate event, like a hurricane or earthquake," said Kraum. "A stressor is something like aging infrastructure, sea level rise and flooding that happen more systematically, over time.

"The plan ultimately focuses on the Big 5: fire, flooding, sea level rise, shoreline erosion and storm surge. When we sat down with our consultants, we found there weren't a lot of models for this. There were lots of vulnerability assessments but not that many plans for resiliency."

The fundamental task was to identify the key links in the network that were both most vulnerable and most essential for the community's survival and recovery, said Mary Raulerson of Kittelson, who worked with the TPO on the plan. "It's hard to get communities to prioritize one area as more critical than another. The task force actually resisted that, because how can you say one area of homes is more important?" But a couple of corridors soon rose to the top. State Route 528 leads from Orlando to Port Canaveral and is the conduit for all the Space Coast's fuel, as well as that for Orlando International airport.

"It is the key route in and out of the port; it's critical to space operations, to the Coast Guard and the Navy," said Kraum. "A bridge from Merritt Island to Port Canaveral needs to be replaced, and it needs to be elevated to avoid flooding."

The resulting plan called for designing and prioritizing funding for that segment. The other key corridor is SR 520 leading out to the tourism haven of Cocoa Beach. "After every big storm or king tide, that's where I go to see just how flooded are we," said Kraum. "It's not just important for tourism, it's also a major evacuation route." After prioritizing the route in the plan, the TPO received funding from the Florida Department of Transportation to design for a more resilient corridor.

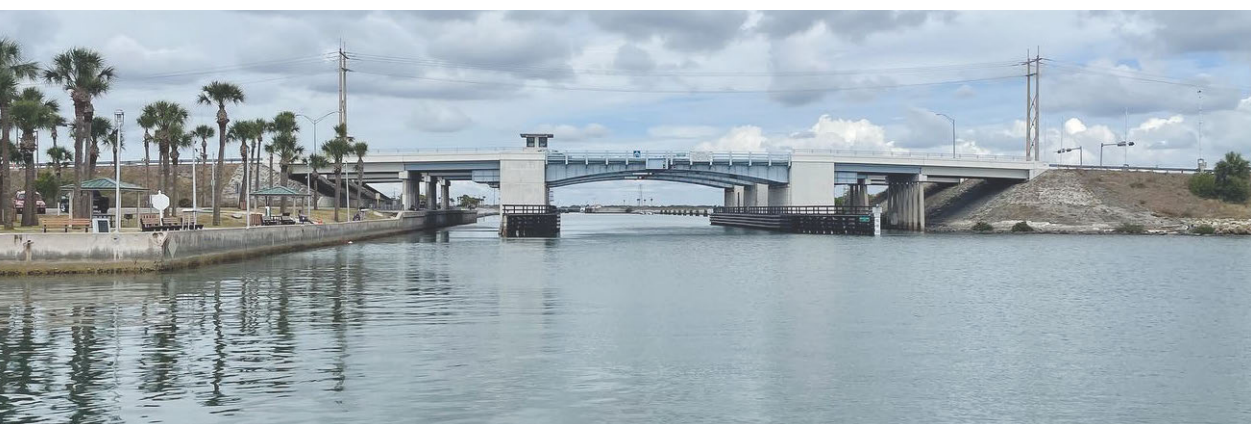
Courtesy of Space Coast Transportation Planning Organization

Change — even to make people safer and more resilient — brings resistance

One of the big resilience moves on those key corridors was to replace traffic signals with roundabouts. "In Florida, where the electricity goes out during every tropical storm and the traffic signals don't work — how do you get around? Something like a roundabout solves a problem and is a resilient solution because you don't need a light. And, they are notably safer. But many residents are leery of the change and some are even opposed," Kraum said. "We haven't had a lot of roundabouts and they have been a tough conversation in the past. But if you lose power they work, and you also remove the [light pole and mounting arm] that can get damaged — and cause damage — in a hurricane. Still, that change makes some people anxious."

The planning effort also brought stark focus to another important realization, said Kraum: "Our community is only as strong as our most vulnerable, and transportation is critical to get to jobs, school, to get to fresh and healthy food and more. We looked at transportation disadvantaged populations and prioritized corridors according to not just shocks and stressors, but also who would be most in need." The Space Coast effort to act ahead of a major disaster, rather than in the wake of one, means the region must make investments for resilience without the cash infusion that would come after an emergency.

"We can sit here and plan and identify issues, but in order to address them, transportation projects will become more complicated and innovative, and expensive. But how do you fund them? In a way, funding is our biggest stressor, the biggest thing that is preventing us from being resilient."



The S.R. 401 bridge serves as a primary access to Cape Canaveral Air Force Station. Photo courtesy of Space Coast Transportation Planning Organization.

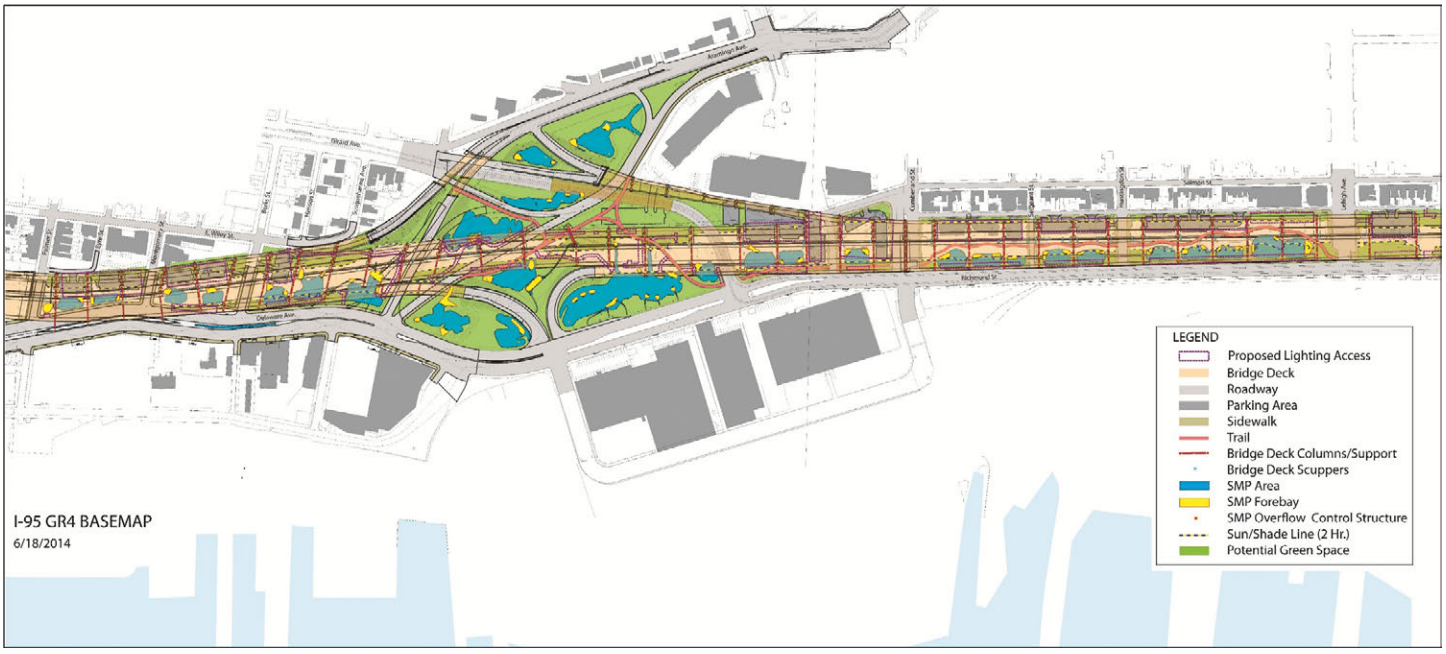
Philadelphia pioneers resilient, green streets — and a greener freeway

Part of institutionalizing resiliency is to ensure that critical facilities are in good repair, and that could mean reconstructing those that are nearing the end of their design life. That was the case for I-95 through central Philadelphia, a mostly elevated, mid-20th century segment that by the early part of the 21st needed a significant overhaul. But rather than merely recreate the asphalt gash that sliced its way through center city, the state, city and neighborhood residents wanted to use the opportunity to make the central city more resilient to flooding from stormwater runoff, treat water naturally and provide more opportunities for healthy activity in the adjoining neighborhood.

At the same time the Pennsylvania Department of Transportation (PennDOT) was considering a rebuild, the city of Philadelphia was developing the concept of "green streets" that use vegetated spaces to capture and clean stormwater, while also making streets safer at the same time. "Most of the time, people want green for beautification, and they don't think about the role it plays in resilience," said JP Weesner, principal landscape architect and urban designer at Kittleson, which consulted to PennDOT on the freeway rebuild. "It's like giving your dog a treat with a pill stuffed in it." Philadelphia has been under a consent decree to better manage stormwater, and projections of more frequent and intense storms are only going to make the challenge worse.

But rather than rely exclusively on giant concrete facilities — or "gray" infrastructure, the city has chosen to lean on green stormwater infrastructure. That approach is critical to resilience, Weesner said. "New Orleans during Katina showed us that the corps of engineers can't solve this problem with that style of engineering. If you have every street, the open spaces, all taking on some of the flooding you handle a lot more." Philly's green streets program is a collaboration among the transportation, water and parks departments to find locations on city streets where rain gardens, vegetated bump-outs and tree trenches can capture runoff, filter it and drain slowly to streams. In what some have termed a "virtuous cycle of green," those same measures can help to slow neighborhood traffic and make streets safer and more comfortable for people walking or biking.

Philadelphia has chosen to lean on green stormwater infrastructure for resilience.



Photos and image courtesy of the PA Department of Transportation

Running along the Delaware River, I-95 in central Philly "has an industrial heritage, and it's elevated over old RR spurs," said Charles Davies, who oversees engineering and design for PENNDOT's Philadelphia region. "But in the last 20-30 years there has been strong residential development, and people wanted access to waterfront. You had this elevated highway that is seen as a visual barrier that breaks the atmosphere of the neighborhood and is not a benign presence."

When it came time to rebuild a section that included the massive Girard Avenue interchange, Davies and company worked with the city and neighborhood stakeholders to develop shared goals for resilient, flood-resistant infrastructure and a more people-friendly design. "We incorporated stormwater ponds to collect and filter water, but designed them as amenities, and used naturalistic landscaping designed for low maintenance," Davies said. "The interchange takes up a lot of space. We were trying to make it into a nicer neighbor, better looking and environmentally benign."

While the highway's elevation creates a visual barrier to the river that residents would prefer wasn't there, it did provide an opportunity to use the area below for rain gardens and runoff-capturing swales.

"We also incorporated a stretch of the East Coast Greenway," a multi-use trail connecting 15 states from Maine to Florida. Such trails offer redundancy in travel options in a given corridor, while helping encourage healthful recreation.

"There was a regulatory requirement, but we wanted to go beyond that," Davies said. "We tried to answer, 'How do you incorporate all that stuff given that this is an elevated highway?' I'm pretty proud of what the team has accomplished." Ten years in the making, construction on the interchange is wrapping up soon.

Courtesy of the PA Department of Transportation

Transportation resilience is gaining traction — but is it fast enough?

In policy, planning and engineering circles, the concept of resilience is slowly gaining a sense of urgency in the face of growing wildfire threats to populated areas, increasing storms and flooding and other expected effects of a changing global climate. Still, Weesner noted, "Places that are really looking at transportation resiliency are few and far between. The concept of resiliency has a short shelf life.

"When there's a flood, a hurricane or a tornado there are questions: 'why aren't we doing something about this?' But the truth is, it's about how we plan the system from the outset."

"We continue to struggle with the fact that when you say resiliency, many people don't know what you're talking about," said Kraum of the Space Coast TPO. "We developed four videos to try to explain what it is and what we're doing." They also held an event dubbed "Ride the Wave to Resiliency" that brought stakeholders and public officials together to talk about what it meant and how it relates to them.

"You don't have to talk about climate change or greenhouse gas emissions. We talk about it in terms of impacts that people have experienced and will feel. Everyone in our community has experienced a hurricane, driven a flooded roadway or gone through a wildfire. These are shocks and stressors people are feeling in their lives. Politicized buzzwords really aren't part of it."

Mattox and Paradise certainly didn't set out to be a cautionary tale, but he hopes other communities will take note and act. "The higher frequency of these movie scale disasters is changing the perspective.

"I lived in a maintenance mode and small capital projects. I never expected to be in this condition. And, this is not unique to Paradise or Lahaina [the Maui community that lost dozens of residents in a 2023 wildfire.] The more common this gets, the more effort and money will be dedicated to resiliency planning and projects. That's the sad truth." ●

David A. Goldberg is a nationally recognized journalist and founding communications director of two national nonprofits, Smart Growth America and Transportation for America. In 2002, Mr. Goldberg was awarded a Loeb Fellowship at Harvard University, where he studied urban policy.

Living on the Water's Edge

EXTREME WEATHER EVENTS EXACERBATE INEQUITY

By Joan Mooney

Many homeowners dream of living at the water's edge — until a catastrophic hurricane like Katrina or Sandy upends their lives. As federal and state government may be less able to help than in the past, it can become a story of haves and have-nots. Those with means can raise their homes on stilts or retreat to their other home if their beach house gets flooded. But those with lower incomes may live in flood-prone areas because that's where they can find affordable housing.

The damage from rising waters will affect more and more people. By 2100, at least 13 million Americans will be displaced by sea level rise, according to projections by the University of Southern California. According to a 2022 analysis, Inequitable patterns of U.S. flood risk in the Anthropoce, Wing, O.E.J., Lehman, W., Bates, P.D., et al, flood risk patterns across the United States are changing rapidly. Within 25 years, average annual flood losses are projected to increase by over 26 percent due to intensifying rainfall, sea level rise, and more severe tropical cyclones. And the risk is not shared equally.

According to the analyses, using Census data, currently, the highest flood risks are borne by poorer, predominantly white communities in rural areas. However, as extreme weather events alter the hazard landscape, Black communities — especially in the Deep South — are expected to see disproportionately greater increases in risk. In addition, without changes in land-use policies and planning practices, population growth and development in flood-prone areas could potentially quadruple flood exposure as compared to extreme weather alone.

The study shows that Federal Emergency Management Authority (FEMA) maps vastly underestimate risk and fail to capture the majority of U.S. flood risk. Nearly 60 percent of national flood damages occur outside officially mapped zones. The report shows that current federal relief and resilience programs often favor wealthier, white communities and advocates for urgent reform in U.S. flood risk management, emphasizing the need for equity-focused adaptation strategies. Targeted investments in risk reduction, relocation, and retrofitting must prioritize the communities most vulnerable now and in the future. Transparent, accessible flood information and current data can guide smarter development and protect vulnerable populations as risks escalate, the study concludes.

Buying and owning a home becomes more complicated when weighing the risks of extreme weather events, location, development patterns and costs. Part of the problem: "Climate risks are not reflected in home prices, so the market is not sending the right signals on risk," said an official at the Lincoln Institute of Land Policy in Cambridge, Mass. "Having climate risks more accurately reflected in property values would start to send the right signal," he said. "You have to be really deliberate and careful."

There are two ways to deal with the overall problem, he said. Either developers can build more affordable housing in areas less vulnerable to extreme weather events, or homes in flood-prone areas can be made more resilient. There's no reason not to pursue both.

Adding resilience to affordable housing

The National Housing Trust (NHT) in Washington, D.C., is working to make affordable housing more energy efficient and resilient to disasters. To reduce the need for carbon-based, nonrenewable resources in those communities, it has installed 13-megawatt solar panels on several properties in D.C, said Eugene Capp, codirector of Energy Solutions at the NHT. The properties pay a reduced power rate for low-income housing. "We started this to make sure the housing itself was sustainable," said Josh Earn, managing director of lending and innovation at the Housing Trust. "Energy is the largest cost."

"The next step is the resilience of the properties themselves," said Earn. In the next year or two, the Housing Trust will install batteries and resilience hubs on several properties. The goal is to ensure that in an emergency such as a power outage, there's enough energy to keep residents' medication refrigerated, charge their electronic devices, power an oxygen system, and cover other essential needs for 72 hours. A resilience hub, which serves an apartment building, takes up an entire room in the basement.

The housing in question is not technically in a "special flood hazard area" on a FEMA map. FEMA only maps along some major rivers and the coast, but properties along the Anacostia River near the city's large reservoir have a flood risk. As an example, most people didn't think of Houston as a flood-prone area until Hurricane Harvey hit, dumping 50 inches of rain in a seven-day period and causing catastrophic flooding to the city and surrounding areas, including areas outside of designated flood zones.

Neighborhood education is part of the process, said Earn. "When we started, there weren't solar panels in the neighborhoods where we were installing them," he said. "We were going into people's homes. There was some skepticism. Then they saw it was successful." What really convinced people was seeing an average $25 monthly reduction on their electric bill.

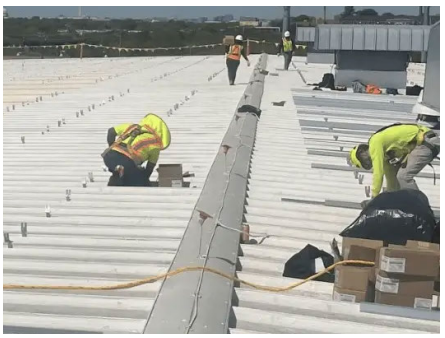
Community resilience hubs in New Orleans

In New Orleans — a city all too familiar with resilience — the group Together New Orleans created the Community Lighthouse Project, a planned network of 85 congregations and community institutions across the city. Each of them will be a resilience hub, providing commercial-grade solar power and backup battery capacity during a power outage or natural disaster. Some churches have installed solar panels on their roof — a money saver in normal times and a potential lifesaver during a power outage.

After Hurricane Francine caused power outages in the city in September 2024, close to 2,300 residents were helped by nine of the initial Community Lighthouse hubs. One older resident was able to charge his oxygen machine at the local church, then return home to sleep, according to an AP report. The hubs can act as locations for FEMA and the Red Cross to distribute food and supplies. The goal is for every city resident to live within a mile of a Lighthouse hub. Eventually, there will be 500 hubs across the state.

Investment in resilience helps property values

Other ways to increase the resilience of neighborhoods on the water's edge, said the Lincoln Institute official, are stricter building codes, sea walls, and green stormwater



NHT in Washington, D.C., is working to make affordable housing more energy efficient and resilient

Courtesy of National Housing Trust

infrastructure. The obstacle is often funding, but even more modest measures like rain gardens and improvements to the stormwater drainage systems can help. "The case we try to make is that these investments have positive impacts on property values, economic growth and people's safety," he said. "It pays to look at it in the long run."

One way to fund these investments, he said, is to look at land value capture, which leverages the anticipated increase in property values to start projects that increase resilience.

The Lincoln Institute has also studied the equity implications of fast and slow relocations. Slow relocations are done by those who can see, for instance, that after five years of flooding, extreme weather is starting to affect their property. They have the means to move somewhere less risky.

Fast relocations happen in a hurry when people's homes — often those in low-income areas — are flooded and residents are forced to evacuate. The nation watched in horror what happened to the Lower Ninth Ward in New Orleans. Many of those residents — who were disproportionately Black — never returned to the city after their homes were destroyed.

Planning for the long view in Louisiana

The Center for Planning Excellence (CPEX), a statewide nonprofit planning group based in Baton Rouge, La., looks at the long term. "In Louisiana, for the longest time, planning was pretty unpopular," said Camille Manning-Broome, the group's executive director. "The tipping point was Katrina and Rita in 2005. Those disasters exposed our vulnerabilities. Our environment is changing, and our development planning is not prepared."

In Louisiana, "we're not resilient because we want to be, but because we have to be," she said "We have severe poverty and poor public health outcomes. A lot of our economy is tied to industries that produce greenhouse gases but that the rest of the nation needs."

CPEX has worked with the state to help the most at-risk communities plan for resiliency. "It was the first time that many of those communities had seen maps that combined sea level rise data with flood data," said Manning-Broome. "We see areas completely under water when we get to 2050. A lot of major sea level rises are going to take place." The process has started those communities talking about planning for their future.

"They already know the level of risk because they're going through death by a thousand cuts," Manning-Broome said. "Most households across our coast have had to let go of insurance because the rates are too high. Then there are also challenges in the fishing industry to our coastal area."

But for many Louisianans, leaving the water's edge is not a serious option. "Most of our economies are about access to water and the type of water," said Manning-Broome. "Whether fishing or sailing, fresh or brackish waters.

"The city is building more resilient infrastructure, especially better stormwater management systems. At the community level, New Orleans has a program for homeowners to replace their driveways with permeable surfaces that will absorb rain instead of causing it to run off."

The biggest challenge, said Manning-Broome, is that no one sees themselves as responsible. "Not the feds, state or local government. It's all left to the individual

(Left) The Community Lighthouse Project is a planned network of 85 congregations and community institutions across the city that will serve as resilience hubs, providing commercial-grade solar power and backup battery capacity during a power outage or natural disaster. Courtesy of Together New Orleans.

(Top photo) As part of the Master Planning process CPEX did in Abbeville, La., they conducted walk audits in each of the city's four districts. They engaged the communities along the routes to look at criteria including safety and walkability. (Above) Photos courtesy of the Center for Planning Excellence.

In Louisiana, most of its economies are about access to the water.

homeowner. We need a more collective frame and understanding of responsibility."

What would a stormwater fee do?

The Water Collaborative, a New Orleans nonprofit, which promotes equitable and sustainable solutions for living and thriving with water, is trying to take a broader view. The group is "centered around the fact that water is a human right," said Joey Algier, narrative strategy and education manager. The group is pushing to add a vote on a stormwater fee to the city's November ballot.

The problem is that currently, only homeowners pay that fee, as a percentage of their property tax, said Algier. Entities with nonprofit status, such as Tulane University and the Superdome, don't pay it. A stormwater fee for everyone would "create an equitable fund that's transparent and accountable to residents," he said. It would help the state create its own source of funding, so it doesn't have to depend on federal money.

"A large part of the opposition is, who gets to control the money," said Algier. "No one is on the side of flooding. The Sewer and Water Board want to create their own stormwater fee. They want to focus it into gray infrastructure," such as sea walls and dams. Green infrastructure includes measures such as bioswales, community gardens and rain gardens, which would cost much less and improve the quality of life in a very hot city."

True cost of flooding

Austin Perez, senior policy analyst for insurance issues at the National Association of REALTORS®, brings it back to insurance and to the long view. "Most people don't believe a flood will happen to them until a big storm like Katrina, Sandy or Harvey," Perez said. "According to FEMA, the flood maps don't reflect the full risk, so consumers shouldn't rely on them to assess a home's flood risk."

The risk of disaster, especially flooding, is simply not being factored into the true cost of homeownership. University of Pennsylvania Wharton Real Estate Professor Benjamin Keys has been studying this for more than a decade. He has concluded in a time of decreasing affordability, the cost of insuring against a catastrophic event can put one more squeeze on homebuyers.

Keys is updating a paper he authored that looks at flood-prone coastal properties and whether sales will slow because of staggering insurance hikes. "A number

of studies suggest that these risks are not the first thing that homebuyers consider. There are a lot of reasons why homeowners are not aware of the risk or do not appreciate the risk. In some states, sellers are not required to state prior flood damage or the flood risk to a property," he said.

Keys said when buyers are calculating their monthly payment, they must look at what insurance will cost a decade from the time of purchase. In the past several years, rates have skyrocketed much more than the rate of inflation. Part of that is because in the past year, there have been 27 disasters that did more than $1 billion in damage, so the insurance industry is reacting to those losses. The National Flood Insurance Program, which provides most of the flood insurance to homeowners, is increasing rates at 18 percent per year to reflect the actual risk of flooding.

While this impacts everyone, it can be devastating to low-income people. When a lender considers a higher insurance premium over the life of the loan, it could keep the would-be buyer from qualifying. Even for longtime homeowners who have paid off their mortgage and seen decent appreciation of their value, spiraling insurance rates may force them to drop coverage they cannot afford.

"These are tough choices for those on a fixed income," Keys said. "We think of homeownership as a way to lock in our costs … It's desirable relative to renting, where a landlord can jack up the rent each year. But now property taxes have gone up in [vulnerable] areas, to fund infrastructure to combat flooding and these areas also have seen a sharp insurance rate increase. A lot of homeowners don't understand flood is not covered by primary insurance, and they don't realize flood maps are drawn in highly political ways and don't account for all types of flood-related risks."

While many want to blame insurance companies for high rates, growth patterns that place people closer to risk, in an environment with many more costly disasters, is a major factor. "We've been moving southward as a country for years now. We've been moving into riskier areas," he said, noting dense development in coastal, warmer areas. "Where we're choosing to build and to live is the biggest driver in the increase in insurance cost."

First Street, an organization that uses more comprehensive climate science and engineering approaches to quantify and communicate the risk for every property in the country, and other tech and science organizations have estimated

The more accurate way for consumers to understand the risks of a property is to get a full-risk quote from the National Flood Insurance Program.

Courtesy of the Center for Planning Excellence

that at least 10 million homes have a high flood risk but are not reflected on FEMA's map or required to buy flood insurance. That helps explain why one third of claims to the NFIP come from outside the special flood hazard area.

"FEMA's maps don't show all flood risks, like heavy rainfall," Perez said. "For example, most of the damage from Hurricane Harvey happened in Houston after it was no longer a hurricane. Harvey dropped 4-5 feet of water in less than a week, causing damage mostly to properties in low-lying areas, not near rivers or oceans."

The more accurate way for consumers to understand the flood risk to a property is to get a flood insurance rate quote from the National Flood Insurance Program, either through a specialized flood insurance agent or through the online rating tool found on floodmsart.gov.

From insurance rates to property values and affordable housing to land use, equity must be a factor in planning for the changing climate. Extreme weather events disproportionately impact vulnerable communities, exacerbating existing inequalities based on race, income, and other factors, leading to a lack of equity and fairness in disaster impacts and responses. Communities are looking to resilient strategies to address the needs of all.

Joan Mooney is a freelance writer in Washington, D.C., who wrote the NATIONAL ASSOCIATION OF REALTORS® Water Infrastructure Toolkit.

REALTORS® Take Action

California Wildfires Relief

REALTORS® reach out to help communities

Severe wildfires impacted several areas within Los Angeles County in Southern California. REALTORS® responded rapidly.

"After burning for 24 days, both fires were fully contained on Jan. 31, with over 37,000 acres burned and more than 16,000 structures destroyed. At least 29 people were killed in the two fires — 17 in the Eaton Fire and 12 in the Palisades Fire, according to the Los Angeles County medical examiner," ABC News reported.

The National Association of REALTORS® (NAR) and California Association of REALTORS® (CAR) were in action before all the flames were extinguished across 45 square miles of the densely populated area.

In late January, NAR's REALTORS® Relief Foundation (RRF) made a $1-million grant available to the CAR to provide disaster relief support to families affected by the wildfires.

"Agents who are REALTORS® deeply understand that in times of crisis, we step up to help our communities remain resilient and united, even in the face of devastation like what we're witnessing in Southern California," RRF President Greg Hrabcak said in statement when the funds were granted. "This grant underscores RRF's dedication to providing assistance during the critical weeks and months following a disaster, and we are committed to helping families stay in their communities and begin to rebuild their lives."

Heather Ozur, president of the CAR and a REALTOR® at the RECollective in Palm Springs, Calif., said the NAR funds were granted to assist with housing relief or displacement for anyone whose home was destroyed or damaged by the fires. The $1,000-per-household grants — for mortgage relief, rental payments, or temporary housing, such as hotel stays due to displacement from their primary residence — were fully disbursed in a month's time.

"With so many homes and businesses lost and a housing crisis that existed long before the fires, REALTORS® recognize the importance of reaching out and helping their communities to recover and rebuild," CAR President Heather Ozur said when the funds were received. "As residents begin the long process of starting over, the REALTOR® community is glad to be able to provide some immediate support in their time of need."

The CAR's REALTOR® Member Grant Program also made $1 million available to REALTORS® and staff members.

REALTORS® are in action, handing out care kits right after LA fires. Photos courtesy of CAR.

The grants within the REALTOR® family, available for up to $10,000 per household for disaster relief, were quickly exhausted in Los Angeles County.

Ozur said while CAR works to leverage more donations and government support, it also is working on several long-term issues. "We are working in the Sacramento Capital with legislators, the governor and the commissioner of insurance to help extend relief. We successfully got a price gouging moratorium extended to July," she said of disaster-related protections against price hikes for hotels, motels and rental housing plus prohibitions on evictions of tenants to relist the rental at a higher rate.

Ozur said CAR continues to play a leadership role in working with local governments to fund relief and rebuilding.

"Wildfires are a huge concern nationally and in California. The question is how do we help with fire hardening in the future? We must find the best ways of mitigating against disaster for residential and commercial buildings," she said, noting that property owners could benefit from government grants to pay for retrofitting against wildfires.

"The wildfires exacerbated an insurance crisis that we already had in California. We need to continue to work with state officials to help alleviate that and ensure that every family can insure their home," Ozur said.

She explained that many families in working- and middle-class parts of Los Angeles County, such as Altadena, may not have enough of an insurance settlement to rebuild. The wildfires took away affordable housing in one of the highest housing cost areas in the nation.

"We need to build more affordable homes. Our lobbying team was just in Washington, D.C., to support the bipartisan More Homes on the Market Act (H.R. 1340) which would raise the capital gains tax exclusion on the sale of a primary residence," she said, noting that more people would sell, increasing housing availability if they didn't face high capital gains taxes. "Zoning needs to allow more homes. We need to revisit constraints that makes


Courtesy of CAR

building so costly, so we can create more affordable and attainable housing."

Ozur again praised the NAR for covering 100 percent of RRF's administrative costs, so every dollar donated goes directly to disaster relief efforts.

"For more than 24 years, the RRF has been a lifeline for communities affected by disasters, providing housing-related assistance. Since 2001, the foundation has distributed more than $43 million in aid, helping more than 25,000 families nationwide," according to an NAR statement released when $1 million was granted to California wildfire relief. "When a major disaster occurs, RRF mobilizes its outreach efforts and turns to NAR members and other constituents for support."

Learn more about RRF at www.rrf.realtor.


Courtesy of CAR

TEN PRINCIPLES FOR BUILDING RESILIENCE

The Urban Land Institute (ULI) helps communities respond to the rebuilding challenges posed by disasters, as well as determine strategies for more resilient land-use and development approaches in advance of disasters.

ULI, a global organization of more than 40,000 real estate and urban development professionals, summarizes its resilience work since Hurricane Sandy in its 2018 Ten Principles for Building Resilience publication.

The report considers the economic, environmental and social factors which contribute to resilience, and how the concept of resilience translates to the private sector, municipal decision-makers, and communities. Ten Principles for Building Resilience equips ULI members, city officials, city leaders and the public to address vulnerabilities and enhance resilience as relevant to their communities, real estate projects and broader civic involvement.

For more information on ULI's Urban Resilience program, please visit https://uli.org/resilience.
The report is available for download at: https://americas.uli.org/ten-principles-building-resilience/