



RESILIENCE STORIES
Celebrating local leadership in North American Communities

by the North American Alliance of Hazards and Disaster Research Institutes (NAAHDRI)



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The **North American Alliance of Hazards and Disasters Research Institutes (NAAHDRI)** is dedicated to bringing together the leaders of hazards and disaster research centers and institutes throughout North America as well as partner individuals and organizations to advance research, education, advocacy, and action.

We are now living in an era where, on average, a disaster occurs somewhere in the world each day. These events destroy built and ecological environments and greatly impact local communities. And although disaster-related deaths have declined substantially in high-income countries over the last century, monetary damage and social disruption from natural and technological hazards have been on a sharp incline. Moreover, the threat of pandemics and other public health emergencies as well as terrorism and other forms of willful human-caused violence remains high globally. Escalating disaster losses demand new, boundary-spanning approaches to science, education, policy, and action.

Hazard mitigation and disaster risk reduction efforts require the commitment of substantial intellectual and financial resources over a long period, which should be guided by constantly improving disaster science with advanced research and a commitment to collaboration with vulnerability-bearers, solution-providers, and each other.

To move toward the goal of reducing hazard losses through evidence-based action, the directors of the hazards and disaster research centers and institutes of North America have allied to advance and marshal disaster research and to inform policy and education. The creation of the North American Alliance of Hazards and Disaster Research Institutes (NAAHDRI) is part of a larger Global Alliance of Disaster Research Institutes (GADRI).

This collection of community-centered risk reduction and resilience success stories illustrates the benefits of investing in people, infrastructure, places, institutions, communities, and their environments. Replicating and scaling similar investments across North America will protect future generations from escalating threats and impacts from natural hazards such as wildfires, hurricanes, heat waves, floods, winter weather, and more.

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[1] BAYOU LAFOURCHE

Louisiana, United States

by Carol Friedland, Louisiana State University

THE CONTEXT

Les Maisons de Bayou Lafourche is an affordable housing solution to the coastal land loss and the increase in extreme weather events along Louisiana's coast.

Located in the Lockport community, along the southeastern coast of Louisiana, the 35 multiplex units were developed as a part of the Louisiana Strategic Adaptations for the Future Environments (LA SAFE). LA SAFE was created by Governor John Bel Edwards in March of 2017 to address communities along the coast facing continuous destruction from hurricanes.

THE APPROACH

These residences are built to the FORTIFIED Multifamily Standard Gold Designation which equips them to withstand high winds and extreme weather. The hurricane bolts and fasteners required by this standard create a continuous load path that redistributes wind to the building's foundation to prevent things like wind uplift.

Recent research from the LSU Agcenter found that components of the FORTIFIED standard like improved roof deck attachments reduced wind loss for homes by at least 19% up to 38%. Additionally, roof to wall connections reduced loss by at least 68% and up to 80%.

In 2018, community meetings hosted by the Louisiana Office of Community Development, The Foundation for Louisiana and LA SAFE officials met with community members from parishes impacted by Hurricane Isaac in

2012. These meetings allowed residents to discuss community needs, and LaFourche Parish residents cited a need for affordable yet durable housing in the northern part of the parish.

THE OUTCOME

Construction on Les Maison began in August 2020. When Hurricane Ida, a category 4 hurricane, made landfall a year later the development was 90% completed. Homes and businesses in nearby communities like Houma, Bayou Cane and Thibideaux were severely damaged by the storm.

Despite being only 50 miles away from where the storm made landfall, the Les Maisons homes and multiplexes were relatively unscathed during the storm, and construction resumed quickly to complete the project. In fact, the first residents were able to move into the community only a month after the storm made landfall.

A WORD FROM THE COMMUNITY

“Les Maisons de Bayou Lafourche showcases the perfect blend of affordable housing and resilient construction critically needed in south Louisiana,” OCD Executive Director Pat Forbes said. “Lafourche Parish is frequently threatened by increasingly intense storms, most recently hurricanes Delta, Zeta and Ida. Using National Disaster Resilience funds to build this community will help Lockport secure a future for its residents that is safer, stronger and smarter.”

In addition to wind resilience, all homes are built 3 feet above the base flood elevation to prevent flood damage. Research from the LSU AgCenter found that elevating a home with 2 feet of freeboard reduces flood risk by 90% with an additional foot reducing risk by an additional 9%.

Similar communities in Florida that remained relatively unscathed during Hurricane Ian in 2022 demonstrate how prioritizing resilience benefits communities. As the environment along the coast continuously changes, successful mitigation techniques used in Les Maisons provide a path forward for more communities to be better equipped to face dangerous hurricanes.



[2] CALGARY Alberta, Canada

by Paul Kovacs, Institute for Catastrophic Loss, Western University

THE CONTEXT

Calgary residents experienced unprecedented damage from a severe thunderstorm on June 13, 2020. The City responded with an award winning education and risk reduction program. Three innovative elements of the response focused on:

- building public awareness of the risk of loss and damage protection best practices;
- \$3,000 rebate for homeowners that installed an impact resistant roof; and,
- development of regulations that may require protective measures in new construction.

Hailstones form in strong thunderstorms. Hail is most common in storms with intense updrafts, high liquid water content, great vertical extent, and where much of the cloud layer is below freezing. Hailstones can result in damage to structures, vehicles, and crops. Extreme events can cause extensive destruction of property, injury, and loss of life.

Hail occurs most frequently within continental interiors, typically along mountain ranges that intensify updrafts. The most destructive storms in Canada have been in 'hailstorm alley' that includes the Calgary area. Hailstorms have resulted in extensive loss and damage in many countries including Canada, United States, China, India, Germany, France, and Australia. Events with direct damage in excess of a billion dollars have been experienced in Calgary, Denver, Dallas, St Louis, Phoenix, Munich, Sydney, and Brisbane.

An intense thunderstorm struck Calgary on June 13, 2020. Insurance companies paid more than \$1 billion in damage claims to repair 31,000 vehicles, 30,000 homes, and 1,400 businesses. Overall direct damage was between \$1.5 and \$2.0 billion, as some losses were not covered by insurance and some were not measured, including destruction of crops.

Thunderstorms occur frequently in the Calgary area, nevertheless, it was evident in 2020 that the citizens were unprepared. Damage to building roofs would have been significantly reduced if the structures had impact resistant roofs. Damage to vehicles would have been prevented if they were sheltered during the storm. Extensive, and largely preventable destruction of property made it evident that public awareness of the risk, knowledge of risk reduction best practices, and incentives to encourage actions are urgently needed.

THE APPROACH

Following the immediate response to the storm, the Mayor and members of Calgary Council directed City staff to develop a comprehensive education and risk reduction program. The program was designed to address the three pillars of Calgary's strategy to mitigate the impact of flooding and severe weather events – education, incentives, and regulations.

Calgary allocated \$175,000 for a public education program. The City established a website to provide residents with information about the risk of damage from hail and best practices for risk reduction. The City hosted webinars to communicate directly with citizens. Partnerships were established with roofers, the insurance industry, and academia to communicate consistent risk reduction information. This included introduction of the Institute for Catastrophic Loss Reduction's HailSmart™ program with messaging focused on the benefits of installing impact resilient roofs and sheltering vehicles.

Calgary also allocated \$5.25 million to establish a \$3,000 rebate for 1,600 homes that experienced hail damage. The rebate was available to homeowners that installed a class 4 impact resistant roof. The objective was to cover the estimated additional cost of installing an impact resistant roof relative to the standard asphalt roofing installed on most homes in the City.

In addition, Calgary established and is leading a multistakeholder discussion exploring how the provincial building code may be revised to reduce the risk of hail damage. The focus is on residential construction in zones with higher risk. Discussion expanded to include those involved in development of the national model building code.

THE OUTCOME

The program received overwhelming enthusiasm from citizens. More than 1,500 visited the new website. More than 150 attended each webinar hosted by the City. A joint radio campaign was successful in reaching homeowners across the community. The number of rebates awarded in the first year was more than double the program target. More than 1,600 homeowners were provided with rebates and over 1,500 additional applications, requesting about \$5 million, were not reviewed when it was evident that funding would be exhausted. Discussion about change in the building code is ongoing.

Calgary was awarded the Resilience in Recovery Award by the Institute for Catastrophic Loss Reduction for the successful implementation of the program. The City was the first community in Canada to provide a comprehensive severe weather risk reduction program that addressed education, financial incentives, and regulations. Leadership by the community also contributed to a healthy dialogue about severe weather risk reduction best practices involving roofers, insurance companies, and academia.

A WORD FROM THE COMMUNITY

Jyoti Gondek, Mayor of Calgary, said "We know that climate change will increase the frequency and severity of many storms that we will see. Damage to buildings and public infrastructure will continue to increase if we don't build climate resilience into our plans right now." She added, "The rebate program was one method that we took. It was an action to futureproof our community. This program was a win-win for Calgarians and the environment as we switch to building materials that can withstand more extreme weather events." Stuart Dalgliesh, the City's manager of planning and development service, said "The program was successful in its goals of education about resistant roofing and assisting homeowners in getting better roofs. The City is proud to demonstrate leadership to advance climate resilience. Other communities should consider actions to promote climate resilience through education, incentives, and regulations. Moreover, we hope our success with this program will encourage the federal government, provincial government, and private industry to actively champion climate resilience."

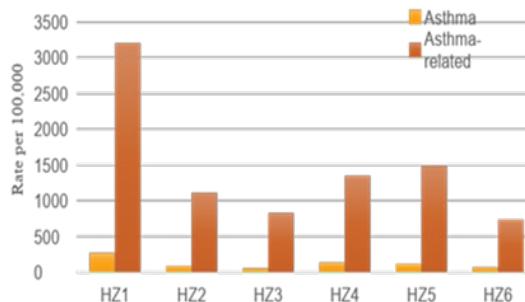
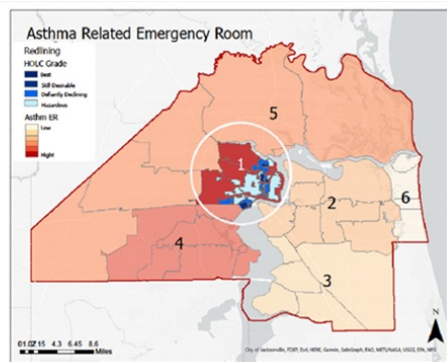


[3] JACKSONVILLE
 Florida, United States

by the Spatial Justice Collective, University of Florida

THE CONTEXT

Many residents of Jacksonville, Florida, live with the outcomes of a legacy of discrimination in public policies based on race, community representation, and voting rights. The impact of these policies continues to be systemic social - and spatial - injustice for racialized communities. For instance, people living in Health Zone 1 (HZ1) experience higher rates of poverty and health conditions in comparison to other areas in Duval County. Notably, Jacksonville ranks 6th in US cities for asthma-related ER visits, with non-Hispanic Black patients being five times more likely to seek emergency care than non-Hispanic white patients. The Jacksonville rate is largely driven by the realities of people living in HZ1.



The housing stock in HZ1 has widespread aging heating/cooling systems, outdated electrical wiring, and deficient plumbing, and occupants often live with exposure to asbestos and lead. Many buildings need to be renovated or replaced to improve the health and safety of residents, but most people are not in a position to bear these costs individually. This is especially true for low-income tenants. Residents are left to face not only disparate health outcomes, but also the risk of displacement as the city redevelops certain areas. In response, community members are collaborating to combat gentrification by taking action to improve the wellbeing of their neighbors.

THE TRIGGER

Overburdened and racialized populations in the United States suffer disproportionately from systemic illnesses, particularly respiratory diseases, caused by substandard housing, poverty, and ambient air pollution. Historical factors such as decades of underinvestment, housing discrimination based on race, and unjust development policies, such as redlining and the Federal Aid Highway Act, have restricted their ability to accumulate wealth through homeownership. Additionally, many racialized communities have been situated near Superfund sites (EPA designated hazardous sites) and small waste generators, resulting in exposure to unsanitary and hazardous environments. Both outside and inside their homes, these communities face higher levels of air-borne pollutants than the general population, contributing to high asthma rates and low birth weight among minority groups. The prevalence of asthma is higher in marginalized communities because of poor housing conditions that contribute to hazardous environments that include pollutants like PM 2.5, ozone, carbon monoxide, nitrogen and sulfur oxides.

THE APPROACH

A coalition of community partners with a track record of action and advocacy in both HZ1 neighborhoods, and in housing and health, has been supported by Edward Waters University and the University of Florida since 2021. This community-led group has been undertaking research, action and policy impact into housing quality and respiratory health since 2021. Using guiding principles of Participatory Action Research (PAR), the coalition undertakes phases of diagnosis, action, observation, and reflection. The data collection for this project includes co-developed interviews, surveys, and indoor air quality measurements via sensors. The community has generated data about ventilation systems, mold, pest infestations, filter efficiency, windows, floors, and general air quality conditions. Residents are also hosting air quality sensors in their homes, enabling an indoor environment dataset to be compiled.

THE OUTCOME

The work is gaining traction in the community with regular service opportunities for coalition partners, building awareness and trust with each other - and importantly with residents of 32209 - and achieving visible change



on the ground. Through the work of the Youth Action Series, youth leaders are increasing the awareness of the importance of healthy housing for present and future generations. These youth leaders will continue their strides in building alternative “just” futures. The fact that the study is being directed by the community is proving to be a strong driver of change. Each PAR cycle enables stakeholders (residents, property owners, and local leaders) to understand current problems and develop collective solutions. The efforts of the project culminated in a Youth Health Summit, titled The Blueprint: Youth for Change Summit, in March '24, a community mural featuring local histories that was recently unveiled, and a podcast series (upcoming on Disasters: Deconstructed). The next PAR cycle features air filtration systems (Corsi-Rosenthal Boxes) built by juvenile-justice connected youth as part of restorative justice work led by the Center for Children’s Rights (CCR).

A coalition has emerged with local vision and passion to fight for affordable and healthy housing in 32209, and the Spatial Justice Collective was privileged to support these efforts. It is beautiful to see neighbors working together towards lasting change in the places they love. Partners from around the state are joining this community in their fight and helping on the ground with everyday issues, as well as leveraging their own institutional and personal privileges to promote policy interventions. The Jacksonville project is becoming a model for cities that share similar health disparities and social/spatial injustices. This pilot program in 32209 is already acting as a seed for other neighborhoods to grow their own action-oriented initiatives.

A WORD FROM THE COMMUNITY

Residents of HZ1 have shared many of the same things with us about their housing and health situations; experiencing extreme heat, poor provision of city infrastructure and services, lack of greenspaces, difficulty accessing healthcare, and respiratory health issues. PAR core group member Abdul-Hai Thomas (CCR) spoke to the youth-powered efforts to be a part of meaningful change, saying that the coalition aimed to “unite and do work together and really focus on doing something that we can visibly see, something that is tangible, something that is immediate.” This idea is core to the broader 32209 Community Revitalization Project. If people are healthier, more connected to each other, and proud of their neighborhood, a place is more difficult to gentrify. The air quality sensors give real-time data about indoor air quality, helping residents understand the problems they are facing so that collective solutions can emerge - such as the youth-built filtration systems that have already been pilot tested to show significant air quality improvements. The PAR process is rooted in hope for communities facing systemic injustices, enabling them to claim their power and create the futures they aspire to live and grow in. Projects like this one have to start with active listening. With collective intention, real and positive change has been and can continue to take place.



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