

Relocation and Other Climate Adaptations on Florida's Gulf Coast

Proceedings of a Workshop—in Brief

INTRODUCTION

Strategically moving communities and infrastructure—including homes and businesses—away from environmentally high-risk areas, such as vulnerable coastal regions, has been referred to as “managed retreat.” Of all the ways humans respond to climate-related hazards, managed retreat has been one of the most controversial due to the difficulty inherent in identifying when, to where, by whom, and the processes by which such movement should take place.

To understand and respond to the unique challenges associated with managed retreat, the Gulf Research Program (GRP)¹ of the National Academies of Sciences, Engineering, and Medicine sponsored a committee of experts to provide in-depth analysis and identify short- and long-term next steps for Gulf Coast communities that may need to relocate.

The committee convened a series of three public workshops in the Gulf Coast region to gather information

on policy and practice considerations, research and data needs, and community engagement strategies. The workshops focused on elevating the voices of communities and individuals contemplating, resisting, undertaking, or facing barriers to relocation (including systemic issues such as structural racism), as well as individuals who have resettled and communities that have received such individuals. Each workshop included community testimonials and panels of local decision makers and experts discussing study-relevant processes and obstacles faced by communities. The first workshop was held in two parts in Houston and Port Arthur, Texas; the second workshop was held in St. Petersburg, Florida; and the third workshop was held in two parts in Thibodaux and Houma, Louisiana. This Proceedings of a Workshop—in Brief recounts the second workshop.²

PURPOSE OF THE WORKSHOP

On July 12, 2022, a hybrid workshop was held in St. Petersburg, Florida³ that was designed to accomplish the following goals:

¹ The GRP was established in 2013 from criminal settlement funds from the Deepwater Horizon oil spill and is intended to “advance and apply science, engineering, and public health knowledge to reduce risks from offshore oil spills and will enable the communities of the Gulf to better anticipate, mitigate, and recover from future disasters.” More information on the GRP is available at: <https://www.nationalacademies.org/gulf/about>

² Additional details about this consensus study, the study’s Statement of Task, and the workshops are available at: <https://www.nationalacademies.org/our-work/managed-retreat-in-the-us-gulf-coast-region>

³ A video recording of the workshop is available at: <https://www.nationalacademies.org/event/07-12-2022/managed-retreat-in-the-us-gulf-coast-region-workshop-2>

- Create an opportunity for the committee to hear from—and ask questions of—Florida Gulf Coast residents about their experiences with wanting to relocate, trying to relocate, or being unable to relocate, or why they are not thinking about relocating;
- Create an opportunity for the committee to hear from and ask questions of Florida Gulf Coast local experts about conditions that make collective relocation difficult (including such factors as affordable housing, insurance, residents not wanting to move, and historic and ongoing societal inequities); and
- Facilitate conversations among workshop participants, with the goals of helping to generate mutual understanding but also identifying potential pathways forward.

WORKSHOP WELCOME AND INTRODUCTION

Study co-directors Chandra L. Middleton and John Ben Soileau, and Tracie Sempier, the committee co-chair, opened the workshop by providing background information about the study. Sempier's opening comments touched upon compound disasters⁴ that profoundly affect the Gulf region and are "built into the fabric of life." Daniel Burger, GRP Senior Program Manager, stated that the shared perspectives drawn from the lived experience of community members and reflected in the workshop would help the GRP better understand the desires of these communities and better address the challenges they encounter in the face of increasing coastal hazards.

COMMUNITY TESTIMONIALS AND CONVERSATION: OPPORTUNITIES AND CHALLENGES OF ADDRESSING CLIMATE ADAPTATION

To frame the workshop around community voices, concerns, and experiences, the day began with a conversation with community members facilitated by Betty Jean-Jeremie, climate equity program manager, and Joseph Ayala, associate program manager, of the CLEO Institute. Participants shared their experiences with environmental hazards in Florida and potential

displacement faced by their neighborhoods, but also their views on how to address inequality and the lack of affordable housing and transportation in the context of relocation. They also discussed opportunities and challenges of considering and undertaking relocation in response to climate change and other environmental hazards. Participants included the following people:

- Alejandro Brito is a Spanish-speaking resident who lives in Sarasota. Due to an increase in living expenses, his daughter and son-in-law moved into the property he was renting. They struggled to find a new place to rent together when the owner sold the property.
- Antwaun Wells, a resident of St. Petersburg, created a nonprofit called Community Resources and Solutions, designed to help residents access community resources. He is also involved with Deuces Live, a nonprofit organization created to revive and revitalize the historic 22nd Street neighborhood.
- Chelsea Nelson, a native Floridian and current Madeira Beach resident, resides with her husband and daughter. They have experienced flooding from extreme weather events and high tide "sunny day flooding."
- Eliseo Santana, a resident of Pinellas County since 1980, is a community leader and advocate. He is also the self-described patriarch of a large family with four grown children and 13 grandchildren, as well as numerous nieces and nephews, who all live in the area, so his "decisions and actions influence a huge amount of other people."
- Florence Wright is a resident of Tampa who recently retired from the school board.
- Getulio Gonzalez-Mulattieri is a veteran, community organizer, and advocate for Chispa Florida, a Latinx climate justice group in the Tampa Bay region that advocates on behalf of frontline communities by sharing the stories of environmental disparities experienced by those communities.
- Marilena Santana, a registered nurse in the Tampa Bay area, is a single mother of four struggling to afford to live in Pinellas County. She works with the

⁴ A compound disaster is a situation in which "there is a single triggering hazardous event resulting in large-scale impacts to lives and livelihoods, which in turn generate secondary or tertiary 'events.'" Cutter, S.L. (2018). Compound, cascading, or complex disasters: What's in a name? *Environment: Science and Policy for Sustainable Development*, 60(6), 16–25.

League of United Latin American Citizens, a Hispanic and Latino civil rights organization in Tampa Bay, as a liaison for healthcare-related concerns in the community.

- Trevor Tatum, a resident of the Seminole Heights neighborhood in Tampa, does pest control and is concerned about environmental issues.

The session started with participants discussing their community priorities and basic needs and concluded with a summary by Sempier. Many participants' comments were associated with issues of affordability and financial instability, as Sempier noted in her summary of the panel discussion. Specific challenges noted by the session participants included food insecurity, accessing childcare while working multiple jobs, accessing quality insurance or healthcare, multi-generational families living together in less-than-desirable living situations, under-maintained housing, and the use of subpar construction materials for home repairs. Additionally, many participants talked about finance-related physical and mental health impacts. Examples included personal fear, nervousness, increased stress associated with the challenges of everyday living, and different types of trauma that often go untreated—such as individuals staying in unstable relationships due to financial hardship. In her summary, Sempier emphasized that these challenges are important because many people cannot focus beyond their basic needs to think about advocating for their community or what they might do in a future disaster if they are living paycheck to paycheck.

Most panel participants also talked about environmental health impacts in their communities, such as air quality and how it contributes to sickness and illness among residents—which Santana said she has seen firsthand in the emergency room—and how it can lead people along a pathway to more vulnerabilities. Wells recounted a slogan for an air quality campaign in south St. Petersburg: “if you smell something, say something.” Sempier noted this was an easy, catchy motto intended to help people identify and begin to address risks associated with fires, gas leaks, or chemical odors.

A set of compounding factors affects where some participants can afford to live, where they end up living, and where they feel they will be able to live in the future. Gonzalez-Mulattieri noted that climate change exacerbates all these factors. Some participants described wrestling with decisions about whether to stay or leave in the context of everyday economic challenges. Most participants expressed a preference to stay where they are. The main reason cited was the role of community and family support networks and connections. Fear of the unknown, a lack of safe and affordable alternative housing, access to resources to afford relocation, and job opportunities in the receiving community were some of the obstacles to relocation noted by a few participants. Several participants also expressed concern about the economic impacts of gentrification, which can affect the entire community by raising the median home value. Gonzalez-Mulattieri noted that residents feel “a sense of pressure” to leave. Sempier highlighted participants' comments that their sense of place is being taken away from them and that their cultural identity is being erased.

Sempier further commented on the layers of complexity revealed by participants' remarks, pointing particularly to discussion of the limited transportation options currently available. Many participants pointed out the negative impacts associated with a lack of good quality, reliable public transportation. For example, the bus lines do not operate on Sundays, when many people who rely on public transportation need to travel to work. Many participants addressed other infrastructural challenges as well, such as making homes more energy efficient and complying with flood-related regulations. Nelson suggested instituting policies that would allow compliance in ways that are not punitive because it is difficult for many lower-income residents to comply with current regulations.

Another topic brought up by several participants was “distrust”—including distrust of government and elected officials, as well as distrust that the weather forecast received would be accurate. Nelson mentioned the flooding in her community during 2020's Tropical Storm Eta which resulted in 75 water rescues in the

middle of the night. She noted that no warnings were provided beforehand for residents, the roads were flooded and impassable by the time sandbags were offered. Nelson stated “[t]here is a real disconnect sometimes with what is being said with what is happening.” Tatum emphasized focusing on “what is best for all and not just one group.” A few participants suggested that communities need to come together well in advance of any disaster to build connections and trust through continuous, two-way communication. In addition, several participants suggested establishing a centralized repository for information and communicating early, often, and systematically on all platforms and in multiple languages.

PLANNING FOR AFFORDABLE HOUSING AS CLIMATE ADAPTATION

In the next panel, committee member Gavin P. Smith asked panelists to discuss challenges associated with relocation and resettlement as well as other challenges for communities.

Dayna Lazarus, a housing technical advisor for the Florida Housing Coalition, began by explaining that “managed retreat” can be thought of or experienced by community members as forced relocation, displacement, gentrification, immigration, or forced migration. She also noted, however, that relocation can mean an opportunity for people to move away from places where repeated hazards occur to safer places. Relocation is happening and will continue to happen, Lazarus emphasized, so decision makers should strive for the best possible outcomes for the people that relocate and those who stay.

Lazarus touched on equity planning, which she defined as an ideological framework in urban planning that theorizes that all planning efforts should focus on social equity. She called for utilizing equitable community engagement practices before, during, and after relocation efforts, and for putting a significant amount of thought into the procedural justice element,⁵ including public engagement and empowerment. She explained, “when

we listen to people and empower them to lead, they often hold the key to the solutions and positive outcomes that we seek.”

Lazarus emphasized the importance of taking actions to operationalize community engagement, such as including members of underserved communities as leaders in planning efforts and utilizing qualitative data collection and analysis. Often qualitative, on-the-ground stories “paint a totally different picture than the numbers.” She also noted that collecting demographic information and information related to social vulnerability is key for equitable engagement outcomes. Her last point was a suggestion to collect qualitative data (e.g., on-the-ground stories) after plans have been implemented to learn lessons for future action.

Eugene Henry with ISO/Verisk, Community Hazard Mitigation talked about engaging communities with incremental and sudden responses to climate change. He commented, “if we can recognize what we have—the community values, our standard of living and interactions, the design and vitality of businesses, the environment, and the interconnectivity,” then it is possible to know not only which communities and structures are sustainable and which are vulnerable, but also how to minimize threats to people, property, and the environment. Henry spoke about instituting mitigation and resilience planning as a community tool through the establishment and achievement of four objectives, which he identified in his presentation as follows: (1) understand priority redevelopment areas; (2) assist communities and businesses in understanding risks, vulnerabilities, and resilience; (3) incorporate higher design standards into construction, development, and redevelopment, which will require increased understanding of political opportunities; and (4) incorporate mitigation with public assets (e.g., human needs, social services, and infrastructure)⁶ and identify long- and short-term financial obstacles and opportunities.

⁵ Procedural justice refers to “the idea of fair processes, and how people’s perception of fairness is strongly impacted by the quality of their experiences and not only the end result of these experiences.” The Justice Collaboratory. (n.d.). Procedural justice definition. <https://law.yale.edu/justice-collaboratory/procedural-justice>

⁶ Public assets are “any property owned by a public body[,] tangible and intangible, including but not limited to physical property, land, shares or proprietary rights.” Law Insider. (n.d.). Public asset definition. <https://www.lawinsider.com/dictionary/public-asset#:~:text=1Sample%202-,public%20asset%20means%20any%20property%2C%20tangible%20or%20intangible%2C%20owned%20by,Sample%201Sample%202>

Jerry Murphy, a faculty consultant for the Program for Resource Efficient Communities in the Institute of Food and Agricultural Sciences Extension Service at the University of Florida, spoke about working with local government to amend comprehensive plans to address the effects of sea level rise (i.e., the “Peril of Flood” compliance requirements)⁷ and responding to statewide statutorily-compliant comprehensive vulnerability assessments. He said it is important to note that the Social Vulnerability Index⁸ is averaged over the entire census tract, hiding pockets of vulnerability and areas in need of focused adaptation action. Therefore, he pointed out, local knowledge about social vulnerability is essential. Murphy stressed that decision makers should provide innovative opportunities and options for geographic migration, while recognizing that underserved populations often occupy areas at risk of flooding. Murphy concluded by noting that new policies and strategies for all infrastructure and housing—affordable or otherwise—are needed for high flood risk areas.

Hilary L. Bruno, the assistant director for Community Development in Pasco County, talked about the Voluntary Homeowner Occupied Buyout Program of the Elfers Parkway Area created due to flooding from Hurricane Hermine in 2016. The sum of \$2,555,858 was awarded to Pasco County to reestablish a floodplain as a passive park,⁹ with the aim of eliminating repetitive loss¹⁰ along

⁷ The “Peril of Flood” law was passed by the Florida Legislature and took effect on July 1, 2015. The law requires that local governments with a Coastal Management Element in their comprehensive plan pursue and encourage development practices that reduce flood risk for the built environment in coastal areas. Lenczewski, B. (2019). Comprehensive planning for the peril of flood. <https://floridadep.gov/sites/default/files/Barbara-Lenczewski-Comprehensive-Planning-for-the-Peril-of-Flood.pdf>

⁸ The Centers for Disease Control and Prevention (CDC) Social Vulnerability Index represents a combination of 15 social factors (e.g., vehicle access and household crowding) from U.S. Census Data and is calculated for each census tract. Geospatial Research Analysis and Services Program (GRASP). (2021). CDC social vulnerability index (SVI): A tool to identify socially vulnerable communities. https://www.atsdr.cdc.gov/placeandhealth/svi/fact_sheet/fact_sheet.html

⁹ A passive park can be defined as “an undeveloped space or environmentally sensitive area that requires minimal development.” This area may be used for passive recreational activities that “place minimal stress on a site’s resources” and “do not require prepared facilities”; however, “the quality of the environment and ‘naturalness’ of an area is the focus.” City MTB. (2018). Understanding active & passive recreational uses – Part 1. <http://www.citymtb.org/home/understanding-active-passive-recreational-uses-part-1>

¹⁰ Repetitive loss is a term used by the Federal Emergency Management Agency (FEMA) that refers to a property that has “incurred flood-related damage on two or more occasions in which the average cost of repairs equals or exceeds 25% of the property’s market value prior to the flooding event.” FEMA. (2022). Flood mitigation assistance

the Anclote River, which dumps into the mouth of Tampa Bay. At the time of the workshop, four out of 212 eligible properties had been acquired through the program. Bruno explained that the plan was to buy properties, demolish them, and leverage resources for relocation. Pre-Hurricane Hermine appraisals determined the acquisition prices. The program included \$25,000 for down-payment assistance for those choosing to remain in the county, an additional down-payment assistance loan of up to \$25,000, and Habitat for Humanity referrals. Community Rating System credits¹¹ were received as a result of removing properties, reducing flood insurance costs for all residents.

She called the program a “successful failure.” The program excelled in the area of outreach, Bruno emphasized, because the individuals who received assistance through the program had good reasons for wanting to leave their homes. It was a failure, she added, because the grant monies were not fully depleted. To fulfill the Community Development Block Grant, 70 percent of the designated funds had to go to low- and moderate-income households, but many residents did not meet this requirement. Additionally, residents tried to claim properties that were not their primary residence, which did not qualify for the buyout program. Other challenges to the success of the program included the pandemic, the real estate market, and fractured home ownership. Furthermore, she added that many people do not want to leave, saying they are willing to deal with the possibility of flooding to be able to live in a “little slice of beautiful Pasco County.”

Smith started the discussion of the above presentations by asking how to balance “deep place attachment” with community resettlement. Bruno responded that this is one of her biggest challenges. Henry highlighted keeping communities in place as long as possible (e.g., by focusing on increased density, fortifying infrastructure,

swift current for fiscal year 2022. <https://www.fema.gov/fact-sheet/flood-mitigation-assistance-swift-current-fiscal-year-2022>

¹¹ The Community Rating System (CRS) is a voluntary incentive program for community floodplain management practices. In CRS communities, flood insurance premium rates are discounted to reflect a community’s reduced flood risk as a result of mitigating actions taken by residents. Additional information about CRS is available at <https://www.fema.gov/floodplain-management/community-rating-system>

and working with grants). He voiced support for moving entire communities into more sustainable areas, not just moving individuals, if relocation is necessary. Lazarus replied that it comes down to providing affordable choices through large-scale, long-term planning. To make it possible for people to migrate and relocate on an equitable basis, Murphy suggested that federal- and state-level policies will have to comprehensively work together to provide a “smorgasbord of options.”

Smith asked how to better meet the needs of those who are relocated. He also asked about modifying or changing federal resilience policies to address the root causes of vulnerability, such as incentivizing the building of “replacement housing out of harm’s way that meet[s] the needs of those [whose properties] ... are being potentially acquired.” Henry called for land use controls (e.g., zoning and building codes) and transportation infrastructure starting at the local level. Otherwise, he said, it really “doesn’t matter what we do at the federal policy level, where it’s going to be an even slower incremental change.” Smith responded that “perverse incentives”—such as extensive post-disaster aid that encourages rebuilding or fails to reduce risk—can counteract local decisions about land use. Bruno stated that creating well-constructed, affordable housing to mitigate future damages also means building more expensive housing. She noted that this is a quandary and explained that her county offers a program that provides repairs to an owner-occupied home. This makes it possible for homeowners to remain in their homes, thanks to a deferred loan, until the title changes hands. Murphy highlighted the need for federal and state cooperation to plan and address the current housing crisis that will be worse because of sea level rise. Lazarus suggested that in terms of policies, housing should be considered a critical asset. She also suggested that local governments and existing aid organizations could be encouraged to help disseminate information and provide assistance to people who are applying for resources.

During the discussion session, committee member Catherine Ross noted the mixed signals residents receive when they are told that they, or their properties, are vulnerable—because these same residents see new

coastal development. Henry, in response, said it is a real problem, since when buyouts and incentives are provided to certain people, encouraging them to relocate, that property may then become available for others to purchase.

The session closed with Betty Jean-Jeremie speaking about state and federal programs that could be used to support homeowners who live in aging houses. She noted that there is more than just an economic impact involved. There is also what she referred to as historical and emotional value in neighborhoods that provides residents with a sense of security, which she emphasized should be taken into consideration before decisions are made.

EFFECTS OF ENVIRONMENTAL RISK AND DISPLACEMENT ON HEALTH AND COMMUNITY

During the third panel of the day, Tisha Holmes, an assistant professor in the Department of Urban and Regional Planning at Florida State University, noted there are a range of social, economic, environmental, political, and demographic factors that can influence people’s decisions to leave or stay in at-risk places. The processes, timing, and approaches taken by decision makers also play an important role. Holmes noted that municipalities juggle multiple priorities with limited funding, so while sea level rise may displace coastal populations in the future, migration away from the coast is typically not prioritized. Encouraging people to move away from at-risk areas is not typically on the political agenda or included as part of the decision-making process. Municipal and regional coastal resilience planning measures currently focus on risk reduction by promoting the design and implementation of structural and non-structural strategies that protect and accommodate people, housing, infrastructure, and economic activity on the coasts. These steps incentivize adaptive development and design policies that encourage people to stay in place. Therefore, she said, measures like avoidance, retreat, and returning developed areas to nature are often cited as a last resort.

Holmes also mentioned that communities located on higher ground or inland from the coast tend to have lower income, higher rental rates, and a higher percentage of minority populations. Yet, she said, these

communities are being invested in and upgraded because of their potential to serve as receiving communities¹² for coastal populations, which places the current inland residents of these areas at a high risk of displacement due to rising property values. Holmes noted that, “in the face of traditional economic gentrification pressures, climate risk—especially sea level rise—is going to amplify and compound these effects and dynamics.” Holmes asserted that research could inform displacement, relocation, and community resilience actions and policies. Recognizing that “the action or inaction of today will affect future generations and ecosystems,” Holmes posed several questions:

- At what point does community risk of exposure and impact outweigh the benefit of being on the coasts and trigger commitments to a strategic, costly movement to higher ground?
- How can policy gaps be filled to manage future hazards and reduce negative outcomes?
- How can individual households and communities who want to relocate be supported effectively?
- What are appropriate governance and planning models that facilitate and fund equitable relocation?
- How can managed retreat address existing structural inequities and oppressive policies?
- How can communities be engaged in the planning process in a way that preserves the cultural history, identity, and legacy of communities?
- How can managed retreat reduce the exposure of relocated people to sources of harm and improve their well-being?

Finally, Holmes suggested keeping at the forefront the guiding principles of equity that include fair distribution of benefits and burdens and emphasize a fair and participatory decision-making process.

According to Russell Meyer, executive director of the Florida Council of Churches, the root problem is

¹² Receiving communities are “locations where people may be relocating in response to coastal hazards and climate impacts.” Spidalieri, K., and Bennett, A. (n.d.). Georgetown Climate Center’s managed retreat toolkit. <https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html>

that the global economic system operates without an “ethic” attached to it. Those with access to funding and resources can “manage” problems, while those without resources deal with them through “mutual solidarity.”¹³ He stressed the “grief [that] comes from the way our economic system has really devastated communities across this country.” Putting ethics back into the economy and using mutual solidarity systems can facilitate the sustaining of living systems with available resources in the face of the existential climate crisis.

Meyer also emphasized the importance of understanding that people are bound to the land—and how, for this reason, he believes that society should help them stay where they are, if they do not want to relocate. “When people have lived some place for generations, they are the land, and the land [is] them. It’s not simply like, this house isn’t safe anymore.” He noted that grief related to mandatory relocation often goes unacknowledged and unaddressed due to a “lack of political accountability.” Meyer said that when such grief is addressed, society will reach a mutual understanding of the kinds of ethics that are needed. He ended by insisting on political accountability around relocation based on mutual solidarity, noting that moving a household does not solve problems because it just leads to more grief.

Kenneth Bryant, the founder and chief executive officer of the Minority Health Coalition of Pinellas, Inc., discussed how climate change exacerbates health disparities. Aside from climate-related considerations, African Americans are disproportionately affected by heart disease, cancers, cerebrovascular disease, renal disease, HIV/AIDS, diabetes mortality, asthma mortality, COVID-19, and infant and maternal mortality. Emphasizing that African Americans are at increased risk from climate change issues, Bryant noted that they are more likely to live in flood-prone areas and have a reduced ability to evacuate due to limited access to reliable transportation. African Americans are 75 percent more likely to live near power plants, highways, and toxic waste sites, and

¹³ Solidarity “emphasizes the ties that bind people together in a society” and refers to “the degree or type of social integration resulting from these ties.” Mutual solidarity means that these ties and social integration are reciprocated by members of the community. Komter, A. (2010). Solidarity. *International encyclopedia of civil society*, 1460–1464. New York, NY: Springer U.S.

are more likely to be employed as essential and outdoor workers, careers that are prone to increased potential for health problems. Bryant touched upon other issues, including access to healthy foods, quality health care, safe and affordable housing, educational and economic opportunities, and internet access. He pointed out that it is difficult for people without resources to consider mitigation and adaptation—and when they move to another place, social support is lost.

Next, Bryant discussed the health impacts of flooding and droughts, which can influence the timing and intensity of the spread of disease from mosquitoes, ticks, and fleas. He identified mental health problems as another significant issue, specifically noting posttraumatic stress disorder,¹⁴ anxiety,¹⁵ depression,¹⁶ suicide,¹⁷ substance abuse,¹⁸ and interpersonal violence¹⁹ occurring during and after an extreme weather event. He stressed that children who experience repeated extreme weather events are especially vulnerable to these conditions.

Chris Uejio, an associate professor in the Department of Geography at Florida State University, identified three ways to conceptualize displacement: (1) stress displacement from extreme events and disasters, (2) gentrification-driven displacement primarily due to market forces, and (3) climate gentrification. He shared an example of a “displacement risk index”²⁰ (designed

by Bertram Melix) that uses a relatively modest 2040 sea level-rise scenario with various displacement risk factors and indicators such as the quality of schools and job opportunities. Areas at high displacement risk involve a composite of representative factors, such as the economic status of residents, the presence of Hispanic renters, and single-parent Hispanic neighborhoods near high proficiency schools.²¹

Uejio then shifted to discuss secondary, or cascading, impacts from climate disaster-related displacement. In 2017, the Hollywood Hills nursing home in Hollywood, Florida, recorded a large number of hurricane-related deaths that did not result directly from Hurricane Irma’s winds or flooding, but were due to a loss of power and air conditioning, resulting in residents’ high core body temperatures. Florida later passed the Nursing Home Emergency Power Rule (Rule 59AER17-1), which requires backup power generation to ensure ambient temperatures will always be maintained below 81 degrees Fahrenheit—which Uejio said is arguably one of the nation’s first indoor safe summertime temperature regulations.

As a developer of affordable mixed-income housing, Leroy Moore, the Senior Vice President and Chief Operating Officer of the Tampa Housing Authority, aims to create “resilient and sustainable long term and inclusive communities . . . so that the product that I deliver to our citizenry is good for the community and good for the environment.” He explained that Tampa has spent 10 years redeveloping the dense public housing downtown in the urban core, near cultural amenities, jobs, schools, and transportation, creating a diverse community where people can live more affordably. In doing so, Tampa undertook redevelopment efforts that anticipated potential sea level rise by embracing density

¹⁴ Cianconi, P., Betrò, S., and Janiri, L. (2020). The impact of climate change on mental health: A systematic descriptive review. *Front Psychiatry*, 11, 74.

¹⁵ Rataj, E., Kunzweiler, K., and Garthus-Niegel, S. (2016). Extreme weather events in developing countries and related injuries and mental health disorders—a systematic review. *BMC Public Health*, 16(1), 1020.

¹⁶ Cruz, J., White, P.C.L., Bell, A., and Coventry, P.A. (2020). Effect of extreme weather events on mental health: A narrative synthesis and meta-analysis for the UK. *International Journal of Environmental Research and Public Health*, 17(22), 8581.

¹⁷ Cianconi, P., Betrò, S., and Janiri, L. (2020). The impact of climate change on mental health: A systematic descriptive review. *Front Psychiatry*, 11, 74.

¹⁸ Ma, C., and Smith, T.E. (2017). Increased alcohol use after Hurricane Ike: The roles of perceived social cohesion and social control. *Social Science and Medicine*, 190, 29–37.

¹⁹ Cianconi, P., Betrò, S., and Janiri, L. (2020). The impact of climate change on mental health: A systematic descriptive review. *Front Psychiatry*, 11, 74.

²⁰ In the context of the referenced study, the displacement risk index is used to “identify communities that exhibit characteristics conducive to displacement via inland migration from coastal residents who experience unbearable SLR [sea level rise], greater exposure to coastal hazards, and/or nuisance flooding, as well as other potential drivers.” Butler, W., Holmes, T., Jackson, A., Lange, Z., Melix, B., and Milordis, A. (2021). Addressing climate driven displacement: Planning for sea level rise in Florida’s coastal communities and affordable housing in inland

communities in the face of climate gentrification: LeRoy Collins Institute at Florida State University. <https://coss.fsu.edu/collins/wp-content/uploads/sites/28/2022/02/Butler-Jackson-Holmes-et-al.-2021-Final-LCI-Report-Climate-Gentrification-Updated-min.pdf>

²¹ School proficiency is an index created by the Department of Housing and Urban Development that uses “school-level data on the performance of 4th grade students on state exams to describe which neighborhoods have high-performing elementary schools nearby and which are near lower performing elementary schools.” The index “is a function of the percent of 4th grade students proficient in reading and math on state test scores for up to three schools” in a given radius. Office of Policy Development and Research. (2020). School proficiency index. <https://hudgis-hud.opendata.arcgis.com/datasets/HUD::school-proficiency-index/about>

and choosing “to go vertical,” increasing the number of units on the same land footprint. Additionally, Moore asserted that elevated housing and infrastructure can expose fewer lives to future flooding. He would like to see more focus on living with the coming rising waters as opposed to relocation, because when communities with fewer resources—especially low-income communities—are pulled away from their “life supporting and quality-of-life supporting features, such as jobs and amenities, you continue that cycle of poverty for a longer period of time.”

Panel moderator Thomas Thornton, Board on Environmental Change and Society, started the discussion by asking panelists to reflect upon innovations in architecture that may be needed to adapt to climate change. In his reply, Moore suggested looking beyond specific projects to the possibility of designing extensive engineering infrastructure to accommodate larger areas that may be inundated with water. Holmes agreed, noting the need for a range and diversity of approaches and the attendant need for investment and commitment in some areas to reshape the paradigm around the idea of learning to live with higher water to keep communities in place. Bryant argued that adaptation needs to be considered—but at some point “we’re just gonna have to move,” so the idea of managed retreat requires serious consideration. Meyer’s concern is for strengthening the role of community involvement in designing the best outcomes for each situation and, in this context, making sure decisions are not driven exclusively by investor profitability.

Sempier asked what would come next if retreat is not on the political agenda. Holmes answered that planners understand the nature of current and future risks, but there are many overlapping goals and priorities. She noted that commitment and action are needed to promote collaboration with communities with the goal of moving forward, across sectors and divisions, to formulate and implement projects emphasizing equity and resilience. Meyer said he has noticed that approaches are not always in place to include the most seriously impacted people in the process of designing the best possible response.

Committee member Lynn Goldman inquired about the best way to identify and engage trusted community voices. Meyer said the tools exist to identify and develop relationships and that the goal is to collaborate with trusted individuals in communities. Holmes reiterated that the tools exist, but it is difficult work, and one challenge involves identifying barriers, such as funding or lack of incentives. Uejio acknowledged that there are organizations and individuals, such as weather broadcast meteorologists, whose voices the public trusts.

Janice Barnes, committee co-chair, asked about possible ways to engage youth with these issues. Moore replied that integrating educational components into redeveloped communities is one way to engage youth. Various types of educational components can increase awareness and understanding; Moore gave the examples of using barcodes that can be scanned to see a description of what the use of solar energy can accomplish in a LEED-certified building, or simply providing a written description of what sustainable technology does so that people passing by understand why it is there. Holmes voiced support for more training and interdisciplinary work for college students who “will be the next generation of practitioners and professionals.” Meyer suggested the possibility of taking fundamentally different approaches for different types of youth.

Thornton closed by noting it is helpful to think about “managed retreat within the broader context of human adaptation to unprecedented climate change.”

REFLECTIONS

During the last activity of the day, several audience members offered reflections on their biggest takeaway from the workshop and suggested additional items to consider. Nan Summers, Design by Nature, highlighted the roles in the workshop discussion of acknowledgment, appreciation, agency, and activation, and suggested that incremental change can be accomplished with the right relationships: “it comes down to design for all.” Sharon Joy Kleitsch, Connection Partners, suggested linking people, resources, and ideas to embrace the whole living system of the Gulf of Mexico, with the goal of involving other countries in the process. In terms of strategy,

committee member Catherine Ross touched upon the possibility of establishing a nationwide approach to learning about regional perspectives on climate challenges with an emphasis on information about some markers, metrics, and resources that could take into account and budget for differences. James Scott, Florida Chapter of the Suncoast Sierra Club, stressed that “learning by doing” is a key way to educate youth and to engage them on issues of environmental science and climate change. Scott stated that “we have all the maps, we have the data, and the world floods and burns around us;” so in addition to the data, we need to “take our science and make it real” by building cultural and communication capacities about these issues in communities. The biggest takeaway for Rebecca Zarger, from the University of South Florida, was the importance of equity and of conveying to decision makers personal stories that they can reflect upon when considering funding and future policies. She also noted the role of mental health issues and the stress that some younger individuals feel as a result of environmental loss and anxiety associated with climate change. Finally, Richard Flamm, Florida Fish and Wildlife Conservation Commission, brought up that animals and plants are affected when humans retreat. He sees an opportunity to recreate communities and neighborhoods that live with nature. His takeaway was that currently “there is a sense of urgency that we’re not seeing.”

CLOSING REMARKS

Natalie Snider, committee member, summarized the main themes she heard throughout the day. She noted that the day started with stories contextualizing—beyond data points—the compounding and interconnected issues along the Gulf Coast and their cascading impacts. Two of the key points she heard had to do with, on the one hand, the lack of disseminated information about available programs and resources and, on the other hand, people’s desire, given the situation, to have a voice and power. She heard from many participants that relocation is often the last and least desirable solution on the list and that people often feel stuck. In many cases, Snider observed, a community does not know that change might

be needed until a disaster occurs. Those who experience a disaster have to recover and move on with their lives, and a buyout program takes time. Snider added that several participants pointed out that relocation might not address the root cause of why they are being underserved.

Snider concluded the workshop by sharing a few possible solutions to issues about and beyond managed retreat that were mentioned throughout the day:

- Leveraging the goodwill of people and volunteers from different ethnic and economic backgrounds working together and giving power to a community to allow people to champion their future;
- Considering rent stabilization to help renters to stay in their homes;
- Undertaking efforts such as solar panel initiatives to help make homes more energy efficient;
- Removing punitive and “perverse” processes;
- Working with trusted individuals in the community, such as community leaders and religious organizations;
- Stepping outside silos and making connections among health, environment, and planning-related initiatives and programs;
- Taking land use planning into consideration for future decisions;
- Empowering communities to design their own future;
- Holding elected officials accountable so they follow through on their commitments;
- Instituting policies and funding to provide and protect affordable housing;
- Encouraging innovations that help to live with rising water in the future; and
- Addressing issues of distributional and procedural equity in systems.

DISCLAIMER This Proceedings of a Workshop—in Brief was prepared by **HEATHER KREIDLER** as a factual summary of what occurred at the workshop. The statements made are those of the rapporteur or individual workshop participants and do not necessarily represent the views of all workshop participants; the planning committee; the Board on Environmental Change and Society; the Committee on Population; or the National Academies of Sciences, Engineering, and Medicine.

REVIEWERS To ensure that it meets institutional standards for quality and objectivity, this Proceedings of a Workshop—in Brief was reviewed by **HARRIET FESTING**, Anthropocene Alliance. We also thank staff member **BRITTANY SEGUNDO** for reading and providing helpful comments on this manuscript. **KIRSTEN SAMPSON SNYDER**, National Academies of Sciences, Engineering, and Medicine, served as the review coordinator.

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