

Planning for Equitable Climate Relocation: Gaps in Knowledge and a Proposal for Future Directions

Journal of Planning Literature
1-16
© The Author(s) 2023
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/08854122221147696
journals.sagepub.com/home/jpl



Katherine Lieberknecht¹  and Elizabeth J. Mueller¹

Abstract

Climate-related property buyouts increasingly affect people, communities, and planning systems, signaling the need for increased attention from practitioners and scholars. We review existing evidence about three phases of a tripartite process of equitable relocation in the United States: buyouts, relocation, and use of vacated land, each with potential to benefit or harm residents and communities. Seeing these pieces as interconnected and embedded in historical context allows us to reduce climate threats while addressing existing inequity. Future research, aimed at filling the gaps we have identified in this review, will be an important part of envisioning a new way forward.

Keywords

equity, justice, climate relocation, climate buyouts, land reuse

Introduction

Researchers project that by 2050 climate change will force between 25 million and one billion people from their homes (Brown 2008; Carey 2020; Kulp and Strauss 2019; Stocker and Kennedy 2009). Of these migrants, millions will leave because of direct climate impacts from flooding, drought, heat, and fire. In response, policy makers, federal agencies, and local governments increasingly enact property buyout programs, due to continued loss of life and damage to property associated with events of increasing intensity and frequency. U.S. decision makers design these programs to proactively remove residents from high climate risk areas, either through voluntary or, less frequently, mandatory participation.

Scholars, decision makers, and practitioners use a wide range of terms to describe the processes of removing residents and, at times, assisting with the securing of a new home (Bukvic et al. 2019). *Managed* or *planned retreat* refers to the intentional movement away from hazardous areas and includes removal of structures or abandonment of land (Hino, Field and Mach 2017; Yarina, Mazereeuw and Ovalles 2019). However, some residents perceive this term as alienating due to its association with top-down power dynamics and a sense of hopelessness (Climigration Network 2021). *Relocation* or *resettlement* is used to refer to entire communities moving to a new, safer site together, or—more generally—to activities similar to managed retreat (Nelson and Ehrenfeucht 2016; Yarina, Mazereeuw and Ovalles 2019). *Buyouts* are the process governments use to purchase homes and land to take them out of private use (Freudenberg et al. 2016).

We frame this review around the idea of *equitable relocation and resettlement*, which we define as programs to move people away from places of climate risk and resettle them in safer areas in a manner that preserves or even improves social, physical, economic, and ecological well-being. We move beyond Fainstein's (2010, 36) definition of equity as a "distribution of material and nonmaterial benefits derived from public policy that does not favor those who are already better off," arguing that equitable outcomes must proactively address past harms experienced by marginalized groups. In this way, equitable buyouts and resettlement seek to remove people from high-risk areas and rehome them in safer areas in a way that ensures social, physical, economic, and ecological benefits for residents, with particular attention toward fair outcomes for those already experiencing marginalization. In addition, we include processes around reuse of these post-buyout lands, which may result in climate-related displacement if planners neglect attention to equitable outcomes. We frame this review around equitable buyouts and resettlement rather than more commonly used phrases, such as managed retreat, for two reasons. First, our review specifically focuses on articles that use an equity lens to examine buyouts, resettlement, and post-buyout land use; thus, we do not include all articles focused on buyouts, but only articles that examine buyouts and associated processes

¹Community and Regional Planning, The University of Texas at Austin, Austin, TX, USA

Corresponding Author:

Katherine Lieberknecht, Community and Regional Planning, The University of Texas at Austin, 110 Inner Campus Drive, Austin, TX, USA.
Email: klioberknecht@utexas.edu

while also including issues of equity. We operationalized this by examining articles identified through an initial search, as well as articles referenced by these articles or suggested by reviewers, and looking for evidence that authors used an equity lens, which was supported by use of a specific equity framework and/or by the author's description of equity or justice concerns, harms, or benefits. As we are focused on climate-related buyouts, we consider justice as referring to environmental and climate justice, both of which closely connect to our topic. Environmental and climate justice both encompass many subcategories of justice; here we focus on distributive justice (how costs and benefits are allocated within a community [Rawls 1971]), and procedural justice (fairness in decision-making processes [Schlosberg and Collins 2014]). Closely related are Kraan et al.'s concept of interactional justice in buyouts, which concerns "the quality of interpersonal treatment people receive through a process" (Kraan et al. 2021, 482); and recognition justice, or how groups experience justice-related issues, such as climate change, and their right to express those differences (Newell et al. 2021, 6).

Secondly, we emphasize that while relocation programs and related research strongly focus on the buyout-related part of the process, post-buyout processes deserve more attention from planners and decision makers. In response, we review literature that relates to *equitable relocation and resettlement*. We focus only on the U.S. institutional context, for the purpose of developing recommendations for future research targeted to centering equity in U.S. policy approaches.

For this review, we initially identified literature through a Google Scholar search for peer-reviewed articles with the keyword phrase "equitable relocation," written in English, and focused on U.S. programs, which yielded 34 journal articles. After reading these articles, we identified twelve as focused to some degree on equity. The search was not time-bound, and the initial search occurred in June of 2020. After this initial query, we added 65 related articles referenced in the original set of articles, recommended by reviewers, or published during the review and revision period, resulting in a set of academic manuscripts and gray literature focused broadly on current and emerging practice of equitable relocation. The use of the search terms "equitable resettlement" and "just resettlement" did not result in additional articles for review, perhaps because "resettlement" is more commonly associated with resettlement of communities during dam development or of international refugees. The search term "just relocation" appears to be a redundant with "equitable relocation," as its use did not result in any new articles to review. Some articles reviewed focus only on buyouts, while others address buyouts as well as resettlement and post-buyout land use; please see Appendix, Table 1 for an overview. We review these studies from planning and aligned disciplines to identify gaps in knowledge to inform future research on equity-centered buyout programs, resettlement, and land reuse.

Since most reviewed literature does not consider interactions among buyouts, resettlement, and land reuse, and very few articles consider all three areas, we structure our review into four separate discussions: 1) buyouts for climate preparedness, 2)

rebuilding and resettlement, 3) post-buyout land use, and 4) a summary of gaps in our knowledge, limitations of existing studies, and future research directions. In a similar way, as the literatures on buyouts, resettlement, and post-buyout land use are in dissimilar phases of development, we use different frameworks for equity for each phase. For buyouts, we frame equity by using the environmental justice categories of distributive and procedural justice (Martin et al. 2016; Schlosberg 2004; Sikor et al. 2013; Walker 2012), since the literature provides enough detail to evaluate how these two environmental justice categories are considered. For resettlement, we frame equity by drawing from planning history, political ecology, and medical anthropology to consider the historical context for threatened communities, the institutional framework used to guide relocation, and the ways that outcomes reflect a logic of care for residents. And for post-buyout land uses, we use a simpler equity framework of benefits and harms, as this area of the literature is not as well developed, making it difficult to apply the specificity of distributive and procedural justice.

We find that existing studies provide an understanding of some of the relationships between buyouts and climate preparedness, such as who has access to buyout funds, who has participated in buyouts, and challenges for community-scaled buyouts. While there has been a rapid increase in research on the need for relocation, there is relatively little information on outcomes for relocated residents and communities. Likewise, there is scant information about post-buyout land use; the research that does exist categorizes land uses but does not emphasize equity and justice. In sum, critical research questions about all three phases of buyout and resettlement programs remain unaddressed.

Why Planners Should Care About Buyouts, Resettlement, and Land Reuse?

Within the next several decades, almost every area on the coast, with inland flooding, or affected by wildfires will consider buyouts and resettlement due to the climate crisis (Carey 2020). Almost 1 billion people live near coastal areas, and an estimated 300 million may have to relocate by 2050 (Hauer 2017; Kulp and Strauss 2019). Within the U.S., researchers estimate that at least 300,000 lower 48 homes will experience chronic flooding over the next three decades, with 2.4 million houses experiencing repeated flooding by 2100 (Dahl et al. 2018) and between 4 and 13 million people at risk (Hauer, Evans and Mishra 2016). Already, the Federal Emergency Management Agency (FEMA) has provided funds used to purchase more than 43,000 properties for flood mitigation purposes (Mach et al. 2019). As a result, buyouts and resettlement have already and will continue to impact a significant number of residents.

These processes will entail difficult, unpopular, and painful choices. Who will move? Where will they go? And what will we do with lands left behind? Without careful planning and direct intervention, climate adaptation, including property buyouts, will disproportionately harm marginalized populations

(Anguelovski et al. 2016, 2020; Maldonado 2014). Because of this dynamic, equity and justice need to be at the forefront of buyout programs and other forms of climate adaptation planning (Scott et al. 2020). All three of these decision-making arenas—buyouts, resettlement, and land reuse—are embedded within property ownership and housing markets, which are intertwined with legacies of racism and colonialism (Elliott, Brown and Loughran 2020; Yarina 2018). Over decades, planners and policy makers have limited the ability of marginalized populations to build wealth through homeownership (Dickerson 2014; Taylor 2019) and influenced the geographic relationship between Black, Indigenous and people of color (BIPOC) neighborhoods and areas of climate risk (Bullard and Lewis 1996; Hendricks and Van Zandt 2021).

The resulting political and power dynamics mean that planners must actively strategize for equitable outcomes. These three phases interact in complex ways, especially around issues of equity. For example, a local government-led buyout program to purchase housing in floodplains without providing assistance in locating affordable, comparable new housing away from climate risk has not addressed underlying climate challenges faced by residents (see, e.g., Lynn 2017). Likewise, buyout programs that ask BIPOC and low-income communities to move in order to reuse these post-buyout lands as climate protection for wealthy households decrease climate equity (see, e.g., Anguelovski et al. 2020). While we find that most literature does not focus on all three phases of the process, it remains important for planners to consider possible interactions among the three phases.

Despite awareness of how commonplace buyouts will become, and harms that will result from unjust processes, the U.S. lacks local, state, tribal, or national agencies or dedicated funding streams that focus on buyouts, resettlement, and land reuse as related processes (Bronen 2011; Maldonado 2014). This institutional vacuum raises concerns that buyouts in the context of weak governance will lead to significant social, cultural, health, and economic harm, ranging from lost livelihoods to debilitating trauma (Maldonado 2014). Maldonado (2014) cites the example of the Isle de Jean Charles relocation program, which was delayed in part due to failures in tribal-agency interactions and contributed to ongoing social and economic disruption. In a similar way, climate retreat processes will echo across economic, housing, land use, governance, and ecological systems (Melillo et al. 2014). In response, planning practitioners and researchers must pay increased attention to climate-related buyouts and associated processes.

As we consider buyout programs, planning scholars and practitioners should also keep in mind the legacy of harms to which the planning profession has contributed. The planning profession is not solely responsible for social and economic disasters such as urban renewal and redlining, but planners played a leading role in these and other devastating public programs and plans. In particular, planners caused disproportionate exposure to climate-related harms as they permitted and even encouraged marginalized residents to live in hazardous areas (Jingnan et al. 2021; Katz 2021). As planners, we acknowledge

that our profession has contributed to a legacy of harms. Consideration of all three parts of the relocation process may help to avoid future harms caused by climate adaptation planning.

In our current era, planners pledge to “maximize the health, safety, and economic well-being of all people living in our communities” as well as “seek social justice” (APA 2021, 1). Planning professionals and scholars have skills, knowledge, and values that can potentially safeguard well-being and equity during relocation. As more municipalities enact climate-related buyout programs, residents need careful development of processes led by impacted communities, that safeguard community benefits, and that address past and prevent future harms (Climigration Network 2021). In the following sections, we review literature related to these processes: the use of buyout programs as a climate preparedness strategy, post-buyout rebuilding and resettlement, and post-relocation land use.

Using Buyouts for Climate Preparedness

Increasingly in the U.S., municipalities and state agencies are adopting voluntary buyout programs to prepare communities for climate change by proactively moving people to less risky areas (Elliott, Brown and Loughran 2020; Mach et al. 2019). Coastal areas are characterized by sea level rise, storm surge, damage from hurricanes and tropical storms, land instability, and coastal erosion, all of which can be linked to some degree to acute and chronic impacts stemming from climate change. While inland areas experience fewer events linked to buyouts, these communities are home to the majority of implemented buyout programs in the U.S., due to the severity of riverine flooding (Koslov 2016). In addition, wildfire threatens homes in the wildland-urban interface, which have increased rapidly due to economic displacement, second home development, and an expanding fire range (Radeloff et al. 2018). Lastly, although much federal policy has focused on buyouts related to acute events such as flooding, longer-term climate-related impacts such as erosion and subsidence potentially require relocation (Bronen 2015).

Buyouts likely will expand as amplified climate risk makes areas dangerous for continued residential use (Berndtsson et al. 2019; Hettiarachchi, Wasko and Sharma 2018; Radeloff et al. 2018). Furthermore, land use planning legacies, as well as historic and ongoing discrimination, also contribute to the need for buyouts (Maldonado 2014, redacted). For example, the lower cost of housing in hazardous areas makes these areas more affordable and more likely to house low-income residents (Godschalk et al. 1999; Lee and Jung 2014). Researchers have also found that BIPOC residents are more likely to live in floodplains (Bakkensen and Ma 2020). An exception is coastal areas, which are susceptible to flooding and sea level rise, but also more likely to be inhabited by wealthy, White homeowners because of high-value amenities (Kahn and Smith 2017).

In response, local and state governments increasingly have created buyout programs to protect residents and property

from climate risk by moving people out of areas that experience, or are projected to experience, climate impacts. In addition, as hazards increase, FEMA and local governments are re-evaluating the long-term, accumulated cost of repeated repair and rebuilding. Despite the increased need for buyout programs, buyouts have been controversial with some residents, developers, and elected officials. Buyout programs in the U.S. are unpopular for cultural reasons, such as strong belief in private property rights, as well as for economic impacts on local taxes and real estate markets (Siders 2019). In addition, buyout programs displace people from their homes, which can be considered to be “the accumulation of many relationships and much history” (Fullilove 1996, 1519). Residents’ attitudes about buyout programs vary depending on attachment to place, as well as perceptions of economic opportunity, new homes, and communities (Binder, Baker and Barile 2015). Lynn (2017) and De Vries and Fraser (2012) document how residents’ distrust of government agencies can contribute to dampened participation in buyout programs. For these reasons, residents are often wary of buyout programs. In addition, developers and decision makers often consider waterfront property to be a key location of economic development and property value, and frequently do not support buyout programs in these areas (Koslov 2016).

Linking Buyout Programs to Equitable Climate Adaptation

Buyouts related to climate preparedness comprise one aspect of climate adaptation planning (redacted). The environmental justice categories of distributive and procedural justice (Martin et al. 2016; Schlosberg 2004; Sikor et al. 2013; Walker 2012) provide a frame that can be applied to equitable climate adaptation planning. In regard to distributive justice, Shi (2021) argues that planners and activists working toward equitable adaptation have not focused enough on redistribution of wealth. Paying attention to wealth redistribution in particular provides a useful framework from which to consider distributive justice concerns about climate-related buyout programs, given the central role of housing value in buyout programs.

Buyouts Inequitably Impact Wealth Distribution

Researchers find that climate-related buyout programs produce inequitable distributive outcomes for low-income or BIPOC residents due to inequities in: valuation of bought-out properties (Green and Olshansky 2012; Lynn 2017; Marino 2018; Yarina, Mazereeuw and Ovalles 2019); access to program assistance (Bronen and Chapin 2013; Elliott, Brown and Loughran 2020; Gotham and Greenberg 2014; Loewenstein 2015; Loughran, Elliott and Kennedy 2019; Lynn 2017; Mach et al. 2019; Muñoz and Tate 2016; Mutter 2015); lack of alternatives to buyouts for BIPOC residents (Elliott, Brown and Loughran 2020; Gotham 2014; Shabazz 2015; Siders 2019); context-blind

consideration of existing infrastructure (Siders 2019; Yarina, Mazereeuw and Ovalles 2019); and an emphasis on individual over community-scale buyouts (Hinzman et al. 2005; Marino 2018; USGAO 2009).

The use of market values influences whom buyout programs benefit and harm. Although eminent domain allows for government seizure of land for the public good, when accompanied by compensation, U.S. municipalities rarely have used eminent domain for climate-related buyouts. Climate-related buyouts have been, for the most part, voluntary programs that offer market value to homeowners as compensation for participation (we discuss how voluntary programs may be experienced as coercive in the next section). However, using market value as a proxy for the full spectrum of value that a home provides inequitably impacts residents who live in low-cost houses proximate to amenities not directly reflected in market value (Marino 2018; Yarina, Mazereeuw and Ovalles 2019). For example, less tangible benefits, such as memories, the value of a friend network, or the comfort of familiarity, reside outside market valuation (Lynn 2017). In addition, owners of lower value housing will have more limited housing choice once displaced, due to differentials in purchasing power (redacted). Processes of racialization and colonization also impact market valuation, causing further inequitable outcomes. For example, Green and Olshansky’s (2012) account of New Orleans’ post-Katrina Road Home Program, which allowed applicants to rebuild or relocate, notes that market values for comparable homes differ across segregated neighborhoods. Related analysis by Rose et al. (2008) shows that pre-Katrina median home values in New Orleans correlated with race and were lower in African-American neighborhoods. As such, the intersection of racism and market valuation likely creates further disparities in benefits and harms.

More privileged places and residents have disproportionate access to nationally funded buyouts. Two U.S. funds can be used for climate-related buyouts: FEMA’s Hazard Mitigation Grant Program (HMGP) and the U.S. Department of Housing and Urban Development (HUD)’s Community Development Block Grant Disaster Recovery program (CDBG-DR) (Lynn 2017). FEMA makes HMGP funds available after federally declared disasters; these funds require collective buyouts and land is reused for ecological function (Bronen and Chapin 2013). The CDBG-DR program also is only available for federally declared disasters; funds can be used for individual or community-scaled buyouts. Analysis of FEMA’s HMGP database, which includes information about 40,000 voluntary floodplain buyouts across 500 communities from 1987 to 2017, shows more opportunity to participate in buyouts for residents in wealthier and more populous counties (Elliott, Brown and Loughran 2020; Mach et al. 2019). In addition, three-quarters of FEMA-funded buyouts are located in the central counties of metropolitan areas (Elliott, Brown and Loughran 2020). Overall, residents of poorer, more rural areas experience less access to FEMA-funded buyouts.

Other scholars discuss broader concerns about post-disaster “crisis” narratives that result in decision-makers accelerating

recovery efforts which benefit the wealthy while harming BIPOC and lower-income residents (Loughran, Elliott and Kennedy 2019; Gotham and Greenberg 2014; Loewenstein 2015; Mutter 2015). (We discuss climate-related displacement and gentrification in more detail in the “Post-buyout Land Uses” section of this review.) Relatedly, Muñoz and Tate (2016) found that households in high social vulnerability areas were less likely to receive full financial compensation through buyout programs and waited for longer periods before receiving funds.

BIPOC and White households experience different rates of participation in buyouts. Elliott, Brown and Loughran (2020) found that while counties most likely to administer buyout programs had higher percentages of White residents, homeowners in neighborhoods of color more often accepted federal buyouts, possibly because these households have fewer options and less flexibility due to weaker demand for home purchases in these areas. In addition, if participating households are unable to purchase a replacement home, relocation reduces these households’ aggregate wealth. Because of this need for distributive equity, there is an associated need for participation and leadership by frontline communities to define adaptation solutions, including design of buyout programs. Elliott, Brown and Loughran (2020) conclude that FEMA’s voluntary buyouts reflect the racialization of the U.S. housing market. The resulting landscape of bought-out properties reflects historic and ongoing racism in housing markets, unequal investment in flood infrastructure, and disparate access to flood insurance. Elliott, Brown and Loughran (2020) cite discriminatory federal housing policy, such as redlining, as one way in which historic racism links to present day segregation at the metropolitan scale, further impacting BIPOC-owned home values (Gotham 2014; Shabazz 2015, as cited in Elliott, Brown and Loughran 2020). Flood managers often do not recognize historic and ongoing racism in housing markets (Elliott, Brown and Loughran 2020; Siders 2019). It also disadvantages the many renters in communities of color: Since 1989, at least 4,500 renter households have lost their homes when their landlords chose to participate in FEMA buyouts, showing how a “voluntary” policy can result in involuntary and inequitable impacts on renters (FEMA 2020 as cited in Kraan et al. 2021).

Buyouts privilege individual over community-scaled buyouts. With few exceptions, buyout programs have focused on individuals rather than communities. As a result, homeowners interested in community-scaled buyouts are sometimes excluded from participation in buyouts. In particular, research finds that members of some Native American tribes may prefer community-wide buyouts to individual buyouts (Marino 2018). For example, an Iñupiat Eskimo community in Shishmaref, Alaska wants to relocate in response to coastal erosion and storms (USGAO 2009; Hinzman et al. 2005); however, many residents prefer a community-scaled buyout (Marino 2018). Marino attributes this desire of residents as a major reason why the individual-scaled buyout program has been unsuccessful. Other land tenure characteristics, such as some Indigenous land being held in trust rather than through

individual ownership (US Department of Interior, n.d.), or tribes seeking new settlements of communal land, may contribute to the need for community-scaled relocations in tribal areas.

Inequitable patterns of infrastructure influence who gets to stay and who is asked to move. Cost-benefit calculations used by public agencies influence buyout prioritizations, resulting in infrastructure investments that allow higher-income neighborhoods to stay, while slating lower-income areas for buyouts (Siders 2019). For example, Yarina, Mazereeuw and Ovalles (2019) discusses the Villas del Sol retreat program in Puerto Rico noted for its racist and inequitable implementation: the municipality cut drainage services to the neighborhood, and then cited inadequate drainage as justification for buyouts.

Residents’ Participation in Buyout Program Design, Decision-Making, and Implementation: An Underdeveloped Aspect of Equity

Scholars argue for more participation by frontline residents to improve buyout program design, increase communication about the need for buyouts, and secure more equitable outcomes (Bukvic and Borate 2020; Yarina 2018). Maldonado (2014) advocates for governance that supports residents’ efforts to stay and adapt, or to support community-led resettlement if residents decide to move. Bronen (2015) argues for new participatory buyout planning processes to better understand local knowledge around climate risk and minimize harms. And McNamara et al. suggest that if “relocation of populations can be planned, participatory, and people centered” than perhaps relocation can be a “transformative opportunity for people to respond to the impacts of climate change...and possibly even improve certain livelihood outcomes” (2018, 111). Examples from Houston, New Jersey, and Puerto Rico provide three approaches to participation by residents, resulting in a range of equity outcomes.

Lynn (2017) anticipates that many residents subjected to buyout programs will lack the ability to participate in, or political power to push back on, plans. His case study documents resident participation in Kashmere Gardens, a low-income, predominantly Black neighborhood in northeast Houston. When the Harris County Flood Control District (HCFCD) designed and implemented a relocation program to move 40 (originally 80) households to obtain land for a flood control project, HCFCD’s process included minimal resident participation and quickly moved to a process of condemnation. Lynn uses the Kashmere Gardens case study to make several recommendations about buyouts, equity, and meaningful participation, including that agencies communicate directly with residents, not just with community organizations.

In contrast, at least one researcher cites buyouts that occurred in New Jersey and New York after Hurricane Sandy as an example of residents’ participation successfully influencing a buyout program and outcomes. Koslov (2016) argues that the Sandy buyouts differed because White working and middle-

class residents pushed for community-wide buyouts, which appealed to homeowners already resigned to displacement due to ongoing gentrification. Homeowners preferred to participate in buyouts which transitioned land back to green space, rather than staying but slowly losing ground to gentrification.

The Proyecto ENLACE project in Puerto Rico provides another example of residents' participation leading to more equitable buyout outcomes. The NGO Proyecto Península de Cantera (acronym ENLACE) uses an "inclusive, participatory-action planning process" to ensure involvement of residents in buyouts from early stages (Yarina, Mazereeuw and Ovalles 2019, 17). Buyout and resettlement processes were based on strategies developed by ENLACE, and residents choose three housing options from a portfolio of safe housing options (Yarina, Mazereeuw and Ovalles 2019, 53). Post-buyout, residents expressed overall satisfaction and a strong sense of agency but acknowledged the emotional difficulty of relocation.

Recognition justice concerns are also interwoven into discussions of distributive and procedural justice. For example, BIPOC and White homeowners experience different rates of participation in buyout programs, Indigenous residents who value or need community-scaled buyouts experience fewer opportunities to participate in buyouts, and low-income households experience inequitable access to infrastructure, which contributes to the perceived need for buyouts.

Buyout programs are often conceptualized as ending when residents have moved away from hazardous areas. However, successful buyout programs include at least two other stages: 1) ensuring that residents successfully settle in new homes and communities, and 2) designing, planning, and implementing reuse of former residential lands. The next section will focus on resettlement.

Rebuilding and Resettlement

"...while anthropogenic climate change may be a relatively new problem, many of the issues it is raising around displacement and relocation are not without precedent." Maldonado et al. (2013, 611)

The scale and spatial concentration of current climate change impacts in coastal zones and island communities have raised awareness of the need to consider relocation as a form of "climigration" or community scale relocation required to protect residents from "climate-induced biophysical changes that alter ecosystems, damage or destroy public infrastructure, and repeatedly endanger human lives" (Bronen and Chapin 2013, 9320). This section considers what we know about efforts to relocate residents collectively, particularly instances where historically marginalized communities are threatened by climate change. Efforts to relocate entire communities in the U.S. remain rare. We organize this review around three dimensions drawn from past work on the role of planning in the production of vulnerability (Mueller and Dooling 2011), from political ecology's discussion of the creation of "waterscapes" (DeVries and Fraser 2017), and from medical anthropology's

concept of the "logic of care" (Mol 2008, in DeVries and Fraser 2017). From these we derive three dimensions to organize our discussion of the existing literature on community scale resettlement: the historical context for current community conditions, the institutional framework used to guide community relocation, and how discussions of outcomes reflect a logic of care for residents.

The Historical Context for Current Community Conditions

Community scale efforts bring to mind past government-led efforts to remove entire communities, including urban renewal, and also more recent redevelopment of public housing. There is a long history of inequitable, damaging, and lethal relocations in the U.S., some of which were led or joined by the planning profession. The politics of these earlier efforts often revolved around economic development goals, rather than residents' well-being. While the justification for these efforts was not climate-related, their legacy is an important piece of context for current efforts.

The concept of social vulnerability in disaster recovery (Cutter, Mitchell and Scott 2000) highlights the differing extent to which particular groups or communities are exposed to impacts of climate-induced disasters and experience in recovering from these events. In particular, racialized patterns of exposure to particular hazards in the U.S. (Perry and Lindell 1991; Pulido 2000; USGAO 1995) require that efforts to resettle entire communities consider what equity means in the context of this history. Climate change researchers emphasize the ways that impacts are linked to inequality and frame responses using a human rights lens (Maldonado et al. 2013). Restoring current conditions and determining appropriate compensation must account for the different starting positions of communities that begin with disproportionate vulnerability to disaster and where property values have been depressed as a result. Scholars writing about the role of planning in creating the uneven landscape of exposure to various threats talk about the production of vulnerability as an ongoing process (Mueller and Dooling, 2011). Urban political ecologists describe interconnected socio-natural urban processes reflecting uneven power relations (Heynen 2014). They use the term waterscapes to describe resulting relationships embedded in places (Swyngedouw 2009, cited in DeVries and Fraser 2017).

The case of the Isle de Jean Charles Tribe in coastal Louisiana illustrates the ways that the current vulnerability is embedded historically. The Tribe received \$48.3 million in CDBG-DR funds for planned relocation due to sea level rise, subsidence, and hurricanes (Isle de Jean Charles Tribe 2019). This tribal community had been displaced by European settlers from their original lands, and regarded the Isle as protecting them from further harm (Maldonado et al. 2013). The case study makes clear how this historical displacement continues to undermine their efforts to gain tribal recognition. The Alaskan tribal communities studied were originally nomadic,

moving seasonally between coastal and inland fishing and hunting camps. They settled in their now-threatened locations when the U.S. Department of the Interior's Bureau of Education developed a formal education system for Alaska native communities and required children to attend schools whose sites were selected by the federal government (Bronen and Chapin 2013). DeVries and Fraser's (2017) study of the relocation of an African-American neighborhood in Kinston, South Carolina described the segregated settlement of the area by freed slaves and its role as one of the few neighborhoods where Blacks could be homeowners. It was also adjacent to hazardous land uses, and flooded repeatedly. The city condemned most of the homes following the flood.

Negative social, health, and economic impacts of these historic relocations reverberate today (Maldonado 2014), and populations affected by past relocations are among the frontline communities who will be most impacted by buyouts. For example, climate retreat programs that ask Gulf Coast Native American communities to relocate from coastal tribal lands echo the mass removal of southeastern tribes in the nineteenth century (Marino 2018). Or, consider African-American homeowners currently living in floodplain neighborhoods now unsafe to reside in due to increasing flooding. These homeowners' ancestors were violently removed from West Africa, prevented from owning land for centuries, and, when finally permitted to purchase a home, were disproportionately concentrated in floodplains due to racist land use and housing policies (Bakkense and Ma 2020). For these residents, climate retreat programs may add complex layers of displacement and trauma.

The Institutional Framework for Relocation. Several studies highlighted particular ways that the U.S. institutional framework for buyouts and relocation impede community scale efforts (Bronen and Chapin 2013; Lynn 2017; Maldonado et al. 2013). On the whole, efforts focus attention on strategies for convincing and compensating individual residents to accept buyouts rather than on community-scale factors. Standards set in the post-war period continue to frame current relocation efforts. The 1970s era Uniform Relocation Act (URA) was created to compensate residents involuntarily relocated or who had property taken through eminent domain for projects receiving federal financing and set standards for federal relocation assistance. It emphasizes financial assistance but disregards issues such as place attachment and emotional suffering (Lynn 2017). These rules were applied to communities regardless of the inequities facing residents prior to relocation. The 1990s era HOPE VI program for the redevelopment of dilapidated public housing focused on the benefits of deconcentrating poverty and improved housing quality to justify relocation of public housing residents, but discounted place attachment (Lynn 2017). The 1988 Stafford Disaster Relief and Emergency Assistance Act was intended to provide federal disaster assistance to state and local governments. However, it fails to include assistance for communities affected by ongoing erosion due to permafrost melt (as in Alaska), or resources for the development of infrastructure or relocation of entire

communities. Finally, it provides no framework for collaboration and planning across agencies (Bronen and Chapin 2013).

Case study evidence on resettlement processes documents the inequities produced by rigid processes. Interviews with 58 current or former residents and 29 professionals who worked on mitigation or relocation initiatives in Terrebonne Parish, Louisiana highlighted the dynamics of adaptation for households, necessitating different needs for households over time, and the misalignment of program elements and resident decision-making about when and whether to rebuild. In addition, they noted that low-and-moderate-income households faced barriers to participation that denied them resources (Nelson et al. 2022). Similarly, research on evacuees' efforts to return to New Orleans following Katrina found the city's poor and communities of color returned to the city at much lower rates than wealthier and White residents. In addition, new businesses and nonprofit start-ups accelerated but were mostly led by wealthier and white residents, and gentrification ramped up (Gotham and Greenberg 2014; Mutter 2015, and Campenella 2013; Lowenstein 2015).

Fifteen of the more than 30 Alaskan communities at imminent risk due to climate change are engaged in community-led relocation planning (Farbotko et al. 2020). Yet tribal communities are often precluded from receiving FEMA disaster mitigation or assistance due to their small size and limited governmental capacity. They are unable to develop required mitigation plans or raise matching funds. Unincorporated tribal communities do not qualify for HUD Imminent Threat Grants or CDBG disaster recovery funds (Iverson 2013). In their study of three Alaskan tribal communities, Bronen and Chapin described relocation efforts as ad hoc, outside of any institutional framework. The communities each worked with different agencies or used different legal strategies to fund needed infrastructure, followed different governance structures, and used different criteria to select relocation sites—often resulting in rejection of selected sites by the federal government (Bronen and Chapin 2013). Each agency involved prioritized assistance based on its own protocols and criteria (Maldonado et al. 2013).

Based on a review of case studies and policy frameworks proposed by other scholars, Supekar (2019) proposes four principles for the development of equitable resettlement policy: encouraging "non-illusory" community participation, mobilizing economic resources, using a context-driven approach, and emphasizing voluntariness. Non-illusory participation means giving communities adequate time and information to respond to plans, using effective forms of communication and outreach that are community specific. Participation should focus on identifying and producing tangible results for the displaced community. The appropriate level of compensation required should take into account societal burdens specific to displaced communities and how these relate to increased climate vulnerability. Consideration of context should be designed to avoid exacerbating existing vulnerabilities—including impacts on receiving communities. This necessarily means avoiding coercion of residents to accept buyouts and reinforces the importance of meaningful participation (Supekar 2019).

Measuring Outcomes and the Logic of Care. The legacy of past government programs can also be seen in the ways that success of current efforts is measured. A major lesson of prior development-related forced displacement and resettlement is that it should be treated as a “complex process that requires more than compensation for material losses” (Wilmsen and Webber 2014, 76). Using a logic of care implies attending to residents’ needs in historical and present context and over time. In the case of community relocation, it also implies consideration of collective concerns and relationships, as expressed by affected communities. Yet, assessments of resettlement efforts typically use economic metrics such as the value of flood losses, and changes in property values to measure success (Pinter and Rees 2021). The lack of a clear framework for community resettlement in federal programs means that community planning efforts are unlikely to be translated into actions that address the context and range of issues identified by residents.

The Isle de Jean Charles tribe developed their own plan for resettlement. In 2019, the state of Louisiana bought a 515-acre plantation for resettlement but the tribe remained dissatisfied with their role in the resettlement process. When their plan was not reflected in the State’s Master Plan for Coastal Restoration they asked for their name to be removed from the project (Dermansky 2019). Subsequently, HUD and the Louisiana Office of Community Development allowed participants to retain title to their land, including mineral rights, and their homes remained intact. For the tribe, these were critical issues since loss of title would undermine their claims for federal recognition as a tribe, and they feared that the government would transform their land and homes into recreational camps (Nelson et al. 2022).

The Alaskan tribal communities developed community plans and chose resettlement sites so that their cultural communities could remain cohesive after relocated (Bronen and Chapin 2013). The rejection of tribes’ preferred sites based on agency rules undermined their ability to rely on traditional knowledge in adapting to a changing environment (Shearer 2011, cited in Maldonado et al. 2013). The delays meant that residents remained in areas with inadequate infrastructure but were unable to fund needed maintenance or repairs (Bronen and Chapin 2013; Iverson 2013). They were also not able to fund initial infrastructure in new locations, due to conflicts over site selection. In particular, lack of adequate plumbing and sewage disposal put residents’ health at risk (Bronen and Chapin 2013, 9323).

Residents’ relocation choices reflect a complex set of concerns, including economic mobility and ongoing attachment to their communities. For example, Loughran and Elliott’s research on households accepting buyouts in Houston between 2000 and 2017 found that residents moving nearby viewed their options in terms of economic mobility, as a “racialized process of neighborhood attainment,” rather than a form of climate migration (Loughran and Elliott 2019, 57). Similarly, interviews with 53 residents of Houston’s repeatedly flooded Kashmere Gardens neighborhood found that residents viewed

the framework used by the Harris County Flood Control District for buyout processes (based on federal URA policies) as overly focused on financial aspects of buyouts. Residents thought about relocation more holistically, including suitability of housing available to them, their treatment by relocation specialists, the relocation planning process, potential health issues (including mental health), and their attachment to their home, neighborhood, and community (Lynn 2017). They may also have had limited choices in local housing markets: A study following Hurricane Sandy found that “more than 20 percent of the 323 households bought out moved to areas with flood hazards as severe as their original homes, and 321 of 323 moved to neighborhoods with higher poverty levels” (McGhee, Binder and Albright 2020, ii-iii). And other studies have found that buyout participants sometimes move to areas of equal or higher climate risk (Loughran and Elliott 2019).

Not surprisingly, relocation has strong effects on residents’ mental health. In the twentieth century, relocated families of color “commonly suffer[ed] from depression, isolation, regret, and resentment due to a sense of loss of control over their lives” (Rohe and Mouw 1991, cited in Lynn 2017, 955). Contemporary research finds that relocation can cause social and emotional harm, as well as financial damage (DeVries 2017; DeVries and Fraser 2012; Lynn 2017). A study of an eastern Missouri community relocated away from dioxin contamination found that loss of place and home was the biggest impediment to successful disaster recovery (Olsen 2017). Attachment to place was also seen in residents’ views in communities highly affected by Hurricane Sandy: they were not totally opposed to relocation, but preferred structural solutions to coastal hazards that would allow them to remain (Bukvic and Owen 2017).

After residents participate in a buyout program and relocate to a new home, bought-out land is then actively or passively repurposed for new, non-residential use. In the section below, we describe research focused on land use of post-buyout properties.

Post-Buyout Land Use

After relocation, newly vacant land is repurposed for flood protection, parkland, recreation, water and air quality protection, agriculture, and wildlife habitat, depending on location, size, and other characteristics of the buyout area (Atoba et al. 2021). These uses can provide an array of ecological, social, and economic benefits but also potential harms. Although post-buyout land use has received less attention in the literature than buyout programs, the 30-year history of FEMA-funded buyouts provides a glimpse of how post-buyout lands might be used in a status quo situation. When Zavar and Hagelman (2016) analyzed FEMA-funded buyouts, they found that managers restored seven percent of the post-buyout lands to wetlands, managed 40 percent as parks, and held 34 percent of post-buyout lands as vacant lands. While the Zavar and Hagelman study provides the most comprehensive analysis of post-buyout lands uses in the U.S., other research offers guidance about how post-buyout land might provide benefits and harms related to climate

preparation and adaptation. Below, we synthesize the literature about post-buyout land use and provide an overview of potential benefits and harms associated with these climate adaptation-related land uses (Anguelovski and Corbera 2022).

Post-Buyout Land Uses: Potential Source of Benefits and Harms

Decisions made by government agencies regarding the use of land after buyouts can generate benefits or harms. Benefits include the creation of ecological infrastructure to protect from climate risks, as well as potentially using land to address past harms. The harms identified include increased displacement of low-income or BIPOC households, in addition to a fragmented pattern of buyouts that leaves remaining households at risk from climate-related events and other conditions.

Post-buyout landscapes can function as ecological infrastructure for climate adaptation. Government agencies can use post-buyout lands for ecological infrastructure that increases flood protection, stabilizes temperatures, and buffers fire (Tate et al. 2016). Open space can reduce flood damage from hurricanes (Highfield, Brody and Shepard 2018), and larger, more connected open spaces reduce flood loss more than fragmented open spaces (Brody et al. 2014; Brody et al. 2018). Since ecological function often depends on ecological infrastructure being implemented as larger, more connected networks, adding buyout properties adjacent to existing parks and open spaces can amplify benefits of new acquisitions (Zavar and Hagelman 2016). These new land uses may also contribute to avoided costs of installing defensive infrastructure, such as flood walls or levees (Yarina, Mazereeuw and Ovalles 2019).

Post-buyout landscapes can acknowledge past land use harms. Post-buyout land use provides opportunities for creative land reuse that could address recent as well as historical and ongoing harms, in addition to providing opportunity for participation and co-design. For example, both parkland and vacant lands could allow for new land uses that protect people from future climate risk while acknowledging past harms, ranging from acknowledgement of recent events such as flooding but also addressing longer-term trauma related to colonization, forced relocations, and loss of multigenerational relationships to land. The literature more commonly discusses post-buyout land uses that reference more recent, climate-risk related traumas rather than reparative land uses that seek to address longer term harms. For example, some post-buyout communities have created memorials to recognize former residents who were impacted by climate-related events, participated in buyouts, and then moved away (Zavar 2019). Other research has identified creative uses of post-buyout lands as pathways to community healing and recovery (Baker et al. 2018; Binder and Greer 2016). For instance, storytelling and art could be used to create gardens, public art, and memorials that acknowledge losses of home, community, and lives. Or, former residents could design a place that reimagines

community connections; although residents can no longer live in the buyout area, new land uses could include picnic areas, community gardens, sports and recreation facilities, or performance areas where former residents can gather and connect with former neighbors. In this way, co-design and planning tools can be used to create hopeful visions and narratives of a new future (Koslov 2016), although few examples of buyouts programs that incorporate these land uses exist.

Even less literature focuses on attempts to address long-term inequities and harms via post-buyout land use and management. Shi suggests such an example of a post-buyout land use that could indirectly address losses experienced by tribal communities over generations:

[C]ould Indigenous peoples and other coastal settlements imagine a process of retreat that results in a new national, public seashore that restores the natural ecosystems and be done in ways that expand indigenous access to historic lifeways?" (Shi 2021, 27)

However, to our knowledge, nothing in the planning literature yet examines how post-buyout land uses could directly intersect with land back or land restitution movements that seek to return land and land use to tribal communities, or, more broadly, substantively engages with how climate adaptation planning research focused on buyouts and their aftermath can reframe around decolonization (see, e.g., Bronen and Cochran 2021). Likewise, the planning literature does not engage with how post-buyout land use might address other types of dis-possession and property devaluation. For example, how might post-buyout land use generate income that could be used to partially compensate buyout participants whose properties' value (and therefore buyout compensation) have been lowered because of racialized real estate markets or disproportionate infrastructure investments?

Post-buyout land use may result in gentrification and displacement. Some buyout programs have led to climate adaptation benefits for wealthy households while harming lower income households or households of color (Goh 2020; Koslov 2016; Shi 2021). For example, Koslov (2016) documents the use of planning processes to remove existing housing for the stated purpose of flood protection, while in actuality the land is rebuilt as waterfront properties for the wealthy. Through these inequitable processes, high-income individuals can gain value at the expense of lower-income households when climate adaptation projects are implemented in low- and middle-income neighborhoods. Other scholars have documented instances of local governments slating low- or middle-income residential areas for buyout programs in order for land to be repurposed for land uses (e.g., green infrastructure) intended to make higher income residents safer (Anguelovski et al. 2020; Gould and Lewis 2018).

Post-buyout land use may result in the "checkerboard effect" and harm to remaining neighbors. The "checkerboard effect" can occur when some homeowners participate in a buyout while others remain in place, resulting in harm to remaining residents as well as to the broader goals of the

buyouts (Freudenberg et al. 2016; Maly and Ishikawa 2013; Zavar and Hagelman 2016). For example, vacant parcels can experience vandalism and dumping, which affects remaining neighbors. In response, Atoba et al. (2021) present a buyout process that prioritizes a parcel's proximity to other buyout parcels and the existing network of open space. They found that connectivity to existing and potential green space did not raise buyout costs but added significant benefits, maximizing value from post-buyout land use. However, Atoba et al.'s consideration of checkerboard effect did not include direct attention to equity; for example, although prioritizing proximity to other buyout parcels may increase conservation value, it may also amplify injustice. For example, if low-income households are more likely to participate in buyout programs due to reduced flexibility (e.g., less opportunity to pay for expensive retrofits), prioritizing buyout parcels adjacent to previously bought-out properties may create clustering of buyouts in lower income neighborhoods, thereby contributing to climate displacement.

Gaps in Our Knowledge, Limitations of Existing Studies, and Future Directions for Research

Based on our review, we find that programs treat buyouts primarily as strategies for reducing threats to residential areas posed by climate change, and climate-related buyout programs produce inequitable distributive and procedural outcomes for low-income or BIPOC residents due to: inequitable valuation of bought-out properties; inequitable access to program assistance; lack of alternatives for residents; context-blind consideration of existing infrastructure; and, an emphasis on individual over community-scale buyouts. The nascent literature regarding the outcomes of relocation efforts is limited and does not cover the array of contexts where such programs may be required. Instead, the literature documents the challenges that communities have faced in planning their own resettlement, and highlights particular harms that current efforts have or might produce. Finally, the literature on post-relocation land use documents both benefits and harms. Benefits identified include creation of ecological infrastructure to protect communities from increased displacement of low-income or BIPOC households, or a fragmented pattern of buyouts that leaves remaining households at risk of harm from disasters or other conditions. Below, we provide an overview of knowledge gaps, research limitations, and future directions for the tri-partite process of climate-related buyout programs.

Buyouts and Climate Preparedness

Existing studies and case studies provide us with a better understanding of some of the relationships between buyouts and climate preparedness, although critical research questions remain unaddressed. Thirty years of FEMA-funded buyouts have yielded knowledge about how infrastructure investments and market valuation influences which residents are allowed

to remain and who is asked to relocate (Elliott, Brown and Loughran 2020; Mach et al. 2019). We have seen that in the U.S., buyout programs have mostly targeted individual residents, rather than more complex community-scaled buyouts (Maldonado 2014). And while more privileged residents have had disproportionate access to nationally funded buyout programs, BIPOC households have been more likely to participate in buyouts (Elliott, Brown and Loughran 2020).

Despite this useful baseline of knowledge, residents, scholars, and practitioners would benefit from more case studies of completed buyout programs. In particular, we emphasize the critical necessity for more research that uses an equity and justice lens to analyze processes and outcomes related to buyouts. For example, who participates in buyout programs, and how do racialized real estate markets influence which residents local governments ask to move, as well as likelihood of resident participation? In a similar way, if condemnation becomes more common in the U.S., planners should monitor the equity implications of what types of communities come under condemnation, given racialized real estate markets. In addition, even as communities experience a growing need for climate-related buyouts, no existing agencies or dedicated funding streams focus on buyouts, resettlement, and land reuse (Bronen 2011; Maldonado 2014), leading to an urgent need for more research focused on equitable governance of processes, programs, and funding sources. A better understanding of how planning legacies and previous discrimination have shaped current buyout programs will add critical context to policy making surrounding future buyout and resettlement programs. For example, given new documentation of relationships between redlining and climate risk (Hoffman, Shandas and Pendleton 2020), in what ways can future buyout programs address and repair climate inequities begun generations ago? Who participates in buyouts, and why, and how can this information help us create more equitable, participatory buyout processes? What planning processes can ensure that buyout programs become more participatory and equitable?

Rebuilding and Resettlement

While there has been a sharp increase in published research on the impacts of climate change and the need for relocation, there is relatively little information on outcomes for residents and communities relocated following climate-related events. In part, this is due to the lack of data collection by agencies charged with providing disaster assistance: for example, FEMA does not track where households receiving assistance end up (McGhee, Binder and Albright 2020). Critically, are buyouts successfully reducing climate risk, or are displaced people making new homes in equally risky areas, due to lack of choice, adequate resources, and/or information? In other words, can buyouts reduce overall climate risk by only paying attention to property location while ignoring systemic issues of discrimination, wealth distribution, and forces of displacement that are expressed through resettlement outcomes? In addition, the kind of information collected must include

residents' views of their options, what matters to them in making decisions about moving, and a broader range of evidence regarding post-relocation outcomes. Currently, information on residents' views suggests that they value social and economic factors highly and that these factors have not been adequately integrated into relocation site selection criteria by public agencies. However, as Yarina notes, the lack of attention to justice, social vulnerability, and community ties in resettlement planning may be due, in part, to the difficulty of measuring and tracking such outcomes (Yarina, Mazereeuw and Ovalles 2019). For communities choosing to relocate together, defining equitable resettlement outcomes will require a more holistic and context-based approach, where community-led planning is linked to programmatic resources. While this echoes one of the climate adaptation assessment principles put forward by Fussell (2007), it will require more attention to relationships between social and ecological vulnerabilities.

Equitable and Ecological Post-Buyout Land Use

Overall, there is a scarcity of empirical data that describes post-buyout land use; the research that does exist categorizes land uses but does not emphasize equity and justice (e.g., Zavar and Hagelman 2016). In response, a key future direction for research should focus on how planners can work with communities to co-design and implement post-buyout landscapes in a socio-ecologically beneficial and just manner. In a similar way, there has been a dearth of research focused on how post-buyout lands can be used and managed to provide ecological function. Ecologically healthy land uses in post-buyout areas are land uses that increase ecological function, which are physical, chemical, and biological processes (e.g., filtration, pollination, photosynthesis) that change or move energy and materials (e.g., water, nutrients, soil) (Naem 1998). Land uses that support ecological functions include but are not limited to the creation of places that allow for flood absorption and water quality improvement; park spaces that provide multiple ecological benefits as well as physical, mental, and emotional health benefits for people, agricultural uses, and habitat areas.

In order to make beneficial and equitable plans for future land use of these areas, we need more data about potential for ecological benefits and harms, how these functions are distributed among populations, and how post-buyout land use impacts adjacent properties (e.g., the checkerboard effect). For example, post-buyout land could be redeveloped into a coastal trail network or a series of socioecological reserves that allow for Indigenous traditional uses (e.g., hunting, fishing, cultivation) while also providing habitat, recreation, and coastline stabilization values. In this way, a new coastal commons could help decolonize landscapes developed through European settlement by providing space for socioecological uses by Indigenous peoples, perhaps avoiding some conflict inherent to other attempts to blend Indigenous land uses with existing colonial land uses (Simpson and Bagelman 2018). More radically, post-buyout land use could even provide a pathway for land back or

land restitution undertakings, although caution would be needed to ensure that future land uses did not put people at risk. For example, while lands bought out because of flood risk could not be used safely for future residential land use, other land uses, such as foodways traditions, might still be safely undertaken and secured through property rights. As such, post-buyout land use presents a critical opportunity for research about how future land use of these properties may intersect with the potential to address historic dispossession or systemic property devaluation due to racialized markets or uneven access to infrastructure. Importantly, our review underscores the compelling need for increased transdisciplinary attention to post-buyout land use—for example, social scientists working with residents and decision-makers to identify post-buyout case studies and document equity and justice implications, matched with ecologists analyzing changes in ecological function and flows over time.

Conclusion

Climate-related property buyouts increasingly affect people, communities, and planning systems, signaling the need for increased attention from planning practitioners and scholars. Existing literature treats buyouts primarily as strategies for reducing threats to residential areas posed by climate change. We argue that this frame is too narrow and prevents understanding and support of strategies that will produce more equitable outcomes. This process necessarily includes three parts: decisions to target particular areas and residents for buyouts or relocation, options residents face—either individually or collectively—for moving to a new home that meets a more holistic set of needs than is reflected in current program parameters, and, finally, reuse of land following relocation. Likewise, while most articles do not focus on the interconnections among these three phases, these interconnections potentially add to the risk of inequitable harms—for example, when participants in buyout programs are provided little support for resettlement, or when future land use of bought-out parcels, such as establishment of private fishing camps, expands recreational access for new, wealthier residents while reducing access by former residents. As a result, planners would benefit from more research examining and documenting these interactions, as well as the equity implications of these interactions. Seeing these three pieces as interconnected and embedded in historical context will allow us to reduce climate threats to residents while addresses existing patterns of inequity. Future research, aimed at filling gaps we have identified in this review—including critical attention to issues of equity and justice in regard to buyouts, resettlement, and land reuse—will be an important part of envisioning a new way forward.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Katherine Lieberknecht  <https://orcid.org/0000-0002-4168-7457>

References

- American Planning Association (APA). 2021. "About Planning." <https://www.planning.org/aboutplanning/>.
- Anguelovski, Isabelle, Anna L. Brand, James J. Connolly, Esteve Corbera, Panagiota Kotsila, Justin Steil, Melissa Garcia-Lamarca, et al. 2020. "Expanding the Boundaries of Justice in Urban Greening Scholarship: Toward an Emancipatory, Antisubordination, Intersectional, and Relational Approach." *Annals of the American Association of Geographers* 110 (6): 1743–69.
- Anguelovski, Isabelle, and Esteve Corbera. 2023. "Integrating Justice in Nature-Based Solutions to Avoid Nature-Enabled Dispossession." *Ambio*, 1–9.
- Anguelovski, Isabelle, Linda Shi, Eric Chu, Daniel Gallagher, Kian Goh, Zachary Lamb, Kara Reeve, and Hannah Teicher. 2016. "Equity Impacts of Urban Land Use Planning for Climate Adaptation: Critical Perspectives from the Global North and South." *Journal of Planning Education and Research* 36 (3): 333–48. <http://doi.org/f833rn>.
- Atoba, Kayode O., Samuel D. Brody, Wesley E. Highfield, Christine C. Shepard, and Lily N. Verdone. 2021. "Strategic Property Buyouts to Enhance Flood Resilience: A Multi-Criteria Spatial Approach for Incorporating Ecological Values into the Selection Process." *Environmental Hazards* 20 (3): 229–47.
- Baker, Charlene K., Sherri B. Binder, Alex Greer, Paige Weir, and Kalani Gates. 2018. "Integrating Community Concerns and Recommendations into Home Buyout and Relocation Policy." *Risk, Hazards & Crisis in Public Policy* 9 (4): 455–79.
- Bakkensen, Laura A., and Lala Ma. 2020. "Sorting Over Flood Risk and Implications for Policy Reform." *Journal of Environmental Economics and Management* 104: 102362.
- Berndtsson, Ronny, Per Becker, Andreas Persson, Henrik Aspegren, Salar Haghighatafshar, Karin Jönsson, Rolf Larsson, et al. 2019. "Drivers of Changing Urban Flood Risk: A Framework for Action." *Journal of Environmental Management* 240: 47–56.
- Binder, Sherri B., Charlene K. Baker, and John P. Barile. 2015. "Rebuild or Relocate? Resilience and Postdisaster Decision-Making After Hurricane Sandy." *American Journal of Community Psychology* 56 (1): 180–96.
- Binder, Sherri B., and Alex Greer. 2016. "The Devil is in the Details: Linking Home Buyout Policy, Practice, and Experience After Hurricane Sandy." *Politics and Governance* 4 (4): 97–106.
- Brody, Samuel, Russell Blessing, Antonia Sebastian, and Philip Bedient. 2014. "Examining the Impact of Land Use/Land Cover Characteristics on Flood Losses." *Journal of Environmental Planning and Management* 57 (8): 1252–65.
- Brody, Samuel, Antonia Sebastian, Russell Blessing, and Phillip Bedient. 2018. "Case Study Results from Southeast Houston, Texas: Identifying the Impacts of Residential Location on Flood Risk and Loss." *Journal of Flood Risk Management* 11: S110–20.
- Bronen, Robin. 2011. "Climate-Induced Community Relocations: Creating an Adaptive Governance Framework based in Human Rights Doctrine." *N.Y.U. Review of Law and Social Change* 35 (2): 357.
- Bronen, Robin. 2015. "Climate-induced Community Relocations: Using Integrated Social-Ecological Assessments to Foster Adaptation and Resilience." *Ecology and Society* 20 (3): 1–8. <https://doi.org/10.5751/ES-07801-200336>.
- Bronen, Robin, and F. Stuart Chapin. 2013. "Adaptive Governance and Institutional Strategies for Climate-Induced Community Relocations in Alaska." *Proceedings of the National Academy of Sciences* 110 (23): 9320–5.
- Bronen, Robin, and Patricia Cochran. 2021. "Decolonize Climate Adaptation Research." *Science (New York, N.Y.)* 372 (6548): 1245–1245.
- Brown, Oli. 2008. *Migration and Climate Change*. United Nations.
- Bukvic, Anamaria, Patrick Biber, Martiza Barreto, and Susan Roberts. 2019. "Socio-ecological Mobility: A Research Strategy for a new Coastline." *Coastal Management* 47 (6): 611–20.
- Bukvic, Anamaria, and Aishwarya Borate. 2021. "Developing Coastal Relocation Policy: Lessons Learned from the FEMA Hazard Mitigation Grant Program." *Environmental Hazards*, 20(3): 1–21.
- Bukvic, Anamaria, and Graham Owen. 2017. "Attitudes Towards Relocation Following Hurricane Sandy: Should we Stay or Should we go?" *Disasters* 41 (1): 101–23.
- Bullard, Robert, and John Lewis. 1996. *Environmental Justice and Communities of Color*. San Francisco, CA: Sierra Club Books.
- Campanella, Richard. 2013. "Gentrification and Its Discontents: Notes from New Orleans." *New Geography* 1. <https://www.newgeography.com/content/003526-gentrification-and-its-discontents-notes-new-orleans>.
- Carey, John. 2020. "Core Concept: Managed Retreat Increasingly Seen as Necessary in Response to Climate Change's Fury." *Proceedings of the National Academy of Sciences* 117(24):13182-13185.
- Climigration Network. 2021. *Lead with Listening: A Guidebook for Community Conversations on Climate Migration*. https://static1.squarespace.com/static/580df9afe4fb5fdf27a053a/t/60f02f35a9bc231ac1d16416/1626353465637/LeadwithListening_ClimigrationNetwork_20210715.pdf.
- Cutter, Susan L., Bryan J. Boruff, and W. Lynn Shirley. 2012. "Social Vulnerability to Environmental Hazards." In *Hazards Vulnerability and Environmental Justice*, 143–60. Oxfordshire: Routledge.
- Cutter, Susan L., Jerry T. Mitchell, and Michael S. Scott. 2000. "Revealing the Vulnerability of People and Places: A Case Study of Georgetown County, South Carolina." *Annals of the Association of American Geographers* 90 (4): 713–37.
- Dahl, Kristina, Rachel Cleetus, Erika Spanger-Siegfried, Shana Udvardy, Astrid Caldas, and Pamela Worth. 2018. *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*. Cambridge, MA: Union of Concerned Scientists. [Online at www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf](http://www.ucsusa.org/sites/default/files/attach/2018/06/underwater-analysis-full-report.pdf).
- Dermansky, John. 2019. *Isle de Jean Charles tribe turns down funds to relocate first US 'climate refugees' as Louisiana buys land anyway*. DeSmog Blog.
- De Vries, Daniel. 2017. "Temporal Vulnerability and the Post-Disaster 'Window of Opportunity to Woo:' A Case Study of an

- African-American Floodplain Neighborhood After Hurricane Floyd in North Carolina." *Human Ecology* 45 (4): 437–48.
- De Vries, Daniel, and John Fraser. 2012. "Citizenship Rights and Voluntary Decision Making in Post-Disaster US." *International Journal of Mass Emergencies and Disasters* 30: 1–33.
- De Vries, Daniel, and John Fraser. 2017. "Historical Waterscape Trajectories That Need Care: The Unwanted Refurbished Flood Homes of Kinston's Devolved Disaster Mitigation Program." *Journal of Political Ecology* 24 (1): 931–50.
- Dickerson, Mechele. 2014. *Homeownership and America's Financial Underclass: Flawed Premises, Broken Promises, New Prescriptions*. Cambridge: Cambridge University Press.
- Elliott, James R., Phylcia L. Brown, and Kevin Loughran. 2020. "Racial Inequities in the Federal Buyout of Flood-Prone Homes: A Nationwide Assessment of Environmental Adaptation." *Socius* 6: 2378023120905439.
- Fainstein, Susan. 2010. *The Just City*. Ithaca, NY: Cornell University Press.
- Farbotko, Carol, Olivia Dun, Fanny Thornton, Karen McNamara, and Celia McMichael. 2020. "Relocation Planning Must Address Voluntary Immobility." *Nature Climate Change* 10: 702–3.
- FEMA 2020. OpenFEMA dataset: hazard mitigation assistance mitigated properties - v2. <https://www.fema.gov/openfema-data-page/hazard-mitigation-assistance-mitigated-properties-v2>.
- Ferris, Elizabeth, and Sanjula Weerasinghe. 2020. "Promoting Human Security: Planned Relocation as a Protection Tool in a Time of Climate Change." *Journal on Migration and Human Security* 8 (2): 134–49.
- Freudenberg, Robert, Ellis Calvin, Laura Tolkoff, and Dare Brawley. 2016. *Buy-in for Buyouts: The Case for Managed Retreat from Flood Zones*. Cambridge, MA: Lincoln Institute of Land Policy.
- Fullilove, Mindy T. 1996. "Psychiatric Implications of Displacement: Contributions from the Psychology of Place." *American Journal of Psychiatry* 153: 12.
- Fussell, Hans-Martin. 2007. "Adaptation Planning for Climate Change: Concepts, Assessment Approaches, and Key Lessons." *Sustainability Science* 2: 265–75.
- Godschalk, David R., Timothy Beatley, Brower Berke Philip, J. David, and Edward J Kaiser. 1999. *Natural Hazard Mitigation: Recasting Disaster Policy and Planning*. Washington, DC: Island Press.
- Goh, Kian. 2020. "Planning the Green New Deal: Climate Justice and the Politics of Sites and Scales." *Journal of the American Planning Association* 86 (2): 188–95.
- Gotham, Kevin Fox. 2014. "Racialization and Rescaling: Post-Katrina Rebuilding and the Louisiana Road Home Program." *International Journal of Urban and Regional Research* 38 (3): 773–790.
- Gotham, Kevin, and Miriam Greenberg. 2014. *Crisis Cities: Disaster and Redevelopment in New York and New Orleans*. Oxford University Press.
- Gould, Kenneth A., and Tammy L Lewis. 2018. "From Green Gentrification to Resilience Gentrification: An Example from Brooklyn." *City & Community* 17: 12–5.
- Green, Timothy F., and Robert B. Olshansky. 2012. "Rebuilding Housing in New Orleans: The Road Home Program After the Hurricane Katrina Disaster." *Housing Policy Debate* 22 (1): 75–99.
- Hauer, Mathew E. 2017. "Migration Induced by Sea-Level Rise Could Reshape the US Population Landscape." *Nature Climate Change* 7 (5): 321–5.
- Hauer, Mathew E., Jason M. Evans, and Deepak R. Mishra. 2016. "Millions Projected to be at Risk from Sea-Level Rise in the Continental United States." *Nature Climate Change* 6 (7): 691–5.
- Hendricks, Marccus D., and Shannon Van Zandt. 2021. "Unequal Protection Revisited: Planning for Environmental Justice, Hazard Vulnerability, and Critical Infrastructure in Communities of Color." *Environmental Justice* 14 (2): 87–97.
- Hettiarachchi, Suresh, Conrad Wasko, and Ashish Sharma. 2018. "Increase in Flood Risk Resulting from Climate Change in a Developed Urban Watershed—the Role of Storm Temporal Patterns." *Hydrology and Earth System Sciences* 22 (3): 2041–56.
- Heynen, Nik. 2014. "Urban Political Ecology I: The Urban Century." *Progress in Human Geography* 38 (4): 598–604.
- Highfield, Wesley E., Samuel D. Brody, and Christine Shepard. 2018. "The Effects of Estuarine Wetlands on Flood Losses Associated with Storm Surge." *Ocean & Coastal Management* 157: 50–5.
- Hino, Miyuki, Christopher B. Field, and Katharine J Mach. 2017. "Managed Retreat as a Response to Natural Hazard Risk." *Nature Climate Change* 7 (5): 364–70.
- Hinzman, Larry D., D. Neil, W. Robert Bettez, F. Stuart Bolton, Mark B. Chapin, Chris L. Dyrurgerov, and Brad Fastie. 2005. "Evidence and Implications of Recent Climate Change in Northern Alaska and Other Arctic Regions." *Climatic Change* 72 (3): 251–298.
- Hoffman, Jeremy S., Vivek Shandas, and Nicholas Pendleton. 2020. "The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas." *Climate* 8 (1): 12.
- Isle de Jean Charles Tribe. 2019. "The Isle de Jean Charles Tribal Resettlement: A Tribal-Driven, Whole Community Process." Press Release, January 15. <https://static1.squarespace.com/static/5672cfb1d82d5e366e753691/t/5c425ac4c74c507d878e696a/1547852484564/IDJC+Press+release+1-18-19.pdf>.
- Iverson, J. 2013. "Funding Alaska Village Relocation Caused by Climate Change and Preserving Cultural Values During Relocation." *Seattle Journal for Social Justice* 12 (2): 561–602.
- Jingnan, Huo, Rebecca Hersher, T. Wendland, S. Newborn, and D. Rivero. 2021. "The Federal Government Sells Flood-Prone Homes To Often Unsuspecting Buyers, NPR Finds." *Morning Edition*, September 13.
- Kahn, Matthew E., and Kerry Smith. 2017. *The Affordability Goal and Prices in the National Flood Insurance Program* (No. w24120). National Bureau of Economic Research.
- Katz, Lily. 2021. "A Racist Past, a Flooded Future: Formerly Redlined Areas Have \$107 Billion Worth of Homes Facing High Flood Risk—25% More Than Non-Redlined Areas." *Redfin News*, March 14.
- Koslov, Liz. 2016. "The Case for Retreat." *Public Culture* 28 (2): 359–87.
- Kraan, Caroline M., Miyuki Hino, Jennifer Niemann, A. R. Siders, and Katharine J. Mach. 2021. "Promoting Equity in Retreat Through Voluntary Property Buyout Programs." *Journal of Environmental Studies and Sciences* 11 (3): 481–92.
- Kulp, Scott A., and Benjamin H. Strauss. 2019. "New Elevation Data Triple Estimates of Global Vulnerability to Sea-Level Rise and Coastal Flooding." *Nature Communications* 10 (1): 1–12.

- Lee, Dalbyul, and Juchul Jung. 2014. "The Growth of Low-Income Population in Floodplains: A Case Study of Austin, TX." *KSCE Journal of Civil Engineering* 18 (2): 683–93.
- Loewenstein, Antony. 2015. *Disaster Capitalism: Making a Killing Out of Catastrophe*. Brooklyn, NY: Verso Books.
- Loughran, Kevin, and James R Elliott. 2019. "Residential Buyouts as Environmental Mobility: Examining Where Homeowners Move to Illuminate Social Inequities in Climate Adaptation." *Population and Environment* 41: 52–70.
- Loughran, Kevin, James R. Elliott, and S. W. Kennedy. 2019. "Urban Ecology in the Time of Climate Change: Houston, Flooding, and the Case of Federal Buyouts." *Social Currents* 6 (2): 121–40.
- Lynn, Kevin A. 2017. "Who Defines "Whole": An Urban Political Ecology of Flood Control and Community Relocation in Houston, Texas." *Journal of Political Ecology* 24 (1): 951–67.
- Mach, Katherine J., Caroline M. Kraan, Miyuki Hino, A. R. Siders, Erica M. Johnston, and Christopher B Field. 2019. "Managed Retreat Through Voluntary Buyouts of Flood-Prone Properties." *Science Advances* 5 (10): 8995.
- Maldonado, Julie K. 2014. "A Multiple Knowledge Approach for Adaptation to Environmental Change: Lessons Learned from Coastal Louisiana's Tribal Communities." *Journal of Political Ecology* 21 (1): 61–82.
- Maldonado, Julie K., Christine Shearer, Robin Bronen, Kristina Peterson, and Heather Lazrus. 2013. "The Impact of Climate Change on Tribal Communities in the US: Displacement, Relocation, and Human Rights." In *Climate Change and Indigenous Peoples in the United States*, 93–106. Cham: Springer.
- Maly, Elizabeth, and Eiko Ishikawa. 2013. "Land Acquisition and Buyouts as Disaster Mitigation after Hurricane Sandy in the United States." In *Proceeding of International Symposium on City Planning* (p. 18). <http://www.cpij.or.jp/com/iac/sympo/13/ISCP2013-8.pdf>.
- Marino, Elizabeth. 2018. "Adaptation Privilege and Voluntary Buyouts: Perspectives on Ethnocentrism in Sea Level Rise Relocation and Retreat Policies in the US." *Global Environmental Change* 49: 10–3.
- Martin, Adrian, Brendan Coolsaet, Esteve Corbera, Neil M. Dawson, James A. Fraser, Ina Lehmann, and Iokiñe Rodriguez. 2016. "Justice and Conservation: The Need to Incorporate Recognition." *Biological Conservation* 197: 254–261.
- McGhee, D. J., S. B. Binder, and E. A. Albright. 2020. "First, do no Harm: Evaluating the Vulnerability Reduction of Post-Disaster Home Buyout Programs." *Natural Hazards Review* 21 (1): 05019002.
- McNamara, Karen E., Robin Bronen, Nishara Fernando, and Silja Klepp. 2018. "The Complex Decision-Making of Climate-Induced Relocation: Adaptation and Loss and Damage." *Climate Policy* 18 (1): 111–7.
- Melillo, Jerry M., T. T. Richmond, and Gary Yohe. 2014. "Climate Change Impacts in the United States." *Third National Climate Assessment* 52.
- Mol, Annemarie. 2008. *The Logic of Care: Health and the Problem of Patient Choice*. Oxfordshire, England, United Kingdom : Routledge.
- Mueller, Elizabeth J., and Sarah Dooling. 2011. "Sustainability and Vulnerability: Integrating Equity into Plans for Central City Redevelopment." *Journal of Urbanism: International Research on Placemaking and Urban Sustainability* 4 (3): 201–22.
- Muñoz, Cristina, and Eric Tate. 2016. "Unequal Recovery? Federal Resource Distribution After a Midwest Flood Disaster." *International Journal of Environmental Research and Public Health* 13 (5): 507. <https://doi.org/10.3390/ijerph13050507>.
- Mutter, John C. 2015. *The Disaster Profiteers: How Natural Disasters Make the Rich Richer and the Poor Even Poorer*. New York, NY: St. Martin's Press.
- Naeem, Shahid. 1998. "Species Redundancy and Ecosystem Reliability." *Conservation Biology* 12 (1): 39–45.
- Nelson, Marla, and Renia Ehrenfeucht. 2016. "Moving to Safety? Opportunities to Reduce Vulnerability Through Relocation and Resettlement Policy." *How Cities Will Save the World: Urban Innovation in the Face of Population Flows, Climate Change and Economic Inequality* 65.
- Nelson, Marla, Renia Ehrenfeucht, Traci Birch, and Anna Brand. 2022. "Getting by and Getting Out: How Residents of Louisiana's Frontline Communities are Adapting to Environmental Change." *Housing Policy Debate* 32 (1): 84–101.
- Newell, Peter, Shilpi Srivastava, Lars Otto Naess, Gerardo A. Torres Contreras, and Roz Price. 2021. "Toward Transformative Climate Justice: An Emerging Research Agenda." *Wiley Interdisciplinary Reviews: Climate Change* 12 (6): e733.
- Olsen, Susan A. 2017. "Environmental Relocation Policy as Experienced by One Eastern Missouri Dioxin-Contaminated Community." Doctoral Dissertation, Walden University.
- Perry, Ronald, and Michael Lindell. 1991. "The Effects of Ethnicity on Evacuation Decision-Making." *International Journal of Mass Emergencies and Disasters* 9: 47–68.
- Pinter, Nicholas, and James C Rees. 2021. "Assessing Managed Flood Retreat and Community Relocation in the Midwest USA." *Natural Hazards* 107: 497–518.
- Pulido, Laura. 2000. "Rethinking Environmental Racism: White Privilege and Urban Development in Southern California." *Annals of the Association of American Geographers* 90: 12–40.
- Radeloff, Volker C., David P. Helmers, H. Anu Kramer, Miranda H. Mockrin, Patricia M. Alexandre, Avi Bar-Massada, Van Butsic, et al. 2018. "Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk." *Proceedings of the National Academy of Sciences* 115 (13): 3314–9.
- Rawls, John. 1971. *A Theory of Justice*. Cambridge (Mass.): The Belknap Press of Harvard University Press.
- Rohe, William M., and Scott Mow. 1991. "The Politics of Relocation: The Moving of the Crest Street Community." *Journal of the American Planning Association* 57 (1): 57–68.
- Scott, Mark, Mick Lennon, Fiadh Tubridy, Patrick Marchman, A. R. Siders, Kelly Leilani Main, Victoria Herrmann, Debra Butler, Kathryn Frank, Karyn Bosomworth, Raphaele Blachi, and Cassidy Jones. 2020. "Climate Disruption and Planning: Resistance or Retreat?." *Planning Theory & Practice* 21 (1): 125–54.
- Schlosberg, David. 2004. "Reconceiving Environmental Justice: Global Movements and Political Theories." *Environmental Politics* 13 (3): 517–40.

- Schlosberg, David, and Lisette B Collins. 2014. "From Environmental to Climate Justice: Climate Change and the Discourse of Environmental Justice." *Wiley Interdisciplinary Reviews: Climate Change* 5 (3): 359–74.
- Shabazz, Rashad. 2015. *Spatializing Blackness: Architectures of Confinement and Black Masculinity in Chicago*. Chicago, IL: University of Illinois Press.
- Shearer, Christine. 2011. *Kivalina: A Climate Change Story*. Chicago, IL: Haymarket Books.
- Shi, Linda. 2021. "From Progressive Cities to Resilient Cities: Lessons from History for New Debates in Equitable Adaptation to Climate Change." *Urban Affairs Review* 57 (5): 1442–79.
- Shi, Linda, E. Chu, I. Anguelovski, A. Aylett, J. Debats, K. Goh, Todd Schenk, et al. 2016. "Roadmap Towards Justice in Urban Climate Adaptation Research." *Nature Climate Change* 6 (2): 131.
- Siders, Anne R. 2019. "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change* 152 (2): 239–57.
- Sikor, Thomas, Janet Fisher, Roger Few, Adrian Martin, and Mark Zeitoun. 2013. *The Justices and Injustices of Ecosystem Services*, 201–14. Oxfordshire: Routledge.
- Simpson, Michael, and Jen Bagelman. 2018. "Decolonizing Urban Political Ecologies: The Production of Nature in Settler Colonial Cities." *Annals of the American Association of Geographers* 108 (2): 558–68.
- Stocker, Laura, and Deborah Kennedy. 2009. "Cultural Models of the Coast in Australia: Toward Sustainability." *Coastal Management* 37 (5): 387–404.
- Supekar, Sunjana. 2019. "Equitable Resettlement for Climate Change: Displaced Communities in the United States." *UCLA Law Review* 66 (5): 1290–328.
- Swyngedouw, E. 2009. "The Political Economy and Political Ecology of the Hyrdo-Social Cycle." *Journal of Contemporary Water Research and Education* 142 (1): 56–60.
- Tate, Eric, Aaron Strong, Travis Kraus, and Haoyi Xiong. 2016. "Flood Recovery and Property Acquisition in Cedar Rapids, Iowa." *Natural Hazards* 80 (3): 2055–2079.
- Taylor, Keeanga-Yamahtta. 2019. *Race for Profit: How Banks and the Real Estate Industry Undermined Black Homeownership*. Chapel Hill, NC: University of North Carolina Press.
- United States Department of Interior. n.d. Native American Ownership and Governance of Natural Resources. <https://revenue.data.doi.gov/how-revenue-works/native-american-ownership-governance/>.
- United States General Accounting Office (USGAO). 1995. *Hazardous and Nonhazardous Waste: Demographics of People Living Near Waste Facilities*. Washington: Government Printing Office.
- United States General Accounting Office (USGAO). 2009. *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*. Report to Congressional Committees. <http://www.gao.gov/new.items/d09551.pdf>.
- United States General Accounting Office (USGAO). 2009. *Alaska Native Villages: Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*. Report to Congressional Committees. <http://www.gao.gov/new.items/d09551.pdf>.
- Walker, Gordan. 2012. *Environmental Justice: Concepts, Evidence and Politics*. Oxfordshire: Routledge.
- Wilmsen, Brooke, and Michael Webber. 2014. "What Can We Learn from the Practice of Developed-Forced Displacement and Resettlement for Organised Resettlements in Response to Climate Change?" *Geoforum; Journal of Physical, Human, and Regional Geosciences* 58: 76–85.
- Yarina, Lizzie. 2018. "Your Sea Wall Won't Save You." *Places Journal*.
- Yarina, Lizzie, Miho Mazereeuw, and Larisa Ovalles. 2019. "A Retreat Critique: Deliberations on Design and Ethics in the Flood Zone." *Journal of Landscape Architecture* 14 (3): 8–23.
- Zavar, Elyse. 2019. "An Analysis of Floodplain Buyout Memorials: Four Examples from Central U.S. Floods of 1993–1998." *GeoJournal* 84 (1): 135–46.
- Zavar, Elyse, and Ronald R Hagelman. 2016. "Land Use Change on US Floodplain Buyout Sites, 1990–2000." *Disaster Prevention and Management* 25 (3): 360–74. <https://doi.org/10.1108/DPM-01-2016-0021>.

Author Biographies

Katherine Lieberknecht is an assistant professor in the Community and Regional Planning program in the School of Architecture at The University of Texas at Austin.

Elizabeth J. Mueller is an associate professor in the Community and Regional Planning program in the School of Architecture at The University of Texas at Austin.

Appendix

					(continued)				
Author	Date	Buyouts	Relocation	Re-use	Author	Date	Buyouts	Relocation	Re-use
Anguelovski	2020			x	Neal. <i>et al.</i>	2005	x		x
Atoba <i>et al.</i>	2021			x	Nelson <i>et al.</i>	2021		x	
Baker <i>et al.</i>	2018			x	Olsen	2017		x	
Bakkensen & Ma	2020	x	x		Pinter & Rees	2021	x	x	
Berndtsson <i>et al.</i>	2019	x			Radeloff <i>et al.</i>	2018	x		
Binder <i>et al.</i>	2015	x			Schlosberg	2004	x		
Binder & Greer	2018			x	Shabazz	2015	x		
Brody <i>et al.</i>	2014			x	Shi	2018	x		x
Brody <i>et al.</i>	2018			x	Shi	2020	x		
Bronen	2015	x			Siders	2019	x		
Bronen & Chapin	2013	x	x		Sikor	2013	x		
Bronen & Cochran	2021			x	Simpson	2017	x		
Bronie	2014			x	Supekar	2019		x	
Bukvic & Owen	2017		x		Tate <i>et al.</i>	2016			x
Bukvic <i>et al.</i>	2019	x	x		USGAO	2009	x		
Bukvic & Borate	2020	x			Walker	2012	x		
Cutter	2000		x		White	2011			x
de Vries	2017		x		Wilmsen & Webber	2014		x	
de Vries & Fraser	2012		x		Yarina <i>et al.</i>	2019	x		x
de Vries & Fraser	2017	x			Yarina	2018	x		
Dermansky	2019		x		Yino <i>et al.</i>	2017	x		
Elliot <i>et al.</i>	2020	x			Zavar	2019			x
Farbotko <i>et al.</i>	2020			x	Zavar & Hagelman	2016			x
Ferris & Weerasinghe	2020		x		Count	77	42	20	22
Freudenberg <i>et al.</i>	2016			x					
Godschalk <i>et al.</i>	1999	x							
Gotham	2014	x							
Gotham & Greenberg	2014	x							
Gould & Lewis	2018			x					
Hermann	2017								
Hettiarachchi <i>et al.</i>	2018	x							
Highfield <i>et al.</i>	2018			x					
Hinzman <i>et al.</i>	2005	x							
Iverson	2013			x					
Kahn & Smith	2015	x							
Keenan <i>et al.</i>	2018			x					
Koslov	2016								
Lee & Jung	2014	x							
Loewenstein	2015	x							
Loughran <i>et al.</i>	2019	x							
Loughran & Elliott	2019		x						
Lynn	2017	x	x						
Mach <i>et al.</i>	2019	x							
McNamara	2018	x							
McGhee	2020		x						
Maldonado <i>et al.</i>	2013		x						
Maldonado	2014	x	x						
Maly & Ishikawa	2013			x					
Marino	2018		x						
Marino	2018	x							
Martin <i>et al.</i>	2016	x							
Mueller <i>et al.</i>	2011	x							
Munoz & Tate	2016	x							
Mutter	2015	x							

(continued)