

*Annual Review of Sociology***Sociology and the Climate  
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**Abstract**

What would it mean for sociology to make climate change a core disciplinary concern? This article reviews research on a selection of trends brought on by the climate crisis: (a) compounding and cumulative disasters, infrastructure breakdown, and adaptation; (b) intensifying migration and shifting patterns of settlement; and (c) transformations in consumption, labor, and energy. While climate change's far-reaching implications remain peripheral to the discipline at large, sociologists studying these trends increasingly understand the crisis as a central problem for the study of social life. We show how sociologists can shed light on core problems emerging from and contributing to the crisis, and also reveal the conditions that make necessary social and cultural transformations more likely. Throughout, we illuminate how sociology can help chart a path out of the climate crisis by identifying alternatives to the high-carbon, low-equity social structures that organize the modern world. Finally, we identify possibilities for scholars who do not see themselves as “environmental sociologists” to contribute meaningful research on the climate crisis, and we encourage them to do so while we can make a difference.

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## INTRODUCTION

What would it mean for sociology to take seriously the fact that the Earth and the seas and the global climate are changing dramatically, that billions of people can already feel the heat rising and the land eroding beneath their feet? We are about to find out, because—if even conservative scientific projections of climate change are right—sociologists born this decade will get their degrees on a planet warmer, wetter, and more unstable than the one we inhabit today. Students, policy makers, and scholars in a number of disciplines will feel an urgent need to make sense of the social causes and consequences of the climate crisis, and an even more powerful compulsion to change things. A number of sociologists feel this urgency now, but climate change's far-reaching implications remain puzzlingly peripheral to the discipline at large (Leichenko & O'Brien 2019, Liu & Szasz 2019).

This article reviews research on a selection of trends brought on by climate crisis—compounding and cumulative disasters; infrastructural breakdown and adaptation; intensifying migration and shifting patterns of settlement; and transformations in consumption, labor, and energy—that traverse multiple sociological subfields. We show how sociology sheds light on core problems emerging from, and contributing to, the crisis, and also how it reveals the conditions that make much-needed social and cultural transformations more likely. Throughout this review, we use the term climate crisis rather than climate change to reflect a terminology that more accurately captures the condition of urgency and danger engendered by a heated world (Carrington 2019). The crisis is intellectual as well. It speaks to the perilous state of our discipline in the face of a warming climate, as our slowness to engage pressing socioecological concerns heightens the disconnect among sociology and students, fellow scientists, policy makers, and the planetary conditions we collectively face.

Sociology has hardly ignored the environment. Foundational thinkers including Weber, Durkheim, and especially Marx created “a rich body of material on environmental issues” (Foster 1999, p. 367). In the twentieth century, however, scholars selectively appropriated this research to build a specifically social science that rejected prevailing physical, ecological, or biological explanations of human phenomena. By the 1970s, sociologists had responded to the marginalization of environmental factors by once again incorporating ideas about the relationship between nature and society (Catton & Dunlap 1978)—a focus of continued import in research on topics such as urban greening (Wachsmuth & Angelo 2018, Angelo 2019), human–animal relations (Jerolmack 2013, Grazian 2017, Bargheer 2018), and the valuing of nature (Fourcade 2011, Farrell 2017). Interest in environmental social movements (Vasi et al. 2015, McAdam 2017) and environmental justice (Pellow & Brulle 2005, Taylor 2014) has since given rise to a healthy subfield of research, albeit one still subordinate to other concerns. The eclipse of the Holocene, the 10,000-year period of climate stability leading up to the rise of the Anthropocene, in which human activity has transformed the climate and redefined geologic time, upends this disciplinary balance. Today the world is transformed, and sociology should be as well.

Almost a decade ago, the American Sociological Association (ASA) convened a task force to synthesize the disciplinary scholarship on climate change. The project aimed to promote the insights sociology had contributed to climate change research, a field dominated by physical scientists and the disciplines of economics and psychology. The resulting volume (Dunlap & Brulle 2015), with contributions from 37 environmental sociologists, represented the first comprehensive stocktaking of sociological research on climate change. The book summarized social causes of climate change, including the patterning of carbon emissions, the role of market organizations (e.g., fossil fuel corporations), and consumption; social consequences of global warming, such as the social distribution of impacts, vulnerability, and adaptation; and the sociopolitical actors and processes



crucial to societal recognition of climate change and efforts to respond (social movements, public opinion, and denial).

In keeping with the ideas that motivated the ASA book, as well as a companion article by Dietz et al. (2020) in this volume, we aim to illustrate how findings and theories from sociology could open new possibilities in scientific fields, policy debates, and planning efforts that show little sociological imagination today. Our primary project, however, is to encourage sociologists who do not focus on the environment to critically assess their subfields in light of climate-linked trends and identify connections between a changing climate and the social structures and processes that interest them, thereby making visible social research relevant to climate change that is otherwise misrecognized. In so doing, we follow Elliott (2018) in arguing that sociology would benefit from a greater focus on the myriad facets of the climate crisis, and we encourage sociologists to bring climate concerns into subfields that have been slow to engage thus far.

A distinct environmental sociology makes little sense in a climate-changed world. We now know that burning fossil fuels for power and development—from large-scale industrialization and industrial agriculture to urbanization and expanded consumption—has transformed the underlying conditions for all life on Earth. The modern energy system is deeply integrated into our social systems, shaping the routines and practices of people worldwide. For generations, the benefits of these systems appeared to outweigh the costs of the polluting carbon they emit. But in recent years the cumulative toll of greenhouse gases has begun to destabilize the social environment. As of summer 2019, the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere is roughly 415 ppm, the highest in all of human history—the highest, in fact, in the past three million years (Willeit et al. 2019). Without stringent restrictions on emissions and widespread adoption of renewable energy, it should reach 500 ppm by 2050, or sooner—significantly higher than that required to raise surface temperatures by more than 2°C and threaten the ecological systems that sustain human societies (and most living species) across the planet.

Few sociologists at the turn of the twenty-first century recognized the significance of mounting evidence that Earth was experiencing a warming trend, punctuated by bursts of unusually damaging weather. In recent years, growing scientific consensus about the human causes and likely effects of climate change has sparked interest in social research on global warming. Scholars are raising important but difficult questions about how citizens, states, and civic organizations can reduce emissions and pressure fossil fuel firms to do so before we reach a global tipping point, and launching exciting new research on the intersection between climate movements and more traditional social movements; on cognition and the cultural meanings of global warming; on climate denial and climate activism; on humans' collective responsibility to endangered species; on social concerns related to large-scale climate engineering projects; and on the evolving meaning of environmental justice in a violent, divided, and unequal world. Space constraints preclude a complete survey of scholarship in all of these areas, and we direct readers interested in these themes to the abovementioned volume, *Climate Change and Society* (Dunlap & Brulle 2015), which synthesizes much of this research. Together, its findings point to a future in which nearly all social action will be recognized as climate action, and all manner of subfields will grapple with climate concerns.

From the beginning of the discipline in the nineteenth century, leading figures studied the most urgent and consequential issues of the time and place: labor, industrialization, class, cities, communities, ethnicity, families, and population change. A century later, these topics remain essential, and it is partly because of global warming's entanglement with them that the state of the climate stands out among emerging issues. Here we highlight promising new research areas; identify insights, findings, and questions that chart a path forward in an unstable climate; and explain how sociology can help illuminate ways out of the crisis.



## EXTREME EVENTS, INFRASTRUCTURE, AND ADAPTATION

Sociology has a long tradition of analyzing weather-related disasters and uncovering their social causes and consequences by conducting research that illuminates human-made sources of vulnerability or patterns of harm, whether at the individual, group, neighborhood, or national level. The fundamental sociological move is to show that everyday inequalities—around race, gender, age, neighborhoods, and nations, among others—determine who lives, who dies, or who suffers disproportionately. Other social conditions, including the density of social networks and capacity to command government services, often play pivotal roles as well. Tierney's (2007) review argued for an understanding of disasters as enmeshed with core sociological concerns, such as social inequality and gender. In the context of climate crisis, her urging for disaster research to move "from the margins to the mainstream" becomes ever more critical and, perhaps, unavoidable. For decades, sociologists have demonstrated that there is no such thing as a natural disaster—a task that is now easier, since a core feature of the Anthropocene is that weather is unnatural. This section discusses sociological research on extreme events and disasters in relation to climate change, with particular attention to how such events can inform more equitable housing, community, infrastructure rebuilding, and resilience efforts. At the same time, we show how attempts to render communities more resilient can act as key moments for observing whether and how patterns of social vulnerability will be reproduced as disasters become understood and experienced as routine rather than exceptional occurrences.

In 2017, a US territory located in one of the world's most ecologically exposed and historically exploited regions, the Caribbean, experienced the kind of catastrophic hurricane that threatens to form more often in the new, changed climate. Maria, arriving just two weeks after Hurricane Irma took out electricity for half the island's population, devastated Puerto Rico. The Category 5 hurricane shredded the communications infrastructure, polluted or cut off the supply of potable water, and caused a complete loss of power in all of the island's municipalities, many of which did not get service restored for 11 months. It severely damaged or destroyed nearly 800,000 housing units, leading at least 150,000 people to migrate off of the island. It tore apart roads and transit systems, generating shortages of food and fuel and causing at least \$43 billion in damage. It disrupted care in the island's 69 hospitals and caused as many as 4,645 excess deaths (Kishore et al. 2018, Santos-Burgoa et al. 2018, Gov. P. R. 2019).

A conventional sociological account would identify the many forms of everyday vulnerability and acute political neglect that made Maria so much deadlier than it might have been. It would highlight how inequalities, within both the United States and Puerto Rico, helped determine which people and places suffered most. A political sociology would address issues including whether and how the federal government mounted a relief program and how funds allocated for rebuilding compared with funds allocated to states with comparable disaster experiences. Early social science research on the disaster shows how mortality from Maria spread unequally across the island, with the most severe impact in poor districts (Santos-Burgoa et al. 2018), and how past and ongoing economic, social, and political crises are implicated in the ensuing devastation (Bonilla & LeBrón 2019). Journalistic reporting has documented shortcomings in the federal disaster response during the immediate event and afterward, when repairing vital infrastructure could have saved lives.

Research on the social challenges of climate change opens up new ways of seeing extreme events, as sociologists interested in disasters discover objects of analysis, including infrastructure, previously excluded from the field. Consider another disaster, the 1995 Chicago heat wave, which one of the authors of this review has studied (Klinenberg 2002). Infrastructure figures into Klinenberg's account of the heat wave merely as background. In setting up his "social autopsy," Klinenberg notes that Chicago's power grid was unable to withstand surging demand



for electricity from residents and businesses reliant on air conditioners to cool down, leading to sustained blackouts. He also reports that some neighborhoods lost water pressure due to widespread use of fire hydrants for public cooling, that problems with melting train rails and bridge plates contributed to traffic backups and delays in ambulance service, and that the city lacked a system for centralizing knowledge about which emergency rooms had filled and which had space for new patients as the heat wave progressed. Contemporary sociologists—along with anthropologists, political scientists, and geographers—have since developed tools for unearthing infrastructure and placing it at the foreground of our analytic work (Star 1999, Freudenburg et al. 2009, Graham 2010, Larkin 2013). Infrastructure shapes countless features of social life: where and in what kinds of spaces we live; how (and how far or frequently) we circulate; which systems we use to communicate (Castells 1996); what we eat and drink; how we generate and access water and electricity; whether and how we withstand extreme weather; and, of course, the extent to which we advance or lessen global warming (Bakke 2016).

One study of water scarcity in Maria's wake (Oxfam 2018), for example, hints at what we can learn from examining how infrastructure breakdowns are refracted by the social structures and cultural practices that interest sociologists but are often ignored in climate policy debates. As power generation and distribution came to a halt across Puerto Rico, so did water-treatment facilities and wastewater infrastructure. Women bore the brunt of these impacts, because on average Puerto Rican women spend far more time than men on cleaning, cooking, and household water management. When the supply was disrupted, women were left in charge of securing, allocating, and conserving available water. They reported elevated rates of health problems related to the shortage, including persistent pain from carrying water, fatigue, skin problems, and illnesses related to cleaning and consuming contaminated water. Observers reported that the water crisis increased depression, anxiety, and stress related to the aftermath of the hurricane. These problems were overdetermined, not unlike the climate vulnerability of the Caribbean more broadly (Sealey-Huggins 2017).

Social infrastructure also influences outcomes during disasters, partly because it affects the formation of social capital in everyday life. Recent sociological studies demonstrate the significance of social capital and social cohesion in disaster resilience and recovery (Aldrich & Meyer 2015, AP-NORC 2015, Cagney et al. 2016, Aldrich 2019). Whereas classic accounts of social capital formation largely attribute bonds and cohesion to cultural preferences and practices of particular groups (Putnam 2000), the theory of social infrastructure proposes that some variation in social capital is attributable to the quality of physical places and organizations at the neighborhood level (Klinenberg 2018). Accessible gathering places, including branch libraries, community gardens and parks, playgrounds, religious and nonprofit organizations, and certain commercial establishments (such as diners, cafes, barbershops, and salons), foster interaction. By contrast, empty lots, neglected parks, and abandoned properties generate stress and anxiety (Branas et al. 2011) and discourage people from lingering or socializing in public space. These conditions affect health and well-being on a daily basis. During disasters, they can make the difference between life and death.

Urban sociologists have long played a leading role in debates about how neighborhood-level conditions influence local labor markets, crime, social cohesion, group formation, health, and collective action (Sampson et al. 1997, Sharkey 2008, Wilson 2012). Climate change introduces new questions for scholars interested in urban inequality. Environmental justice, a concept that once referred mainly to unequal exposure to industrial pollution and its attendant health risks, is increasingly applied to unequal vulnerability to climate threats, at both the global and local levels. Globally, a cruel fact about climate change is that those nations most responsible for emitting greenhouse gases are best positioned to protect themselves, at least in the short term, whereas nations with the lowest carbon footprint generally possess few resources to do so (Roberts &



Parks 2006, Ciplet et al. 2015, Harlan et al. 2015). Locally, a similar pattern holds. In US cities, for instance, poor neighborhoods are typically more exposed to heat waves and more prone to catastrophic flooding, and their residents are more likely to experience morbidity and mortality during extreme events (de Sherbinin & Bardy 2015).

As societies anticipate climate change's worsening effects, sociologists have also begun to examine how practices of prediction and knowledge production shape understanding of extreme events and spur particular forms of response. Klinenberg's (2002) account of the Chicago heat wave begins with forecasts of an unusual weather system, yet neither the social process of forecasting nor the social production of the lethal heat gets analytic attention. Recent work on meteorologists (Fine 2009, Daipha 2015) and the problem of preparedness (Lakoff 2017) suggests that Klinenberg could have productively extended his research into the social world of prediction. The findings might have illuminated a number of issues whose significance sociologists recognize today, including the question of how meteorologists and journalists writing about weather think about the relationship among climate, health, and society; translate their predictions into the language of policy and public health; and frame extreme events, as Norgaard (2011) examined regarding local media coverage of unusual weather in Norway. [For instance, are such events presented as aberrations, natural disasters, acts of God, or expressions of a new pattern or new (ab)normal?] What systems of knowledge production (in scientific institutions and media organizations) and social interactions determine these forecasts and forms of communication? Under what conditions do they change, and to what extent do they influence public opinion? Psychologists and political scientists pursue these questions (Jasanoff 2010, Kahan et al. 2012); a greater focus on how we come to anticipate and imbue climate change and associated disasters with meaning would push more sociologists to address them too.

The policy and planning tool that cities and nations use to promote climate security in the face of anticipated threats is called adaptation (Pelling 2010, Klinenberg 2012, Carmin et al. 2015). Evidence suggests that well-designed adaptation projects, from sea walls and stormwater storage basins to green roofs and urban parks, can reduce ecological vulnerability, at least until the glaciers melt and sea-level rise overwhelms any imaginable defense. It is widely accepted that adaptation measures are ever more necessary for sustaining dense settlements in coastal and heat-prone regions, but what constitutes adaptation is hotly debated. Recent catastrophes in Europe, where between 35,000 and 70,000 people died in the three-week heat wave of 2003, and the United States, where hurricanes have inundated cities and towns along the coasts, reveal that the severity of climate threats extends beyond the world's most socially vulnerable places. As wealthy nations invest in adaptation, it can exacerbate environmental injustice and inequality. Adaptation projects are particularly urgent in areas whose habitability is already imperiled by sea-level rise and persistent drought—environmental conditions exacerbated, in some instances, by the very interventions labeled adaptations (Paprocki 2018)—but many of these places, including the Maldives, Bangladesh, and settlements around the Sahel desert, lack the resources they need to respond. Neither the hard-won Paris Agreement nor any other international climate treaty contains sufficient aid to compensate (UN Environ. Programme 2018). Where resources are available, social scientists document how interventions can have unintended consequences such as negatively affecting or displacing poor residents. Emerging research asks who benefits from adaptation and how resilience relates to equity and justice (Anguelovski et al. 2016, Gould & Lewis 2018, DuPuis & Greenberg 2019).

If Maria's widespread destruction of Puerto Rico's homes demonstrated once again how extreme events make visible the marks of long-term social vulnerability, debates over how to rebuild the island and render it more resilient act as windows to observe whether and how patterns of vulnerability will be reproduced. The difficulty of everyday life after the hurricane pushed



thousands of families to flee, but Puerto Rico's depopulation and a lack of safe and affordable housing were problems long before the storm struck. Burdensome and expensive legal procedures for buying or building a house have made it difficult for low-income families to perform formal real estate transactions, leading people to build housing that was not compliant with building codes or was informal, unrecognized by the state. This has left many families with uncertain and insecure tenure over their land. Meanwhile, the housing vacancy rate is 18%, and vacant units increased as the island lost about 45,880 households while adding 115,197 housing units in the decade before Maria (Hinojosa & Meléndez 2018, Resil. P. R. Advis. Comm. 2018). Careful sociological analysis of the postdisaster situation and the debate over rebuilding, repairing, and formalizing the housing stock can help untangle this paradox, among others, while revealing processes that contribute to reproducing vulnerability and inequality on the island, with lessons applicable to other disasters.

Those who chose to stay in Puerto Rico, or were unable to leave, face decisions about whether to rebuild their homes stronger for the next storm or move out of harm's way and return exposed areas to the rising sea. In many cases, people find that their agency is limited, and more powerful others ultimately decide. Both options, hunkering down and letting go, are part of the repertoire of ongoing government recovery plans for this and other recent disasters (Gov. P. R. 2019), but the notion of retreat provokes strong reactions: "Dead is the only way they will ever get me to leave," a man whose roof blew off his home told reporters (Kimmelman & Gregory 2019). As destruction from extreme events compounds, dilemmas about whether to stay or leave are surfacing with greater frequency, raising a host of questions that resonate with long-standing sociological concerns about how people move and settle.

## **MIGRATION AND SETTLEMENT**

Climate science and social science point unequivocally to a shrinking terrain of habitability in its present form (IPCC 2014, 2019; Sassen 2016; US Glob. Change Res. Program 2018). More frequent and severe disasters, declining crop yields, rising temperatures, saltwater intrusion, tidal floods, and melting permafrost are just some of the ways an increasingly unstable climate system is felt in everyday life. Yet even as physical science fundamentals are resolved, uncertainty remains about the shifts in human movement and settlement likely to result. This section synthesizes research on a set of urgent new questions that could form the heart of environmental and climate justice research over the coming century: In the face of escalating crises, who will receive protection to remain in place? Who will be forced to move? At what point will communities start wanting to retreat, and which will be able to do so on their own terms?

Headlines abound suggesting that societies are on the verge of seeing mass numbers of climate migrants and environmental refugees, but empirical research shows the complex and variable role of environmental factors in migration patterns and decision making. Environmental change can suppress movement as well as amplify it, or have little to no impact (Abel et al. 2019, p. 240; for thorough reviews, see Hunter et al. 2015 and Adger et al. 2014, pp. 769–70). As Zickgraf (2018, p. 72) writes, "the only consensus regarding climate change's effect on human migration is that there is no consensus." Sociological research plays a key role in rejecting the resurgent environmental determinism that posits simple cause-and-effect relationships between climate crisis and human movement, with one major focus of inquiry centered on refining predicted patterns of movement under different climate scenarios and various slow- and sudden-onset hazards. In other words (Hunter et al. 2015, p. 384), "rather than asking whether drought causes migration, for example, researchers are beginning to ask, In what combinations of contexts does drought increase or decrease migration? What are the key micro-, meso-, and macroscale interactions that predict migration-environment associations?" Answers to these questions reveal human movement



in the context of climate change to be as multifaceted and multicausal as migration more generally, shaped by existing lines of social difference, political and economic systems, cultural practices, social networks, technology, and numerous other factors.

Still, the accelerating rate of effects such as sea-level rise points to the likelihood of a strengthening “climate signal” in human movement (Burkett 2018, p. 463). Hauer et al. (2016, p. 691) found that more than 13 million people on US coasts risk inundation from sea-level rise before 2100, meaning “that the absence of protective measures could lead to US population movements of a magnitude similar to the twentieth century Great Migration of southern African-Americans” (see also Curtis & Schneider 2011, Curtis & Bergmans 2018). Bronen (2010) created the term “climigration” to underscore the necessity of wholesale community relocations being called for by some Indigenous villages in Alaska, where warming is occurring at a faster pace, already resulting in irreversible environmental change. However, despite government studies recognizing these sites’ imminent uninhabitability, planned relocation has yet to occur due to insufficient funding, inadequate governance frameworks, and policy mechanisms ill-equipped to facilitate collective movement away from hazards, especially in tribal contexts (Marino 2018). In the meantime, comparisons of local migration rates over time and with less-threatened villages have found, as yet, no evidence of an upward trend, but rather the opposite: faster population growth in the very places that are more at risk (Hamilton et al. 2016, p. 127).

Such trends are also apparent elsewhere in the United States. Housing construction in high-risk coastal flood zones outpaces that in less exposed areas (Clim. Cent. & Zillow 2019, Flavelle 2019). Even in places affected by recent hurricanes, one study found “a systemic pattern of ‘building back bigger,’” with residential footprints growing markedly in poststorm years (Lazarus et al. 2018, p. 759). Sociologists have theorized how and why places become growth-oriented “recovery machines” after disasters. Aid programs geared toward rebuilding property rather than restoring community combine with “a political mandate to (re)build bigger and better than ever as public testament to the resilience of the local spirit” (Pais & Elliott 2008, p. 1420). Yet, they show, the resulting growth is uneven. Historical systems of oppression, prestorm inequalities, and poststorm policies facilitate the recovery of whiter, wealthier homeowners, more powerful constituencies typically able to remain—and even enhance their property holdings—in dangerous yet desirable places (Collins 2010, Davis 2018). Marginalized groups, meanwhile, are subject to displacement as rents rise and aid proves insufficient or hard to come by (Pais & Elliott 2008, p. 1432).

The vast scale of population dislocation following Hurricane Katrina, in particular, spurred substantial sociological research into displacement (e.g., Weber & Peek 2012). Like forced relocation in other contexts, postdisaster displacement threatens dire consequences for those affected. Erikson’s (1976) classic study of a coal slurry flood in West Virginia found that residents were traumatized not only by the initial disaster but also by the relocation that followed. Families and neighbors were dispersed into temporary housing that became long term. People lost their sense of community and networks of social support as well as material possessions. Scholars such as Fullilove (2016) have documented the long-term individual and social costs of forced relocation due to urban renewal policies targeting predominantly Black neighborhoods for demolition to make way for new development—a history that contributed to fierce debates over post-Katrina proposals to shrink the footprint of New Orleans, proposals many residents viewed as urban renewal under the new guise of disaster recovery and resiliency planning. While a number of Katrina survivors did relocate to areas that were better off by various measures (Graif 2016), experiences of discrimination in these destinations contributed to the decision some made to return, regardless of gains in the new locale (Asad 2015).

Extending research on displacement beyond the aftermath of individual events, one study of patterns across the United States found that increases in local hazard damage over time



correspond with increased housing instability, particularly for Black women and Latinas (Elliott & Howell 2017). While residential mobility does not necessarily equate to instability, Elliott & Howell (2017, p. 1203) note, “Generally we have assumed a direct connection, especially among less advantaged populations for whom increasing number of moves can become not just a consequence of vulnerability but also a cause.” They also acknowledge the converse: Immobility, or staying in place, can likewise be both a consequence and cause of vulnerability, as “some individuals and families can become simply too disadvantaged to move” while some “are *forced* to move. . . movement that results from having no other choice” (emphasis in original).

Recognition of the harmful consequences of forced displacement and involuntary immobility, along with repeat experiences of extreme weather and anticipation of further climate change, is spurring interest in managed retreat, planned relocation out of the most at-risk areas before the next disaster strikes (Koslov 2016, Hino et al. 2017). While preemptive in aspiration, retreat in the United States primarily takes the form of postdisaster buyouts, funded largely by federal aid. After Hurricane Sandy, for instance, homeowners in select neighborhoods could opt to sell their damaged properties to New York State at prestorm value, on condition that the land would be permanently returned to natural open space, a buffer against future floods and storm surge. In some places, such as Staten Island, where one of the authors of this review conducted research, there was ardent demand and residents organized collectively to lobby for buyouts, with varying degrees of success. In other places, including other parts of New York City similar in many ways to these Staten Island neighborhoods, retreat was vehemently rejected—as it was by the city’s mayor and many local officials, despite state-level support. Questions arise about how threatened groups mobilize in the face of uncertainty, what factors make retreat more or less likely in a given place, and how the process and outcomes work to reshape or reproduce existing relations of power and inequality.

Like disasters, buyouts are widespread but typically analyzed on a case-by-case basis, leaving their broader patterns and implications unclear. Decision-making criteria such as cost–benefit analysis indicate that poorer communities may be more likely to be targeted for retreat while wealthier areas receive investments for protection in place (Siders 2019). However, research also suggests that managed retreat funding may favor those who possess the resources, organizing capacity, and relative privilege to access it, as was the case for the predominantly white, middle-class homeowners who pressed for buyouts in Staten Island. A sociological study of buyouts in Harris County, Texas, found evidence that payments for flood-prone homes were facilitating a new wave of white flight; an area’s racial succession from white to Hispanic in past decades was the strongest predictor of whether it later became the site of buyouts, which appeared to go disproportionately to non-Hispanic residents (Loughran et al. 2019).

In this way, federal aid distributed via buyouts may exacerbate the same inequalities compounded by disaster impacts and modes of response more generally (Gotham & Greenberg 2014). Nearly every US county has “experienced notable property damage from natural hazards” since 2000, with observable effects on forms of social stratification and widening wealth inequality—patterns and trends often studied without taking climate change, environmental injustice, or inequitable disaster recovery policies into account (Howell & Elliott 2019, p. 449). Howell & Elliott (2019) found that the average wealth of white residents increased in counties that received more aid from the Federal Emergency Management Agency (FEMA), while the average wealth of Black, Latinx, and Asian residents decreased. Residents with greater predisaster wealth, as well as homeowners and those with more educational credentials, similarly made larger gains in counties receiving more FEMA aid.

The short-distance, within-country moves already characteristic of disaster displacement, buyouts, and other resettlement programs are those most likely to intensify with climate crisis. Yet



there are also distinct features of climate change that present novel conditions. First, some places and regions confront looming and irreversible uninhabitability, rendering return impossible and raising thorny political, legal, social, and emotional questions of lost sovereignty and the loss of traditional lands and environments tied to cultural practices and lifeways (Norgaard et al. 2018). Second, nonhuman animal and plant species are moving too, attempting to keep pace with shifting habitats. Some species are dying off due to ecological destruction, while others are increasing their range, introducing vector-borne diseases to new locales, among other impacts. Third, no place will be completely unaffected by climate change and the movement of people in relation to its effects and societal responses. This sets the stage for new forms of collaboration and conflict as infrastructure is strained, movement away from one hazard augments risks of another, and retreat by those with most resources threatens “climate gentrification” of receiving communities, setting off further displacement far from initial sites of retreat (Hauer 2017, Keenan et al. 2018).

The presumption that certain people and places must inevitably retreat in the face of climate change tends to fall not on the wealthy and privileged but on the marginalized—from small island developing states (Farbotko 2010) to the rural poor in coastal Bangladesh, whose outmigration to urban areas is produced and justified through processes of “anticipatory ruination” that benefit environmentally and socially destructive industries (Paprocki 2018, 2019). As with migration generally, there are types of climate migrants whose movement is considered cost-beneficial or profitable and thereby adaptive, calculations that can conflict with people’s own experiences and understandings of risk. The growing concern for “trapped populations” (Gov. Off. Sci. 2011) tracks a broader shift in mainstream migration studies and among associated policy makers toward seeing human movement as a means of adaptation, rather than simply a failure to adapt. Scholars agree that some people and groups are as likely to become stuck in place with worsening climate change as they are to be uprooted and forced to resettle (Black et al. 2013), but debates persist over the possibility of identifying trapped populations in practice, in part because the term’s normative stance carries with it a top-down assessment of the benefits of movement that may not be shared by those so labeled (Ayeb-Karlsson et al. 2018, Zickgraf 2018).

Discourses of trapped populations do not typically engage the ample sociological scholarship on forcibly settled, segregated, and contained groups, for instance, people incarcerated in toxic prisons and immigrant detention centers (Pellow 2017, Pellow & Vazin 2019) and Indigenous peoples confined to reservations—a “strategy of containment [long] used by the US to facilitate the proliferation of extractive industries. . . the drivers of today’s ordeal with anthropogenic climate change” (Whyte 2016, p. 91). In these cases, movement and/as adaptation holds potential to undermine and transform, rather than facilitate, the dominant social and economic systems that contribute to environmental and climate injustice. Such examples underscore the extent to which climate change is not only a force and context for movement and settlement but also an effect of these patterns, partially produced by them and by associated shifts in land use, and sharing some common drivers.

At a key moment for theory, policy, and activism in this area, sociology has a pivotal role to play. Regardless of the difficulty of isolating a category of environmental or climate migrant, this category is very much in the process of formation; debates in legal and policy realms center on the possibility of protections for climate refugees or displaced persons, and what funding and governance frameworks for managing climate-linked resettlement might look like. Sociologists are well placed to analyze these classificatory struggles, as constructivist approaches to the refugee category have done (FitzGerald & Arar 2018, p. 391), and to examine how people are making sense of their own experiences, and organizing collectively, in relation to emergent categories and policies, as Elliott (2017, 2019) documented for “flood zone homeowners” fighting reforms of the



National Flood Insurance Program. With technologies of border militarization, surveillance, and tracking being marketed and construed as forms of “armed lifeboat”-style adaptation (Parenti 2011) to protect against the so-called floods and waves of climate migrants envisioned in both progressive environmentalist and xenophobic discourses, so too are coalitions organizing at the intersection of immigrant and climate justice, with recent calls to include freedom of movement as part of a Green New Deal that grapples with the United States’ historic contributions to the emissions driving displacement worldwide (Miller 2019).

## **CONSUMPTION, LABOR, AND LANDSCAPES OF ENERGY TRANSFORMATION**

As emerging ideas for a Green New Deal make clear, climate change has given the sociology of consumption a new challenge. Consumer capitalism, with its reliance on carbon-intensive systems and imperative to grow, created and habituated certain human behaviors that are difficult to change (Clark & York 2005, Elliott 2018). As the climate consequences of consumer capitalism’s “insatiable appetite for natural resources” (Beck 2010) become undeniable [see Dietz et al. (2020) in this volume for a detailed review of sociological research on the drivers of climate change], this section examines how sociologists have sought to answer the salient questions: How and under what conditions do individuals and groups alter their levels and forms of consumption to reduce carbon emissions and mitigate climate change? How do the institutional contexts and cultural meanings of consumption change, revealing new opportunities for individual and collective action? In answering these questions, sociologists have also discovered cases of failure: efforts whose promises to lower carbon footprints through transformed social or economic practices, such as sharing economy firms, have not come to pass and may even increase environmental harms.

A key insight from the sociology of consumption in the past two decades has been that the majority of consumption is “undertaken to accomplish everyday life” (Gronow & Warde 2001; Warde 2005, 2015). This notion has generated interest in how normalized everyday practices come to exist, persist, or disappear. In this context, understanding behavior changes to reduce emissions and mitigate climate change goes beyond studying the motivating factors behind “green” or “sustainable” lifestyles, individuals’ choices, or the connection between climate concern and consumer actions. Framing consumption as a social practice foregrounds processes of “recruitment and defection” (Shove 2010) into and out of carbon-intensive practices, such as driving or eating meat. Here, a combination of institutional contexts, including government policies, and cultural meanings reveal or obscure lines of action that go beyond attempts to alter individual beliefs.

Where scholars once focused primarily on individual consumers, they are now paying closer attention to the dynamics and opportunities of collective consumption. The variation between these two approaches hinges on the distinction between the terms consumer and consumption (Warde 2015). When the object of study is the consumer, researchers tend to focus on the process of market exchange and the role of the individual. For instance, studies analyzing “green” consumers typically interview or observe individuals to understand how their personal values, objectives, experiences, and circumstances shape what they buy or use, and then situate those accounts in an institutional context (Connolly & Prothero 2008, Elliott 2013, Warde 2015). Such scholarship analyzes the presumed causal connection between attitudes and behavior to understand how people make choices about what to consume. Given this framing, this body of scholarship sought to reveal determinants of consumer behavior, as a precursor to influencing that behavior (D’Souza et al. 2007, Finisterra do Paço et al. 2009, Young et al. 2010, Elliott 2013).

Individual consumer behaviors do help determine carbon emissions in the case of energy-intensive practices such as home heating or cooling (Shove et al. 2012, Steg 2016). Household



actions such as buying and using efficient water heaters or fuel-efficient vehicles, among others, could, together, reduce overall US emissions by around 7%. This is significant, especially considering that households accounted for 38% of total US CO<sub>2</sub> emissions in 2005, and personal travel accounted for 22% of emissions in 2017 (Dietz et al. 2009, Univ. Mich. 2018).

Recent sociological scholarship, however, challenges the individualist assumptions of previous research by asking where individual consumer choices end and social practices begin, thereby raising questions about consumer agency or lack thereof. Scholars such as Elliott (2018) have noted how the most carbon-intensive consumer domains of housing, transportation, and food (Dietz et al. 2009) blur the lines between individual and collective social behavior. Patterns of mobility, eating, home heating and cooling, or washing are also not fully explained by the framing of individual choice or the green consumer as a stable category (Willis & Schor 2012, Ehrhardt-Martinez et al. 2015). The new role of the sociology of consumption, then, has been to analyze a “socially conditioned actor, a social self, embedded in normative and institutional contexts, and considered bearers of practices” (Warde 2015, p. 129, quoted in Elliott 2018, p. 325). These contexts become landscapes for potential transformation that results less from motivating green consumers than from generating institutional possibilities for new behavior and altered meanings of social practices.

Common to empirical studies along these lines is the notion that defecting from high-carbon social practices is not necessarily tied to personal sacrifice or austerity but can produce cobenefits: increased leisure time, fairer distribution of resources, and strengthened local trust between individuals and groups. Consider, for instance, shifting patterns of consumption related to how people work. The more people work, the more they earn, the more economies produce, and the more people buy and use, with significant consequences for the global climate (Schnaiberg 1980, Foster 1999, York et al. 2003, Clark & York 2005). As wealthy countries fail to decouple economic growth from emissions, some scholars have endorsed a rejection of growth-centric policy and discourse, instead advocating for stabilizing or even reducing GDP growth (Rockström et al. 2009). Working-time reduction has emerged as a key policy option to reduce emissions while protecting employment (Leete & Schor 1994, Knight et al. 2013). Across countries, the average number of working hours has a strong positive relationship with levels of carbon emissions (Fitzgerald et al. 2018). Proponents argue that reducing working time could have quality-of-life cobenefits, such as higher levels of subjective well-being and satisfaction, even with attendant reductions in income. In the meantime, we note that worsening climate change means that many jobs are becoming more dangerous, not least due to deadly heat (Public Citizen 2018).

One of the most significant social benefits of working-time reduction is the increase in leisure time (Fitzgerald et al. 2018). While time-rich households might engage in more ecologically intensive activities, such as far-away travel, historical investigations into the possibility of “low-carbon leisure” have shown how swapping work for leisure can give way to low-carbon forms of collective consumption for pleasure. Cohen (2014) defines low-carbon leisure as “indulging yearnings to escape, but without burning fossil fuels.” A historical case from France in the 1930s under the government of Prime Minister Léon Blum documents how workers gained the institutionalized right to a 40-hour workweek and two weeks of paid vacation. As the national government funded the construction of theaters and financed productions, labor unions joined in partnership, often subsidizing access to plays for their members. When the same government legislated two paid weeks off work, the subminister of leisure and sport mandated a 40% discount on train fares for once-a-year trips. Hundreds of thousands took advantage in 1936, and nearly two million did so the next year (Cohen 2014). These historical precedents show how changing institutional contexts, through national policy, can generate new possibilities for collective low-carbon consumption, without sacrificing pleasure.



Case studies from a number of industrialized countries demonstrate how individuals and groups have reorganized work and leisure to be less carbon intensive, more fairly distribute wealth and resources, and strengthen local trust—partly by promoting face-to-face interactions (Schor & White 2010). A key commonality among these cases is that breaking away from carbon-intensive practices came about through social movements that reconfigured local institutional and cultural contexts to support such a shift. Schor & Thompson (2014) argue that these local movements represent a new economic paradigm, called new economics, which places at its core the normative importance of fairer and more egalitarian social relations. Adherents commit to decentralize ownership and management of economic and ecological assets and broad distributions of skills—with the purpose of strengthening local trust and democracy. The concept of plenitude anchors the discourse on how people could live differently to pursue ecological balance, fairness, and community (Schor & White 2010). Working-time reduction is a central principle, emphasizing the freedom from the alienating labor relations of the present-day economy to pursue low-carbon leisure activities, while diversifying risk from an increasingly low-wage and precarious employment context (Schor 2005).

Some institutional and cultural shifts that promise to transform social practices and mitigate climate change can have no impact at all on carbon emissions or can even increase them. Empirical research on such failed attempts is as important as research on successes. The sharing economy, for instance, promised to reduce consumption by encouraging sharing or renting existing goods and services rather than producing new ones, but no evidence shows that consumption or emissions have declined as a result. In fact, some scholars suggest that these services induce demands leading to even higher emissions—for example, by encouraging far-away travel in the case of Airbnb, where lower costs for accommodation might be offset by flying longer distances to destinations (Schor & Attwood-Charles 2017). Promises of social benefits from the sharing economy have not delivered, either. Consider Airbnb, which said it would generate social opportunities for users but wound up promoting gentrification of low-income neighborhoods (Ladegaard 2018, Wachsmuth & Weisler 2018). It is instructive to contrast this outcome with burgeoning sociological research that explores how to reduce emissions and enhance urban sustainability by centering housing justice, collective consumption, and more “democratic ecologies” (Cohen 2019a,b; Rice et al. 2019).

Officials in postindustrial urban centers often boast that their cities have small carbon footprints due to their built density; extensive public transport networks; and knowledge-intensive, high-tech firms. This discourse obscures cities’ dependence on polluting activities elsewhere. In the case of high-tech firms, computers and smartphones produce global flows of electronic waste, and data centers holding information in the cloud account for 2% of global emissions, a share expected to triple in the next decade (Bawden 2016). The low-carbon footprints of dense settlements such as Manhattan and San Francisco can also be deceptive, as carbon accounting methods do not typically consider or measure consumption, with associated emission counts outsourced beyond city limits. Carbon counts attribute emissions resulting from in-city activities and power plants but tend not to incorporate the full life cycle of emissions for all goods and services consumed, or emissions resulting from air travel (Wachsmuth et al. 2016, Rice et al. 2019).

If and when societies rapidly decarbonize, rural landscapes will likely be transformed to harness wind and solar energy. How the transition takes place will be crucial, as renewable energy development holds potential either to imitate the extractive political and institutional patterns of coal, oil, and gas or to take a different trajectory altogether (Mitchell 2011). Howe & Boyer (2016) note that just as colonial and foreign corporate “extractivism” benefited wealthy actors and regions at others’ expense, so too there is a danger that “green capitalist” renewable energy initiatives will reproduce resource exploitation legitimized by the urgency of decarbonization. Drawing on fieldwork from a large-scale initiative to develop a wind energy project in Mexico’s



Oaxaca province, Howe & Boyer (2016) document how transition has failed to link sustainable energy to benefits for local populations. Large-scale renewable projects in southern Mexico have prioritized the interests of international investors and federal officials over cultural and environmental impacts. Meanwhile, renewable energy in the form of land-intensive strategies such as hydropower drives increasing displacement, and untested geoengineering initiatives threaten to do the same (Randell 2018). Renewable energy projects often follow extractive frameworks that defined colonialism and run the risk of producing backlash. Howe & Boyer (2016) document how local movements and alternative approaches can arise in response, describing efforts to create the first community-owned wind farm in Latin America. The lesson is that the renewable energy transition's success depends not only on technical and economic conditions for replacing carbon energy but also on whether new energy projects can be enacted more equitably, with greater social support and attention to local resource sovereignty.

There is no shortage of productive questions for those concerned with promoting social transformation in response to climate change by means of collective consumption. Sociologists could profitably revisit the question of how the 40-hour-or-more workweek became normalized, through institutions and policies as well as the enactment of religiously rooted moral orders and associated cultural significance of "hard work." They could also study how people have organized resistance to and defected from such practices. How, for example, are state policies and cultural meanings shifting to bring about the possibility of working-time reduction in places such as Germany? Outside the workplace, sociologists could examine questions about the normalization of inefficient air conditioning and other household appliances, or inefficient building construction that fails to insulate against increasingly frequent and deadly heat waves. Sidestepping "green" moralizing about consumer choices, sociologists have room to attend further to institutional contexts as the key sites for analysis and intervention.

## CONCLUSION

The climate crisis is decisively shaping contemporary social life and creating a new wave of social problems. Sociology will eventually incorporate socioecological concerns into its core fields—the only question is whether this will happen quickly enough for the discipline to remain relevant to students and fellow scientists, useful to policy makers, and interesting to those who want to understand life and death on our warming planet.

The climate crisis will not merely change sociology. Soon, perhaps sooner than most anticipate, it will transform the way we do social science. While basic research will continue to be driven by theoretical questions, the project of doing research for research's sake makes little sense in a full climate crisis, in which our species scrambles to sustain itself and other forms of life on Earth. Consider that as we write this article in the summer of 2019 in the privilege of overcooled offices, record-breaking temperatures are rippling across the world. Enormous swaths of Arctic tundra are on fire, releasing methane that accelerates the warming potential of CO<sub>2</sub>, while the melting of Greenland's vast ice sheets threatens to dramatically increase sea-level rise. If environmental impacts expected to come by midcentury are making themselves felt now, imagine what problems sociologists will be studying in 2050.

Housing and community are two themes that run throughout this review. During extreme events, homes are, for many, the front line of protective infrastructure. When homes fail to insulate from the heat, get battered and damaged, or wash away, bonds between people and their surrounding communities can determine how people survive and recover, as can the broader political economies of housing and longer histories of marginalization and disinvestment at the root of other societal crises. Furthermore, either after disasters or in the face of a slowly shrinking band



of human habitability, people must choose whether and how to relocate their homes, and how to maintain or recreate their communities or integrate into new ones should they be compelled to settle in new places away from particular hazards. Of course, people will not be able to choose the choices that will be available. The state, whether at the municipal, regional, or national level, will play a crucial role in shaping local options. Finally, how these actions translate into larger landscape transformations, and how people build, heat, and power their homes and organize their communities on an everyday basis, can strongly determine their carbon footprint. Here, again, the state will play a major role in shaping what happens.

Following the tradition of Olin-Wright's (2010) *Real Utopias* project, sociology could play a vital role in not only documenting problems that emerge in conjunction with climate crisis but also illuminating successes, showing how states and societies lower their carbon emissions, how experiences with disasters or social movements inform fairer and more equitable rebuilding and resilience efforts, or how communities gain agency over decisions about where and how to settle amid ecological change. Following more critical traditions, sociology could also interrogate frauds and failures, from the greenwashing campaigns of fossil fuel companies that use ecological language to legitimate carbon-intensive energy systems to sharing economy firms that promote their products with unfounded claims about their role in mitigating environmental harm. Whatever the method, whichever the theory, the sociology of climate change could help states and societies identify alternatives to the high-carbon, low-equity social structures that organize the modern world. If it does not, then we have failed.

Return to the early days of environmental sociology: The subfield arose in response to the discipline's perceived anthropocentrism; its original stated goal was to introduce biophysical or ecological variables into empirical social research (Dunlap 2002, Pellow & Brehm 2013). Much research published since has followed in this vein, and for four decades the mainstream of environmental sociology has analyzed the relationships between ecological variables (e.g., CO<sub>2</sub> emissions or air pollution) and social or economic outcomes (e.g., income, GDP, or health). This research, while often rigorous and crucial to uncover the coconstitution of nature and society, cannot alone generate solutions for the climate crisis, which demands new theorizing across the discipline and its subfields, many of which have insights to contribute but have yet to situate their work in the context of climate change. That is a loss not only for sociology but for everyone who cares about what happens in the crisis. That should be all of us, because everything is at stake.

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## LITERATURE CITED

Abel GJ, Brotrager M, Cuaresma JC, Muttarak R. 2019. Climate, conflict and forced migration. *Glob. Environ. Change* 54:239–49



- Adger WN, Pulhin JM, Barnett J, Dabelko GD, Hovelsrud GK, et al. 2014. Human security. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability*, Part A: *Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. CB Field, VR Barros, DJ Dokken, KJ Mach, MD Mastrandrea, et al., pp. 755–91. New York: Cambridge Univ. Press
- Aldrich DP. 2019. *Black Wave: How Networks and Governance Shaped Japan's 3/11 Disasters*. Chicago: Univ. Chicago Press
- Aldrich DP, Meyer MA. 2015. Social capital and community resilience. *Am. Behav. Sci.* 59(2):254–69
- Angelo H. 2019. Added value? Denaturalizing the “good” of urban greening. *Geogr. Compass* 13(8):e12459
- Anguelovski I, Shi L, Chu E, Gallagher D, Goh K, et al. 2016. Equity impacts of urban land use planning for climate adaptation: critical perspectives from the Global North and South. *J. Plan. Educ. Res.* 36(3):333–48
- AP-NORC (Assoc. Press–NORC Cent. Public Aff. Res.). 2015. *Two years after Superstorm Sandy: resilience in twelve neighborhoods*. Rep., AP-NORC, Chicago
- Asad AL. 2015. Contexts of reception, post-disaster migration, and socioeconomic mobility. *Popul. Environ.* 36(3):279–310
- Ayeb-Karlsson S, Smith CD, Kniveton D. 2018. A discursive review of the textual use of “trapped” in environmental migration studies: the conceptual birth and troubled teenage years of trapped populations. *Ambio* 47(5):557–73
- Bakke G. 2016. *The Grid: The Fraying Wires Between Americans and Our Energy Future*. London: Bloomsbury
- Bargheer S. 2018. *Moral Entanglements: Conserving Birds in Britain and Germany*. Chicago: Univ. Chicago Press
- Bawden T. 2016. Global warming: data centres to consume three times as much energy in next decade, experts warn. *Independent*, Jan. 23
- Beck U. 2010. Climate for change, or how to create a green modernity? *Theory Cult. Soc.* 27(2/3):254–66
- Black R, Arnell NW, Adger WN, Thomas D, Geddes A. 2013. Migration, immobility and displacement outcomes following extreme events. *Environ. Sci. Policy* 27:32–43
- Bonilla Y, LeBrón M, eds. 2019. *Aftershocks of Disaster: Puerto Rico Before and After the Storm*. London: Haymarket
- Branas CC, Cheney RA, MacDonald JM, Tam VW, Jackson TD, Ten Have TR. 2011. A difference-in-differences analysis of health, safety, and greening vacant urban space. *Am. J. Epidemiol.* 174(11):1296–306
- Bronen R. 2010. Forced migration of Alaskan indigenous communities due to climate change. In *Environment, Forced Migration and Social Vulnerability*, ed. T Affer, J Jäger, pp. 87–98. Berlin: Springer
- Burkett M. 2018. Behind the veil: climate migration, regime shift, and a new theory of justice. *Harv. Civ. Rights Civ. Lib. Law Rev.* 53:445–93
- Cagney KA, Sterrett D, Benz J, Tompson T. 2016. Social resources and community resilience in the wake of Superstorm Sandy. *PLOS ONE* 11(8):e0160824
- Carmin J, Tierney K, Chu E, Hunter LM, Roberts JM, Shi L. 2015. Adaptation to climate change. See Dunlap & Brulle 2015, pp. 164–98
- Carrington D. 2019. Why the *Guardian* is changing the language it uses about the environment. *Guardian*, May 17. <https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment>
- Castells M. 1996. *The Information Age: Economy, Society and Culture*. 3 vols. Oxford, UK: Blackwell
- Catton WR, Dunlap RE. 1978. Environmental sociology: a new paradigm. *Am. Sociol.* 13(1):41–49
- Ciplet D, Roberts JT, Khan MR. 2015. *Power in a Warming World: The New Global Politics of Climate Change and the Remaking of Environmental Inequality*. Cambridge, MA: MIT Press
- Clark B, York R. 2005. Carbon metabolism: global capitalism, climate change, and the biospheric rift. *Theory Soc.* 34(4):391–428
- Clim. Cent., Zillow. 2019. *Ocean at the door: new homes and the rising sea*. Res. Rep., Clim. Cent., Zillow, Princeton, NJ. <https://www.climatecentral.org/news/ocean-at-the-door-new-homes-in-harms-way-zillow-analysis-21953>
- Cohen DA. 2014. Seize the Hamptons. *Jacobin*, March 10. <https://jacobinmag.com/2014/10/seize-the-hamptons/>



- Cohen DA. 2019a. A Green New Deal for housing. *Jacobin*, Febr. 8. <https://jacobinmag.com/2019/02/green-new-deal-housing-ocasio-cortez-climate>
- Cohen DA. 2019b. Eco-apartheid is real. *The Nation*, July 26
- Collins TW. 2010. Marginalization, facilitation, and the production of unequal risk: the 2006 Paso Del Norte floods. *Antipode* 42(2):258–88
- Connolly J, Prothero A. 2008. Green consumption: life-politics, risk and contradictions. *J. Consum. Cult.* 8(1):117–45
- Curtis KJ, Bergmans RS. 2018. Estimating the population impacts of sea level rise. In *Routledge Handbook of Environmental Displacement and Migration*, ed. R McLeman, F Gemenne, pp 106–16. New York: Routledge
- Curtis KJ, Schneider A. 2011. Understanding the demographic implications of climate change: Estimates of localized population predictions under future scenarios of sea-level rise. *Popul. Environ.* 33(1):28–54
- Daipha P. 2015. *Masters of Uncertainty: Weather Forecasters and the Quest for Ground Truth*. Chicago: Univ. Chicago Press
- Davis M. 2018. The case for letting Malibu burn. *Longreads*, Dec. 4. <https://longreads.com/2018/12/04/the-case-for-letting-malibu-burn/>
- de Sherbinin A, Bardy G. 2015. Social vulnerability to floods in two coastal megacities: New York City and Mumbai. *Vienna Yearb. Popul. Res.* 13:131–65
- Dietz T, Gardner GT, Gilligan J, Stern PC, Vandenberg MP. 2009. Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *PNAS* 106(44):18452–56
- Dietz T, Shwom R, Whitley C. 2020. Sociology and the climate emergency. *Annu. Rev. Sociol.* 46:625–48
- D'Souza C, Taghian M, Khosla R. 2007. Examination of environmental beliefs and its impact on the influence of price, quality and demographic characteristics with respect to green purchase intention. *J. Target. Meas. Anal. Foreign Mark.* 15(2):69–78
- Dunlap RE. 2002. Environmental sociology: a personal perspective on its first quarter century. *Organ. Environ.* 15(1):10–29
- Dunlap RE, Brulle RJ, eds. 2015. *Climate Change and Society: Sociological Perspectives*. Oxford, UK: Oxford Univ. Press
- DuPuis EM, Greenberg M. 2019. The right to the resilient city: progressive politics and the green growth machine in New York City. *J. Environ. Stud. Sci.* 9(3):352–63
- Ehrhardt-Martinez K, Schor JB, Arahmase W, Alkon AH, Axsen J, et al. 2015. Consumption and climate change. See Dunlap & Brulle 2015, pp. 93–126
- Elliott JR, Howell L. 2017. Beyond disasters: a longitudinal analysis of natural hazards' unequal impacts on residential instability. *Soc. Forces* 95(3):1181–207
- Elliott R. 2013. The taste for green: the possibilities and dynamics of status differentiation through 'green' consumption. *Poetics* 41(3):294–322
- Elliott R. 2017. Who pays for the next wave? The American welfare state and responsibility for flood risk. *Politics Soc.* 45(3):415–40
- Elliott R. 2018. The sociology of climate change as a sociology of loss. *Eur. J. Sociol.* 59(3):301–37
- Elliott R. 2019. "Scarier than another storm:" values at risk in the mapping and insuring of US floodplains. *Br. J. Sociol.* 70(3):1067–90
- Erikson KT. 1976. *Everything in Its Path*. New York: Simon & Schuster
- Farbotko C. 2010. Wishful sinking: disappearing islands, climate refugees and cosmopolitan experimentation. *Asia Pac. Viewp.* 51(1):47–60
- Farrell J. 2017. *The Battle for Yellowstone: Morality and the Sacred Roots of Environmental Conflict*. Princeton, NJ: Princeton Univ. Press
- Fine GA. 2009. *Authors of the Storm: Meteorologists and the Culture of Prediction*. Chicago: Univ. Chicago Press
- Finisterra do Paço AM, Raposo MLB, Filho WL. 2009. Identifying the green consumer: a segmentation study. *J. Target. Meas. Anal. Foreign Mark.* 17(1):17–25
- FitzGerald DS, Arar R. 2018. The sociology of refugee migration. *Annu. Rev. Sociol.* 44:387–406
- Fitzgerald JB, Schor JB, Jorgenson AK. 2018. Working hours and carbon dioxide emissions in the United States, 2007–2013. *Soc. Forces* 96(4):1851–74



- Flavelle C. 2019. Homes are being built the fastest in many flood-prone areas, study finds. *New York Times*, July 31
- Foster JB. 1999. Marx's theory of metabolic rift: classical foundations for environmental sociology. *Am. J. Sociol.* 105(2):366–405
- Fourcade M. 2011. Cents and sensibility: economic valuation and the nature of “nature.” *Am. J. Sociol.* 116(6):1721–77
- Freudenburg WR, Gramlin R, Laska S, Erikson KT. 2009. *Catastrophe in the Making: The Engineering of Katrina and the Disasters of Tomorrow*. Washington, DC: Island
- Fullilove MT. 2016. *Root Shock: How Tearing Up City Neighborhoods Hurts America, and What We Can Do About It*. New York: New Village
- Gotham KF, Greenberg M. 2014. *Crisis Cities: Disaster and Redevelopment in New York and New Orleans*. New York: Oxford Univ. Press
- Gould KA, Lewis TL. 2018. From green gentrification to resilience gentrification: an example from Brooklyn. *City Community* 17(1):12–15
- Gov. Off. Sci. 2011. *Migration and global environmental change: future challenges and opportunities*. Foresight Rep., Gov. Off. Sci., London
- Gov. P. R. 2019. *Puerto Rico disaster recovery action plan*. Action Plan Amend. 2, Gov. P. R., San Juan. <https://www.cdbg-dr.pr.gov/en/download/action-plan-amendment-2-non-substantial-amendment-effective-on-august-23-2019/?wpdmdl=4994&refresh=5e3b686c9be5f1580951660>
- Graham S. 2010. *Disrupted Cities: When Infrastructure Fails*. New York: Routledge
- Graif C. 2016. (Un)natural disaster: vulnerability, long-distance displacement, and the extended geography of neighborhood distress and attainment after Katrina. *Popul. Environ.* 37(3):288–318
- Grazian D. 2017. *American Zoo: A Sociological Safari*. Princeton, NJ: Princeton Univ. Press
- Gronow J, Warde A. 2001. *Ordinary Consumption*, Vol. 2. New York: Psychology
- Hamilton LC, Saito K, Loring PA, Lammers RB, Huntington HP. 2016. Climigration? Population and climate change in Arctic Alaska. *Popul. Environ.* 38(2):115–33
- Harlan SL, Pellow DN, Roberts JT, Bell SE, Holt WG, Nagel J. 2015. Climate justice and inequality. See Dunlap & Brulle 2015, pp. 127–63
- Hauer ME. 2017. Migration induced by sea-level rise could reshape the US population landscape. *Nat. Clim. Change* 7(5):321–25
- Hauer ME, Evans JM, Mishra DR. 2016. Millions projected to be at risk from sea-level rise in the continental United States. *Nat. Clim. Change* 6(7):691–95
- Hino M, Field CB, Mach KJ. 2017. Managed retreat as a response to natural hazard risk. *Nat. Clim. Change* 7(5):364–70
- Hinojosa J, Meléndez E. 2018. *The Housing Crisis in Puerto Rico and the Impact of Hurricane Maria*. New York: Cent. Estud. Puertorriq.
- Howe C, Boyer D. 2016. Aeolian extractivism and community wind in southern Mexico. *Public Cult.* 28(2):215–35
- Howell J, Elliott JR. 2019. Damages done: the longitudinal impacts of natural hazards on wealth inequality in the United States. *Soc. Probl.* 66(3):448–67
- Hunter LM, Luna JK, Norton RN. 2015. Environmental dimensions of migration. *Annu. Rev. Sociol.* 41:377–97
- IPCC (Intergov. Panel Clim. Change). 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability*. Geneva: IPCC
- IPCC (Intergov. Panel Clim. Change). 2019. *Global Warming of 1.5°C*. Geneva: IPCC. [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Full\\_Report\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf)
- Jasanoff S. 2010. A new climate for society. *Theory Cult. Soc.* 27(2/3):233–53
- Jerolmack C. 2013. *The Global Pigeon*. Chicago: Univ. Chicago Press
- Kahan DN, Peters E, Wittlin M, Slovic P, Ouellette LL, et al. 2012. The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nat. Clim. Change* 2(10):732–35
- Keenan JM, Hill T, Gumber A. 2018. Climate gentrification: from theory to empiricism in Miami-Dade County, Florida. *Environ. Res. Lett.* 13(5):054001



- Kimmelman M, Gregory C. 2019. Rebuilding a Puerto Rico barrio: 'Dead is the only way they'll ever get me to leave.' *New York Times*, Jan. 20
- Kishore N, Marqués D, Mahmud A, Kiang MV, Rodriguez I, et al. 2018. Mortality in Puerto Rico after Hurricane Maria. *N. Engl. J. Med.* 379:162–70
- Klinenberg E. 2002. *Heat Wave: A Social Autopsy of Disaster in Chicago*. Chicago: Univ. Chicago Press
- Klinenberg E. 2012. Adaptation. *New Yorker*, Dec. 31
- Klinenberg E. 2018. *Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life*. New York: Broadway
- Knight KW, Rosa EA, Schor JB. 2013. Could working less reduce pressures on the environment? A cross-national panel analysis of OECD countries, 1970–2007. *Glob. Environ. Change* 23(4):691–700
- Koslov L. 2016. The case for retreat. *Public Cult.* 28(79):359–87
- Ladegaard I. 2018. Hosting the comfortably exotic: cosmopolitan aspirations in the sharing economy. *Sociol. Rev.* 66(2):381–400
- Lakoff A. 2017. A fragile assemblage: mutant bird flu and the limits of risk assessment. *Soc. Stud. Sci.* 47(3):376–97
- Larkin B. 2013. The politics and poetics of infrastructure. *Annu. Rev. Anthropol.* 42:327–43
- Lazarus ED, Limber PW, Goldstein EB, Dodd R, Armstrong SB. 2018. Building back bigger in hurricane strike zones. *Nat. Sustain.* 1(12):759–62
- Leete L, Schor JB. 1994. Assessing the time-squeeze hypothesis: hours worked in the United States, 1969–89. *Ind. Relat. J. Econ. Soc.* 33(1):25–43
- Leichenko R, O'Brien K. 2019. *Climate and Society: Transforming the Future*. New York: Polity
- Liu JC, Szasz A. 2019. Now is the time to add more sociology of climate change to our introduction to sociology courses. *Teach. Sociol.* 47(4):273–83
- Loughran K, Elliott JR, Kennedy SW. 2019. Urban ecology in the time of climate change: Houston, flooding, and the case of federal buyouts. *Soc. Curr.* 6(2):121–40
- Marino E. 2018. Adaptation privilege and voluntary buyouts: perspectives on ethnocentrism in sea level rise relocation and retreat policies in the US. *Glob. Environ. Change* 49:10–13
- McAdam D. 2017. Social movement theory and the prospects for climate change activism in the United States. *Annu. Rev. Political Sci.* 20:189–208
- Miller T. 2019. Save the climate, dismantle the border apparatus. *Jacobin*, July 23. <https://jacobinmag.com/2019/07/green-new-deal-freedom-movement-borders>
- Mitchell T. 2011. *Carbon Democracy: Political Power in the Age of Oil*. London: Verso
- Norgaard K. 2011. *Living in Denial: Climate Change, Emotions, and Everyday Life*. Cambridge, MA: MIT Press
- Norgaard KM, Reed R, Bacon JM. 2018. How environmental decline restructures Indigenous gender practices: What happens to Karuk masculinity when there are no fish? *Soc. Race Ethn.* 4(1):98–113
- Olin-Wright E. 2010. *Envisioning Real Utopias*. London: Verso
- Oxfam. 2018. *The weight of water on women: the long wake of Hurricane María in Puerto Rico*. Rep., Oxfam Am., Boston
- Pais JF, Elliott JR. 2008. Places as recovery machines: vulnerability and neighborhood change after major hurricanes. *Soc. Forces* 86(4):1415–53
- Paprocki K. 2018. Threatening dystopias: development and adaptation regimes in Bangladesh. *Ann. Am. Assoc. Geogr.* 108(4):955–73
- Paprocki K. 2019. All that is solid melts into the bay: anticipatory ruination and climate change adaptation. *Antipode* 51(1):295–315
- Parenti C. 2011. *Tropic of Chaos: Climate Change and the New Geography of Violence*. New York: Bold Type
- Pelling M. 2010. *Adaptation to Climate Change: From Resilience to Transformation*. New York: Routledge
- Pellow DN. 2017. *What Is Critical Environmental Justice?* New York: Wiley
- Pellow DN, Brehm HN. 2013. An environmental sociology for the twenty-first century. *Annu. Rev. Sociol.* 39:229–50
- Pellow DN, Brulle R. 2005. *Power, Justice, and the Environment*. Cambridge, MA: MIT Press
- Pellow DN, Vazin J. 2019. The intersection of race, immigration status, and environmental justice. *Sustainability* 11(14):1–17



- Public Citizen. 2018. *Extreme heat and unprotected workers: Public Citizen petitions OSHA to protect the millions of workers who labor in dangerous temperatures*. Rep., Public Citizen, Washington, DC
- Putnam RD. 2000. Bowling alone: America's declining social capital. In *Culture and Politics*, ed. L Crothers, C Lockhart, pp. 223–34. Berlin: Springer
- Randell H. 2018. The strength of near and distant ties: social capital, environmental change, and migration in the Brazilian Amazon. *Sociol. Dev.* 4(4):394–416
- Resil. P. R. Advis. Comm. 2018. *ReImagina Puerto Rico: housing sector*. Rep., Resil. P. R. Advis. Comm., San Juan
- Rice JL, Cohen DA, Long J, Jurjevich JR. 2019. Contradictions of the climate-friendly city: new perspectives on eco-gentrification and housing justice. *Int. J. Urban Reg. Res.* 44(1):145–65
- Roberts JT, Parks B. 2006. *A Climate of Injustice: Global Inequality, North–South Politics, and Climate Policy*. Cambridge, MA: MIT Press
- Rockström J, Steffen W, Noone K, Persson Å, Chapin FS III, et al. 2009. A safe operating space for humanity. *Nature* 461(7263):472–75
- Sampson RJ, Raudenbush RW, Earls F. 1997. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science* 277(5328):918–24
- Santos-Burgoa C, Goldman A, Andrade E, Barrett N, Colon-Ramos U, et al. 2018. *Ascertainment of the estimated excess mortality from Hurricane Maria in Puerto Rico*. Proj. Rep., George Washington Univ., Washington, DC
- Sassen S. 2016. A massive loss of habitat: new drivers for migration. *Sociol. Dev.* 2(2):204–33
- Schnaiberg A. 1980. *The Environment: From Surplus to Scarcity*. Oxford, UK: Oxford Univ. Press
- Schor JB. 2005. Sustainable consumption and workingtime reduction. *J. Ind. Ecol.* 9(1/2):37–50
- Schor JB, Attwood-Charles W. 2017. The 'sharing' economy: labor, inequality, and social connection on for-profit platforms. *Sociol. Compass* 11(8):e12493
- Schor JB, Thompson CJ. 2014. *Sustainable Lifestyles and the Quest for Plenitude: Case Studies of the New Economy*. New Haven, CT: Yale Univ. Press
- Schor JB, White KE. 2010. *Plenitude: The New Economics of True Wealth*. New York: Penguin
- Sealey-Huggins L. 2017. '1.5°C to stay alive': climate change, imperialism and justice for the Caribbean. *Third World Q.* 38(11):2444–63
- Sharkey P. 2008. The intergenerational transmission of context. *Am. J. Sociol.* 113(4):931–69
- Shove E. 2010. Social theory and climate change. *Theory Cult. Soc.* 27(2/3):277–88
- Shove E, Pantzar M, Watson M. 2012. *The Dynamics of Social Practice: Everyday Life and How It Changes*. Thousand Oaks, CA: Sage
- Siders AR. 2019. Social justice implications of US managed retreat buyout programs. *Clim. Change* 152(2):239–57
- Star SL. 1999. The ethnography of infrastructure. *Am. Behav. Sci.* 43(3):377–91
- Steg L. 2016. Values, norms, and intrinsic motivation to act pro-environmentally. *Annu. Rev. Environ. Resour.* 41:277–92
- Taylor D. 2014. *Toxic Communities: Environmental Racism, Industrial Pollution, and Residential Mobility*. New York: NYU Press
- Tierney K. 2007. From the margins to the mainstream? Disaster research at the crossroads. *Annu. Rev. Sociol.* 33:503–25
- UN Environ. Programme. 2018. *The Adaptation Gap Report 2018*. Nairobi: UN Environ. Programme
- Univ. Mich. 2018. *Carbon footprint*. Factsheet, Cent. Sustain. Syst., Univ. Mich., Ann Arbor. <http://css.umich.edu/factsheets/carbon-footprint-factsheet>
- US Glob. Change Res. Program. 2018. *Fourth National Climate Assessment*, Vol. 2: *Impacts, Risks, and Adaptation in the United States*. Washington, DC: US Glob. Change Res. Program
- Vasi IB, Walker ET, Johnson JS, Tan HF. 2015. "No fracking way!" Documentary film, discursive opportunity, and local opposition against hydraulic fracturing in the United States, 2010 to 2013. *Am. Sociol. Rev.* 80(5):934–59
- Wachsmuth D, Angelo H. 2018. Green and gray: new ideologies of nature in urban sustainability policy. *Ann. Am. Assoc. Geogr.* 108(4):1038–56
- Wachsmuth D, Cohen DA, Angelo H. 2016. Expand the frontiers of urban sustainability. *Nat. News* 536(7617):391–93



- Wachsmuth D, Weisler A. 2018. Airbnb and the rent gap: gentrification through the sharing economy. *Environ. Plan. A* 50(6):1147–70
- Warde A. 2005. Consumption and theories of practice. *J. Consum. Cult.* 5(2):131–53
- Warde A. 2015. The sociology of consumption: its recent development. *Annu. Rev. Sociol.* 41(1):117–34
- Weber L, Peek LA. 2012. *Displaced: Life in the Katrina Diaspora*. Austin: Univ. Tex. Press
- Whyte KP. 2016. Is it colonial déjà vu? Indigenous peoples and climate injustice. In *Humanities for the Environment*, ed. J Adamson, M Davis, pp. 88–104. New York: Routledge
- Willeit M, Ganopolski A, Calov R, Brovkin V. 2019. Mid-Pleistocene transition in glacial cycles explained by declining CO<sub>2</sub> and regolith removal. *Sci. Adv.* 5(4):eaav7337
- Willis MM, Schor JB. 2012. Does changing a light bulb lead to changing the world? Political action and the conscious consumer. *Ann. Am. Acad. Political Soc. Sci.* 644(1):160–90
- Wilson WJ. 2012. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: Univ. Chicago Press
- York R, Rosa EA, Dietz T. 2003. Footprints on the Earth: the environmental consequences of modernity. *Am. Sociol. Rev.* 68(2):279–300
- Young W, Hwang K, McDonald S, Oates CJ. 2010. Sustainable consumption: green consumer behaviour when purchasing products. *Sustain. Dev.* 18(1):20–31
- Zickgraf C. 2018. Immobility. In *Routledge Handbook of Environmental Displacement and Migration*, ed. R McLeman, F Gemenne, pp. 71–84. New York: Routledge